Query Management Facility
Version 12 Release 2

QMF High Performance Option User's Guide for TSO and CICS

IBM

Query Management Facility
Version 12 Release 2

QMF High Performance Option User's Guide for TSO and CICS

IBM

Contents

About this information

This information describes how to install, configure, and use QMF™ High Performance Option Version 12.1.

Tip: For online delivery of this information, press PF1 from a panel. For detailed installation instructions, refer to the program directory on the SMP/E tape.

QMF High Performance Option (HPO) is a system utility used for generating, preparing, and running report programs for IBM® Db2® Query Management Facility™ for TSO and CICS®.

HPO combines HPO/Compiler and HPO/Manager into one suite of performance facilities for QMF for TSO and CICS. Using HPO/Compiler and HPO/Manager, you can improve resource usage:

- By tracking and identifying heavily used reports, and then automatically converting them into efficient COBOL programs, most reporting jobs for the enterprise can be greatly streamlined to reduce CPU resource consumption.
- By governing (preemptively and in real time) ad hoc and dynamic query and report activities, CPU resource usage can be precisely metered out at varying levels according to any number of schedules applied to QMF user groups.

Specific changes since the previous edition of this book are indicated by a vertical bar (|) to the left of a change. Editorial changes that have no technical significance are not noted.

Who should read this information

This information is intended for:

- End users, who run compiled report programs and provide runtime variables.
- Programmers, who convert QMF reports (queries, forms, and procedures) into compiled programs or who generate general purpose programs for accessing Db2.
- Administrators, who maintain control over QMF objects.

Service updates and support information

To find service updates and support information, including software fix packs, PTFs, Frequently Asked Questions (FAQs), technical notes, troubleshooting information, and downloads, refer to the following Web page:

http://www.ibm.com/software/data/qmf/support.html

Highlighting conventions

This information uses the following highlighting conventions:

- **Boldface** type indicates commands or user interface controls such as names of fields, folders, icons, or menu choices.
- `Monospace` type indicates examples of text that you enter exactly as shown.
- *Italic* indicates the titles of other publications or emphasis on significant terms. It is also used to indicate variables that you should replace with a value.

How to look up message explanations

You can use any of the following methods to search for messages and codes.

Searching an information center

In the search box that is located in the top left toolbar of any Eclipse help system, such as the IBM Information Management Software for z/OS® Solutions Information Center, enter the number of the message that you want to locate. For example, you can enter DFS1065A in the **search** field.

Use the following tips to help you improve your message searches:
- You can search for information on codes by entering the code; for example, enter -327.
- Enter the complete or partial message number. You can use wild cards in the message number to broaden your search; use * to represent multiple characters and use ? to represent any single character. For example:
  - The search string DFS20?I returns any messages that begin with the string DFS20, followed by any single character, followed by I.
  - The search string DFS20??I returns any messages that begin with the string DFS20, followed by any two characters, followed by I.
  - The search string DFS20*I returns any messages that begin with the string DFS20, followed by any number and type of characters, followed by I.

The information center contains the latest message information for all of the information management products that are included in the information center.

Using a Web search engine

You can use any of the popular search engines that are available on the Web to search for message explanations. When you type the specific message number or code into the search engine, you will be presented with links to the message information in IBM information centers.

How to send your comments

Your feedback is important in helping to provide the most accurate and high-quality information. If you have any comments about this book or any other QMF documentation, use either of the following options:
- Use the online reader comment form, which is located at:

  www.ibm.com/software/data/rcf/
- Send your comments by e-mail to comments@us.ibm.com. Be sure to include the name of the book, the part number of the book, the version of QMF, and, if applicable, the specific location of the text you are commenting on (for example, a page number or table number).

Chapter 1. Work with QMF HPO/Compiler

QMF HPO/Compiler includes the following system utilities for generating, preparing, and running report programs for IBM's Query Management Facility (QMF):

- Program Generator

  This facility is used by programmers to convert QMF reports (queries, forms, and procedures) into compiled programs, to automatically generate Db2 stored procedure programs from QMF queries and forms, or to generate general purpose application programs for accessing Db2. In addition, this facility can automatically register report programs with the End User Facility.

- End User Facility

  As report programs are generated and prepared for execution, they are automatically registered with the End User Facility. Once programs are registered, this facility is used by end users to run the compiled report programs. The non-technical user interface makes it easy to list, locate, and process reports.

  After selecting a report, the end user is prompted to supply any runtime variable values. If the report is to run in batch mode, JCL is automatically generated and optionally submitted. Otherwise, the interactive report is run online in the appropriate environment, TSO or CICS.

Issue the following TSO command to display the QMF HPO/Compiler Selection Menu:

```
CALL'QMFHPO.SRAALOAD(RAAMAIN)''M1'
```

The QMF HPO/Compiler Selection Menu is displayed. You can invoke each of the menu options using the one-character selection codes.

```
QMF HPO/Compiler -- Selection Menu ------------------------------------ 12.1.0
ENTER SELECTION ===>
                                          Db2 SSID ===> DB2P
                                          Location ===> DB2PLOCATION
                                          User ID:
                                          Date:
                                          Time:
 ------------------------------------------------------------------------------
 1  Program Generator
 2  End User Facility
 Q  QMF
 X  Exit
 ------------------------------------------------------------------------------
```

Figure 1. QMF HPO/Compiler Selection Menu panel

Chapter 2. Use the Program Generator

Program Generator is used by programmers to convert QMF reports (queries, forms, and procedures) into compiled programs, to automatically generate Db2 stored procedure programs from QMF queries or forms, or to generate general purpose application programs for accessing Db2. In addition, this facility can automatically register report programs with the End User Facility.

Using Program Generator you can:

- Generate programs

  Program Generator generates three basic types of programs: QMF report programs, stored procedure programs and data layer programs. The Generate Programs option guides you through the process of specifying and locating the input objects (queries, forms, and procedures), specifying options for the programs to be generated, and generating the programs. The generated programs are in Enterprise COBOL. This option provides hooks into other Program Generator options (Prepare Programs and Run Programs) to automatically perform additional functions on a program once it is generated. It also provides a mechanism to register generated programs for use with the End User Facility.

- Prepare programs

  Program Generator provides a convenient panel-driven interface to easily prepare Db2 programs, online or in batch. Preparing a program involves running a precompile, bind, CICS command translation (for CICS programs), compile, and link. The Compile Programs option is tailored to preparing the type of programs generated by the Generate Programs option, but it can be used to prepare Db2 programs from any other sources that fit the same model.

- Run programs

  The Run Programs option gives you the ability to run Db2 programs online and to tailor and submit JCL to run batch Db2 programs. The user specifies a program to run and its characteristics, and Program Generator automatically performs all of the work to run it.

- Maintain end user facility tables

  Program Generator provides an easy-to-use, panel-driven interface that allows you to maintain the information about the reports registered to the End User Facility. This option provides list, browse, create, drop, and edit functions for End User Facility reports (which are registered in Db2 tables).

Related concepts:

Related tasks:

Starting Program Generator

About this task

You can start this facility from a normal TSO/ISPF session or from a QMF session under TSO/ISPF. Starting from within a QMF session allows you to work with any current QUERY, FORM, or PROCEDURE object.

To start Program Generator from TSO/ISPF, select option 1 from the Compiler Selection menu. You can also invoke this facility by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO'
```

To start Program Generator from QMF, run the following QMF procedure:

```
TSO CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO'
```

Additionally, you can build a command synonym that runs this procedure so that users can access the procedure fully qualifying its name (see "Run programs" on page 45 for more information). A QMF command synonym named RCO is created during the standard installation process so that you can invoke this facility from QMF.

```
QMF HPO/Compiler -- Program Generator Selection Menu ----------------- 12.1.0
Option ===>

                                     Db2 SSID ===> DB2P
                                     Location ===> DB2PLOCATION
                                     User ID:
                                     Date:
                                     Time:
-----------------------------------------------------------------------------

1  Generate Programs (Full Dialog)
2  Generate Programs (Short Dialog)
3  Compile Programs
4  Run Programs
5  Maintain End User Facility Reports
D  Set Default Parameters
X  Exit
```

Figure 2. QMF HPO/Compiler Program Generator Selection Menu panel

Generate different types of programs

Using Program Generator you can generate three types of programs:

- QMF report programs

  At the simplest level, a QMF report is the result of issuing the QMF commands **RUN QUERY** and **PRINT REPORT**. A report program generated by this facility produces the same result, although there might be significant variations on a program's function (for example, it might also perform a **SAVE DATA** command). A query (or a query and form) is often referred to as a report. QMF procedures, which consist of a series of QMF commands, contain one or more reports. Program Generator can generate one program for each report in a procedure, and can also generate a single procedure (Proc) program that runs each of the report programs.

- Stored procedure programs

  A stored procedure program is a program stored at a Db2 server that can execute SQL statements and perform other functions. A client application, on

either the same machine or a remote machine, can invoke the program using the SQL statement CALL. There are many advantages to using stored procedures. You should consult the documentation provided with your licensed Db2 product for more information.

Note: Program Generator supports Db2 stored procedures that run in a WLM-managed address space only. Stored procedures that run in the Db2-managed stored procedure address space are not supported.

Program Generator generates stored procedure programs from QMF queries. Substitution variables used in an input query are converted to input parameters for the generated stored procedure. If the query is a SELECT statement, the result set returned by that SELECT statement can be returned as a result set from the stored procedure.

- Data layer programs

  A data layer program is a general utility program providing access to Db2 in order to retrieve data (via an SQL cursor or **SELECT INTO** statement) or to manipulate data (via an SQL **INSERT**, **UPDATE**, or **DELETE** statement). Data layer programs are generated from QMF queries, but do not provide any QMF-specific functionality, such as reports or procedure commands. Data Layer programs are intended to be called directly from other programs (rather than being invoked directly or via the SQL statement CALL), and they accept input variables and return output variables via the LINKAGE SECTION of the program.

Generate programs

The generation process proceeds in two phases. The first phase consists of specifying and then locating the input objects (queries, forms, and procedures). Locating the input objects consists of exporting them from QMF to specified data sets and members (or temporary data sets), or verifying that they exist outside of QMF. The goal of this phase is to produce a list of all reports specified in the input, along with the pertinent information about each (for example, query name, form name, or query data set and member). This list is referred to as the Report List.

The second phase consists of using the Report List to selectively operate on, and generate programs for, each report. Operations include reviewing the query (browsing or editing it); providing values for substitution variables in the query and form; and setting generation options for the program.

Related concepts:

"Working with substitution variables" on page 13

Related tasks:

"Generating programs with the full dialog panel" on page 6
Program generation is initiated from the Generate Programs (Full Dialog) panel.

"Confirming query and form locations" on page 7

"Confirming exports" on page 9
If the **Confirm Exports?** flag on the Set Default Parameters panel is set to Y, the Export Confirmation panel displays before any objects are exported.

"Using the Report List" on page 9

"Using the Single Report List panel" on page 11

"Reviewing the query before generation" on page 12

"Setting generation options" on page 17

Programs can also be generated using batch JCL. The batch JCL executes TSO (IKJEFT01) and issues the ISPSTART command to run the main program named RAAMAIN under ISPF. The input query, or query and form, are passed as parameters into RAAMAIN.

Generating programs with the full dialog panel

Program generation is initiated from the Generate Programs (Full Dialog) panel.

About this task

Note: You can also generate programs from the Generate Programs (Short Dialog) panel or from running a batch JCL job.

To start Program Generation from the Generate Programs (Full Dialog) panel, select option 1 from the Program Generator Menu to display the Generate Programs (Full Dialog) panel. This panel can also be reached by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO 1'
```

```
DB2P / DB2PLOCATION -- Generate Programs (Full Dialog) -------------- 12.1.0
Command ===>
Use % and _ as wildcard characters to produce a list of objects
Press ENTER to proceed to next panel.
Type CAN or CANCEL or press PF3 to end.

Generate programs from one of the following:
1. Query Name.... ===>

2. Query Name.... ===>
   Form Name..... ===>

3. Procedure Name ===>
```

Figure 3. Generate Programs (Full Dialog) panel

From the Generate Programs (Full Dialog) panel:

• If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel displays again with an error message. Otherwise, the program generation process begins.

• If you press **PF3**, all input fields are ignored and you return to the Program Generator Menu.

Before you can generate a program, you must identify the input source: a query, a query and form combination, or a linear procedure. If you choose a query or a query and form, a Report List with one report is produced. If you choose a query with no form, the same default form settings as QMF are assumed, and a form name of *DEFAULT is used. If you choose a procedure, the procedure is parsed, and a Report List is produced consisting of all reports specified in the procedure.

For Data layer programs you can enter either the name of a query or the name of a procedure that refers to queries. This is because Data layer programs are only used to provide access to data.

The fields on the panel are:

Query Name

Enter the name of a query from which to generate a program. If the name is unqualified, then the current SQLID is used as the query owner. You can enter the name QUERY to specify the current QMF query object. You can use a percent sign (%) or an underscore (_) as wildcard characters in the name to produce a list of queries from which to select.

Form Name

Enter the name of a form from which to generate a program (along with a query). If the name is unqualified, then the current SQLID is used as the form owner. You can enter the name FORM to specify the current QMF form object. You can use a percent sign (%) or an underscore (_) as wildcard characters in the name to produce a list of forms. Leave this field blank to generate a data layer program.

Procedure Name

Enter the name of a linear procedure from which to generate programs. If the name is unqualified, then the current SQLID is used as the procedure owner. You can enter the name PROC to specify the current QMF procedure object. You can use a percent sign (%) or an underscore (_) as wildcard characters in the name to produce a list of procedures from which to select.

Confirming query and form locations
About this task

After the input objects are specified, a list of the reports they specify is built that contains the name of the query and optional form for each. The next goal is to ensure that each object referenced exists (in exported format) in a data set and member. Objects that have not been exported (that is, they exist only in QMF) are automatically exported. Also, the existence in the specified data sets of all objects that have already been exported is verified at this time.

This step in the input specification phase is controlled from the Confirm Query/Form Locations panel. This panel lists the name and location of the query and form for each report for which you are generating a program. This panel displays only if the **Confirm Query/Form Locations?** flag on the Set Default Parameters panel is set to Y. If it is set to N, this panel is suppressed, and default values are used for all fields.

```
DB2P / DB2PLOCATION -- Confirm Query/Form Locations ---------------- 12.1.0
Command ===>                                         Scroll ===> PAGE

Set Export / Data set / Member fields for each report's query and form.
Press ENTER to proceed to the Report List panel.
Type CAN or CANCEL or press PF3 to cancel generation process at this time,


--------------------------------------------------------------------------------
Report
  Query: Export.. ===>   (Y=Yes, N=No)
         Data set ===>
         Member.. ===>
  Form:  Export.. ===>   (Y=Yes, N=No)
         Data set ===>
         Member.. ===>
 --------------------------------------------------------------------------------
***************************** Bottom of data ****************************
```

Figure 4. Confirm Query/Form Locations panel

When the Confirm Query/Form Locations panel is first displayed, the **Export**, **Data set**, and **Member** fields are filled in with values from the Set Default Parameters panel. However, if the input to the generation process was a procedure that contained IMPORT commands for any of the listed objects, the data sets and members referenced in those commands are used for the corresponding objects on this panel. You can change any of the fields for any of the objects listed by typing over the value.

From the Confirm Query/Form Location panel:
- If you press **Enter**, all input fields validate. If any errors are detected during input validation, the panel displays again with an error message. Otherwise, the program generation process proceeds with these location settings.
- If you press **PF3**, the program generation process stops and you return to the Generate Programs panel.
- If you press **PF7** or **PF8**, the panel scrolls backward or forward.

The following fields are listed for each input query and form. If there is no form specified for a particular report, then the input fields for that form are initially blank and are ignored.

Export Enter Y if this object currently resides in QMF and must export to the specified data set. Enter N if this object has been exported to the specified data set.

Data set
Enter the name of the data set into which this object must export (if the **Export** flag is set to Y) or which contains this object (if the **Export** flag is set to N). If the data set does not exist, the Allocate Data Set pop-up window displays, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field. If the **Export** flag is set to Y, you can enter the name *TEMP, to specify that a temporary data set must be created for the export.

Member
If the specified **Data set** is a PDS, you must enter the member into which this object must be exported or which already contains this object. If the specified **Data set** is not a PDS or is *TEMP, leave this field blank.

Confirming exports

If the **Confirm Exports?** flag on the Set Default Parameters panel is set to Y, the Export Confirmation panel displays before any objects are exported.

About this task

Two commands are issued by Program Generator when exporting a query. First, a **CONVERT** command is issued to ensure that the query is an SQL query (as opposed to a prompted or QBE query), and then an **EXPORT** command is issued. The CONVERT command converts the specified query and replaces the current query object with its SQL version. This current query is then exported.

Note: The CONVERT command resets the contents of the current query object.

On the Export Confirmation panel, the command displayed is the **effective** export command, not the commands which are actually issued. For example, if a query named QUERY1 is exported, the command as displayed on this panel is:

```
EXPORT QUERY QUERY1 TO ...
```

while the actual commands issued are:

```
CONVERT QUERY QUERY1 ...
EXPORT QUERY TO ...
```

```
DB2P / DB2PLOCATION -- Export Confirmation ---------------------- 12.1.0
Command ===>

Press ENTER to confirm this export command.
Type CAN or CANCEL or press PF3 to bypass this export command.


About to issue this EXPORT command to QMF:
------------------------------------------------------------------------


------------------------------------------------------------------------
```

Figure 5. Export Confirmation panel

From the Export Confirmation panel:
- If you press **Enter**, the export command is processed by QMF.
- If you press **PF3**, the export command is bypassed and the object that was being exported is assumed to exist in the specified data set and member.
- If you type NOCONF and press **Enter**, the export command proceeds, and the value of the **Confirm Exports?** flag on the Set Default Parameters panel is set to N. All subsequent exports proceed without confirmation.

Using the Report List
About this task

If you specified a linear procedure as input to the generation process:
- A list of queries and forms referenced in the input procedure is built. This list is called the Report List.
- The Report List confirms that the objects referenced in the reports exist in exported format in the data set specified for that object.

- Subsequent processing on the Report list is performed from the Report List panel.
- The Report List panel displays one row for each report in the Report List. Each row lists the query name, the form name, and a set of input fields that control the generation process for that report. The rest of the generation process is controlled from this panel, based on the settings of these input fields.

```
DB2P / DB2PLOCATION -- Report List ----------------------------------- 12.1.0
Command ===>                                              Scroll ===> PAGE
Set the action flags in each row.
Press ENTER to process the action flags.
Type CAN or CANCEL or press PF3 to end.

Browse Procedure? (Y/N)..... ===>
Generate Proc Program? (Y/N) ===>
                                                    Review Edit Generate
Num Query                     Form                  Query  Vars Program
--- ----------------------    ------------------------ ------ ---- --------

***************************** Bottom of data ******************************
```

Figure 6. Report List panel

From the Report List panel:
- If you press **Enter** (without entering a command), the action flags is processed. These flags determine which panels display next. The Report List panel is not displayed again until all of the flags have been processed, or until an error is encountered in processing the flags.
- If you press **PF3**, the action flags are ignored and you return to the Generate Programs panel.
- If you press **PF7** or **PF8**, the panel scrolls backward or forward.
- If you type NOCONF and press **Enter**, the value of the **Confirm Exports?** flag on the Set Default Parameters panel is set to N.
- If you type CONF and press **Enter**, the value of the **Confirm Exports?** flag on the Set Default Parameters panel is set to Y.
- If you type STOPQMF and press **Enter**, the QMF session that was started to issue export commands, terminates. This command has no effect when Program Generator was started from within a QMF session.
- If you type EDIT <num> and press **Enter**, where <num> is a valid report row number, you edit the previously generated program for that report row. If you type EDIT PROC and press **Enter**, you edit the previously generated procedure program.
- If you type REGISTER <num> and press **Enter**, where <num> is a valid report row number, you proceed to the Register Programs panel with initial values set for registering the program in that report row. If you type REGISTER PROC and press **Enter**, you proceed to the Register Programs panel with initial values set for registering the procedure program.
- If you type COMPILE <num> and press **Enter**, where <num> is a valid report row number, you proceed to the Compile Programs panel with initial values set for preparing the program in that report row. If you type COMPILE PROC and press **Enter**, you proceed to the Compile Programs panel with initial values set for preparing the procedure program. See "Prepare programs" on page 40 for information on the Compile Programs option.
- If you type RUN <num> and press **Enter**, where <num> is a valid report row number, you proceed to the Run Programs panel with initial values set for running the program in that report row.

- If you type RUN PROC and press **Enter**, you proceed to the Run Programs panel with initial values set for running the procedure program. See "Run programs" on page 45 for information on the Run Programs option.

The fields on the panel are:

Browse Procedure?
Enter Y to browse the input procedure. If you enter N, you do not browse the input procedure.

Generate Proc Program?
Enter Y to proceed to the Proc Program Generation Options panel to generate a program for the procedure. If you enter N, no action is taken. You must generate programs for each report in the procedure before you can generate the procedure (Proc) program.

Review Query
Enter B to browse the input query, E to edit the input query, or N to do neither.

Edit Vars
Enter Y to proceed to the Edit Variables panel. If you enter N, no action is taken.

Generate Program
Enter Y to proceed to the Generation Options panel, and to generate a program for this report. If you enter N, no action is taken.

Using the Single Report List panel
About this task

If you specified a query or a query and form combination as input to the generation process the following occurs:

- A list of queries and forms is built. This list is called the Single Report List.
- The Single Report List confirms that the query and (optional) form objects referenced exist in exported format in the data set specified for that object.
- Subsequent processing on this single entry is performed from the Single Report List panel.
- The Single Report List panel displays the same information for one report as the Report List panel displays in each row for each report in the Report List. The query name, form name, and three input flags that control the generation process for the report are listed. The rest of the generation process is controlled from this panel, based on the settings of these input flags.

```
DB2P / DB2PLOCATION -- Single Report List -------------------------- 12.1.0
Command ===>
Set the action flags.
Press ENTER to process the action flags.
Type CAN or CANCEL or press PF3 to end.
Query :
Form. :
1. Review Query?.... ===>    (B=Browse, E=Edit, N=None)
2. Edit Variables?.. ===>    (Y=Yes, N=No)
3. Generate Program? ===>    (Y=Yes, N=No)
```

Figure 7. Single Report List panel

From the Single Report List panel:

- If you press **Enter** (without entering a command), the action flags are processed. These flags determine which panels are displayed next. The Single Report List panel does not display again until all of the flags are processed, or until an error is encountered in processing the flags.
- If you press **PF3**, the action flags are ignored and you return to the Generate Programs panel.
- If you type NOCONF and press **Enter**, the value of the **Confirm Exports?** flag on the Set Default Parameters panel is set to N.
- If you type CONF and press **Enter**, the value of the **Confirm Exports?** flag on the Set Default Parameters panel is set to Y.
- If you type STOPQMF and press **Enter**, and if a QMF session has been started to issue export commands, the session is terminated. This command has no effect when Program Generator was started from within a QMF session.
- If you type EDIT 1 and press **Enter**, you edit the previously generated program.
- If you type REGISTER 1 and press **Enter**, you proceed to the Register Programs panel with initial values set for registering the program.
- If you type COMPILE 1 and press **Enter**, you proceed to the Compile Programs panel with initial values set for preparing the program.
- If you type RUN 1 and press **Enter**, you proceed to the Run Programs panel with initial values set for running the program.

The fields on the panel are:

Review Query?
Enter B to browse the input query, E to edit the input query, or N to do neither.

Edit Variables?
Enter Y to proceed to the Edit Variables panel. If this flag is set to N, no action is taken.

Generate Program?
Enter Y to proceed to the Generation Options panel, and to generate a program for this report. If this flag is set to N, no action is taken.

Reviewing the query before generation
About this task

You can browse or edit a query before generating a program by setting the **Review Query?** action flag to B or E, respectively, on the Report List panel.

```
BROWSE -- USER.APPL.QUERY(QUERY1) ------------------ LINE 00000000 COL 001 079
Command ===>                                                   Scroll ===> PAGE
****************************** Top of data *********************************


***************************** Bottom of data ******************************
```
Figure 8. Example of a browse session panel

If you press **PF3**, you exit from the browse or edit session. The next panel in the sequence displays.

Working with substitution variables

QMF queries can contain substitution variables. Before a query is run, QMF replaces each variable in the query with its value. If a variable does not have a value (that is, it is unbound) then the query cannot be run.

Variable bindings can be established through the SET GLOBAL and RUN QUERY commands. When using QMF in an online mode, a prompt panel is displayed whenever a query with unbound variables is run. The panel lists the unbound variables with a field in which you can enter its value. You cannot be prompted when running QMF in batch. Therefore, the values must be set through commands in the procedure that invokes the query.

Related tasks:

"Setting variable values"

"Using the Edit Variables panel" on page 15

Setting variable values
About this task

A variable can be replaced with a literal text string. Before the query with the variable is embedded in the generated program, the variable is replaced by the literal. For example, this query contains a variable named &VAR1:

```
SELECT &VAR1
  FROM HR.DEPT_TABLE
```

If &VAR1 is given the value NAME, then the query that will be embedded in the generated program is:

```
SELECT NAME
  FROM HR.DEPT_TABLE
```

In addition, QMF substitution variables can be replaced with host variables. Host variables can be used to receive values from Db2 or send values to Db2. For example, this query contains a host variable named: MAXDAYS in the WHERE clause:

```
SELECT NAME, DEPT
  FROM HR.DEPT_TABLE
 WHERE VACATION_DAYS > :MAXDAYS
```

If :MAXDAYS holds the value of 20 when this query is run, then the predicate will be evaluated as:

```
WHERE VACATION_DAYS > 20
```

A QMF substitution variable cannot always be replaced by a host variable. You can convert **some** QMF queries with variables into syntactically correct embedded SQL with host variables by substituting the variables with host variable names. However, it is possible to create a QMF query with variables that cannot be converted into embedded SQL by this substitution. For example, a QMF query can contain a variable in the FROM clause:

```
SELECT NAME, DEPT
  FROM &TAB
```

It is syntactically incorrect to code embedded SQL with a host variable in a FROM clause:

```
SELECT NAME, DEPT
  FROM :TAB
```

In a case like this, the &TAB variable must be replaced by a literal string, for example, HR.DEPT_TABLE.

When specifying a replacement value for a QMF substitution variable, a host variable is specified by entering a value that begins with a colon (:). Although host variables are not required to start with a colon in embedded SQL, that requirement is made for host variables generated here. A value that does not begin with a colon is processed as a literal string.

The following example shows a query that contains variables, binding values for those variables, and the resulting embedded SQL

Query with substitution variables:
```
SELECT NAME, &ASOFDATE, DEPT
      FROM &CREATOR.DEPT_TABLE
   WHERE VACATION_DAYS > &MAXDAYS
      AND JOB = &JOB
      AND STATUS = &STATUS
```

Table 1. Variable Binding Values

Variable Name	Value
&ASOFDATE	:TODAYS-DATE
&CREATOR	HR
&MAXDAYS	20
&JOB	'MGR'
&STATUS	:STATUS-IND

SQL embedded in a COBOL program:
```
EXEC SQL DECLARE C1 CURSOR FOR
   SELECT NAME, :TODAYS-DATE, DEPT
      FROM HR.DEPT_TABLE
   WHERE VACATION_DAYS > 20
      AND JOB = 'MGR'
      AND STATUS = :STATUS-IND
END-EXEC.
```

When you specify a host variable to replace a substitution variable, you can request that Program Generator automatically generate a host variable that is suitable for comparison with a specific database column. To do so, after the colon, enter an equal sign (=) followed by the name of the column. The name and data type of the host variable generates automatically to match the column.

Table 2. Example of automatically specifying host variable using an equal sign

Variable Name	Value
&INPUTID	:=Q.STAFF.ID
&INPUTNAME	:=Q.STAFF.NAME

You can also explicitly define the host variable name and data type. After the host variable's name, enter a space followed by its data type. For example:

Table 3. Example of explicitly defining the host variable and data type

Variable Name	Value
&ASOFDATE	:TODAYS-DATE DATE

Table 3. Example of explicitly defining the host variable and data type (continued)

Variable Name	Value
&STATUS	:STATUS-IND SMALLINT

Valid data types are:
- INTEGER
- SMALLINT
- FLOAT
- DECIMAL
- DECIMAL(p)
- DECIMAL(p,s)
- CHAR(n)
- VARCHAR(n)
- DATE
- TIME
- TIMESTAMP

When the program is generated, a definition of the appropriate type is included for each host variable. For example:

```
01  HOST-VARIABLES.
    03  TODAYS-DATE     PIC X(10).
    03  STATUS-IND      PIC S9(4) COMP.
```

Code to read a value for each host variable is also included in the generated program. For stored procedure programs, values are obtained from input parameters to the stored procedure, accessed via the program's LINKAGE SECTION. For data layer programs, values are also passed in from the calling application and accessed via the LINKAGE SECTION. For other types of programs that run in batch, values are obtained by reading the HOSTVARS or PROCVARS DD. Online programs display prompt panels to obtain values from the user.

Using the Edit Variables panel
About this task

When you set the **Edit Variables?** action flag to Y, the Edit Variables panel is displayed. This tabular panel contains three columns:
- substitution variable names
- values
- whether or not host variables from the second column must include an indicator variable to specify whether the host variable's value is NULL

Program Generator determines the default value for each variable by parsing the input query to determine if the variable is compared with a specific database column. If it is, the default value for that variable is an automatically-generated host variable for that column. Otherwise, the default value is a host variable with the same name as the original substitution variable. However, if the input to the generation process was a procedure, then the default setting for a variable is taken from a binding on the **RUN QUERY** command for that report. If there is no binding, the default setting is taken from any preceding **SET GLOBAL** command. If you do not provide appropriate values for each variable, you can encounter an

SQL error when you try to generate a program from the query.

```
 ╭──────────────────────────────────────────────────────────────────────────╮
 │ DB2P / DB2PLOCATION -- Edit Variables --------------------- Row 1 to 1 of 1 │
 │ Command ===>                                              Scroll ===> PAGE  │
 │                                                                            │
 │ Overtype variable values to change.                                        │
 │ Press ENTER to save variables values.                                      │
 │ Type CAN or CANCEL or press PF3 to leave values unchanged.                 │
 │ Variable Name     Literal Value or Host Variable and Data Type      Null   │
 │ ----------------  ---------------------------------------------------- ---- │
 │                                                                            │
 │ ***************************** Bottom of data ****************************** │
 ╰──────────────────────────────────────────────────────────────────────────╯
```

Figure 9. Edit Variables panel

From the Edit Variables panel:
- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel displays again with an error message. Otherwise, these variable settings are saved (and later used if you generate a program for this report).
- If you press **PF3**, all input fields are ignored and you proceed to the next panel. The previous variable settings will be restored.
- If you type ABORT and press **Enter**, all input fields are ignored and you return to the Report List panel. The previous variable settings are restored.

To replace variables with literals, enter a value in the following field:

Literal Value
Enter the literal value with which to replace this variable. The value can be up to 55 characters in length. It must not start with a colon (:). Leaving this field blank implies a value of a single space.

To replace variables with host variables, enter values in the following fields:

Host Variable and Data Type
Enter the host variable name, beginning with a colon (:).

To automatically define a host variable that is suitable for comparison with a specific database column, enter an equal sign (=) after the colon, followed by the table creator, table name, and column name.

For example, to create a host variable suitable for use with the ID column of the Q.STAFF table, enter:=Q.STAFF.ID. The name and data type of the host variable will be generated automatically. To explicitly specify the host variable name and data type, enter the name after the colon, followed by at least one space and then the data type. Valid data types are: SMALLINT, INTEGER, DECIMAL(p,s), DECIMAL(p), DECIMAL, FLOAT, CHAR(n), VARCHAR(n), DATE, TIME, and TIMESTAMP.

Note: If you are specifying a data type for a host variable that is the target in an SQL LIKE clause, you must specify VARCHAR(n) as the type rather than CHAR(n).

This is not a requirement of Program Generator; however, Db2's processing of a LIKE clause with a CHAR host variable is non-intuitive. Using the VARCHAR data type usually produces the desired results.

Null Enter Y to specify that an indicator variable must be included with the specified host variable. An indicator variable is an additional host variable with data type SMALLINT that indicates whether or not the value of the

primary host variable is NULL. If the indicator value is less than zero, the primary host variable value is NULL. Enter N to specify that an indicator variable is not required. For host variables used in the WHERE clause of an SQL statement, indicator variables are typically not required.

Note: For stored procedure programs, the ability to set the NULL value on input parameters is determined by the parameter style chosen when the program is generated. In this case, the NULL values entered on the Edit Variables panel are ignored.

Setting generation options
About this task

Before you generate a program, become familiar with the generation options. These options allow you to control the characteristics of the program that are generated. These options are set on the Generation Options panel. Each set of options has a corresponding pop-up window which is accessed from the Generation Options panel. These options can affect the speed and performance of the generated program.

Refer to "Generate different types of programs" on page 4 for more information about the types of programs that you can generate.

Note: When a SELECT statement is included in a multistatement query, two programs are generated. The main program processes all of the non-SELECT statements, and the SELECT Program processes the SELECT statement. The generation options panel varies slightly to allow for the two generated programs.

If you set the **Generate Program?** action flag to Y, the Generation Options panel is displayed.

```
DB2P / DB2PLOCATION -- Generation Options -------------------------- 12.1.0
Command ===>
Query :                           Form :
---------------------------------------------------------------------------
General Options...
Program/Plan Name ===>
Environment...... ===>    (B=Batch, T=TSO, C=CICS, S=Stored Procedure)
Program Type..... ===>    (P=Print, D=Display, N=No Report, L=Data Layer)

Enter "/" to set options below...
_ Db2 Options                    _ Data Processing Options
_ Report Options                 _ Host Variable Options
_ Data Layer Options             _ Stored Procedure Options
_ Miscellaneous Options

_
Write Source Code To...
Data Set ===>
Member.. ===>          (blank=Program/Plan Name)
```

Figure 10. Generation Options panel

```
DB2P / DB2PLOCATION -- Generation Options ------------------------- 12.1.0
Command ===>
Query :                          Form :
----------------------------------------------------------------------------
General Options...
Program/Plan Name ===>       SELECT Program Name ===>
Environment...... ===>    (B=Batch, T=TSO, C=CICS, S=Stored Procedure)
Program Type..... ===>    (P=Print, D=Display, N=No Report, L=Data Layer)

Enter "/" to set options below...
_ Db2 Options                        _ Data Processing Options
_ Report Options                     _ Host Variable Options
_ Data Layer Options                 _ Stored Procedure Options
_ Miscellaneous Options
_
Write Source Code To...
Data Set ===>
Member.. ===>         SELECT Member ===>              (blank=Program/Plan Name)
```

Figure 11. Generation Options panel for multistatement queries with SELECT

From the Generation Options panel:

- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel is displayed again with an error message. If no errors are detected, and options were selected, the pop-up windows displays for the selected options, then the panel displays again. If no options are selected, then the program generates with the specified options. After generation, the Actions After Generation pop-up window displays, allowing you to specify subsequent actions to take. If there is a processing error, you return to the Report List panel.
- If you press **PF3**, all input fields are ignored and you proceed to the next panel. No generation takes place.
- If you type ABORT and press **Enter**, all input fields are ignored and you return to the Report List panel. No generation takes place.

The following topics discuss the fields that you can set from the Generation Options panel.

Related tasks:

"Specifying the Generation Options panel fields"

"Specifying the Db2 options" on page 20

"Specifying the data processing options" on page 22
Enter / next to the **Data Processing Options** field on the Generation Options panel to display the Data Processing Options pop-up window, on which you can specify additional options related to how the program should read or manipulate data.

"Specifying the report options" on page 26

"Specifying the host variable options" on page 27

"Specifying the data layer options" on page 28

"Specifying the stored procedure options" on page 29

"Specifying the miscellaneous options" on page 31

"Specifying data set information for the generated program" on page 33

Specifying the Generation Options panel fields
About this task

The fields on the Generation Options panel that you can specify are:

Program/Plan Name

Enter the name of the program to generate. The name must conform to plan and program ID naming rules.

SELECT Program Name

Enter the name of the SELECT program to generate. The name must conform to the plan and program ID naming rules. This field is only applicable to multistatement queries with SELECT.

Environment

Select one of the following:

Note: This option must be set to B, T, or S for a non-SELECT query.

- **Batch programs**

  Enter B to generate a batch program. Batch report programs are straightforward. Data is read from an SQL cursor, formatted, and written to the REPORTnn DDs. Once all of the data is read, the report files are closed and the program ends. Data layer programs are always generated as if for the batch environment, but they can be called by programs running in the batch or TSO environments.

- **TSO programs**

  Enter T to generate an online TSO program. TSO report programs must be run under TSO and ISPF because they make calls to ISPF dialog manager services. You can generate two types of TSO programs:

  – Display programs allow you to browse the report, in most cases before all of the data is read (just like QMF). When you scroll forward, enough rows are fetched from the cursor to fill up the next panel of formatted report data. However, there are some reports (such as those that have print capability or those that use the **ACROSS** usage code) that require all of the data to be read before any of the formatted report can be displayed. In these cases, a prompt panel warns you that all of the data must be read, and you can cancel or continue the report.

  – Print programs are specialized programs that produce a printed version of a report being displayed by a display program. From a display program that has been generated with print capability, issuing the **PRINT** command invokes a corresponding print program that generates a printed report by writing to the RAAPRINT DD or by invoking GDDM services if a GDDM printer nickname is specified on the **PRINT** command.

- **CICS programs**

  Enter C to generate an online CICS program. CICS programs are pseudo-conversational. You can generate two types of CICS programs:

  – Display programs allow you to browse the report after the data is read from Db2 and the cursor is closed. The report data is browsed using the supplied BMS maps. The generated CICS program (not the BMS map) controls the scrolling through the report. Standard PF keys are used to scroll forward (PF8), backward (PF7), left (PF10), and right (PF11). In addition, full ISPF-like scrolling is supported with a command line and a scroll amount field.

  – CICS print programs perform a similar function as TSO print programs, but they write their output to a CICS data queue. The name of the print queue defaults to RAAP*nnnn*, where *nnnn* is the terminal ID, but you can override this name on the PRINT command.

- **Stored procedure programs**

  Enter S to generate a stored procedure program. Stored procedure programs run under the control of Db2 in response to a CALL statement executed by a client application. Stored procedure programs accept input parameter values, execute an SQL statement, and optionally return a result set (if the executed SQL statement was SELECT).

Program Type

The setting of the Program Type option determines the basic function of the generated program. Enter P if the generated program must print a report, D if it must display a report online, N if it must do neither, or L to generate a data layer program. This option must be set to:

- Specifying **P** for **PRINT** results in a program that formats a report for printed output. This type of report has regular page breaks, and includes a carriage control character as the first character of each line of the report. The QMF PRINT REPORT command generates this type of report.
- Specifying **D** for **DISPLAY** results in a program that formats a report and displays it online to the user. The QMF DISPLAY REPORT command generates this type of report.
- Specifying **N** for NO REPORT results in a program that does not print or display a report, but it retains additional QMF processing, such as SAVE DATA processing. This type of program can be used as a skeleton or model for other processing.
- Specifying **L** for DATA LAYER results in a program that executes an SQL statement, using input host variables values and returning output data (if any) via the LINKAGE SECTION. Data layer programs differ from the other program types because they cannot contain additional QMF processing.

This option must be set to:

- P, N, or L for a batch program.
- P, D, or N for a TSO or CICS program.
- N or P for a stored procedure program.

Notes:

1. TSO and CICS **PRINT** programs can be invoked only from a corresponding **DISPLAY** program, which is, a program for the same report, using the same host variables.
2. The options apply to programs that are generated from SELECT queries. If the input query is not a SELECT statement, there is no concept of a report, so the program type must be **N** or **L**.

Specifying the Db2 options
About this task

Enter / next to the **Db2 Options** field on the Generation Options panel to display the Db2 Options pop-up window on which you can specify additional options related to how the program must work with Db2.

Attachment Facility

Enter T to generate a program that uses the TSO attachment facility, C to generate a program that uses the call attachment facility (CAF), or R to generate a program that uses the RRS attachment facility (RRSAF). This

option must be `T` or `C` for a TSO program. This option must be `R` for a stored procedure program. This option is ignored for a CICS program.

Note: Programs that contain embedded SQL statements need to connect to Db2 before executing the statements.

- For batch programs, you can choose between the TSO attachment facility, the call attachment facility (CAF), and the RRS attachment facility (RRSAF).
- For TSO programs, you can choose between TSO and CAF (RRSAF is not supported by Db2 under TSO).

    Using the TSO attachment facility entails running TSO and executing the program via the DSN command processor. Under TSO, you supply the DSN commands needed to run the program and plan.

    CAF can be used as an alternate method for connecting to Db2. A program using CAF includes routines to call the various Db2 attachment routines. This method of connecting to Db2 allows you to directly execute the program, instead of via TSO. Using this method allows you to reduce startup and overhead costs.

    The interface to using RRSAF is similar to that for CAF, with the additional restriction that RRSAF is not supported with programs run online from a TSO session. Apart from this Db2 restriction, using RRSAF is very similar to using CAF.

- For CICS programs, there is no option, as CICS programs always use the CICS attachment facility to connect to Db2.
- For stored procedure programs, Db2 requires WLM-managed stored procedures to use RRSAF.

CAF Module Usage

Enter `D` to generate a program that uses the Db2 call attachment module (DSNALI) or `H` to generate a program that uses the HPO call attachment module (AACAF). This option is ignored if **Attachment Facility** is not `C`.

Notes:

1. DSNALI is a Db2-supplied module which must be link-edited with the generated program. Calls are made to it to establish a connection with Db2 and open the application plan.

2. AACAF (supplied as an alias of RAACAF in QMFHPO.SRAALOAD) is link-edited with the generated program. At runtime, AACAF dynamically loads the standard Db2 CAF module DSNALI. The primary advantage to using AACAF instead of using DSNALI is that, because DSNALI is dynamically loaded at runtime, you will not have to re-link the generated program if your Db2 version changes. If DSNALI is link-edited with the generated program, then you must re-link the program when DSNALI changes.

SQL Type

Enter `S` to generate a program that uses static SQL, or `D` to generate a program that uses dynamic SQL. This option must be `S` for a data layer program.

Notes:

1. Usually, static SQL is the preferred method because it uses less CPU time by the generated program. In some cases, you can use dynamic SQL. For example, programs that use dynamic SQL are able to work

with Information Builders' EDA/Dynamic Extender for Db2. Dynamic SQL also allows more flexibility in the SQL that is run. For example, unqualified SQL object names will be qualified by the `CURRENT SQLID` at runtime rather than by the `OWNER` or `QUALIFIER` bind parameters at bind time.

2. You can generate a program that uses static SQL by default, but uses dynamic SQL for SAVE DATA processing. To do this, enter `S` for SQL Type on the Db2 Options pop-up window and enter `D` for SQL Type on the Data Processing Options pop-up window.

3. In general, choose static SQL unless there is a specific need for the functionality of dynamic SQL.

DSNTIAR Calls
Enter `Y` to include static calls to the DSNTIAR routine in the generated program to retrieve SQL error message texts. Enter `N` to omit those calls, so that the generated program produce only SQL return codes (without message text).

If the DSNTIAR Calls option is set to `Y`, the generated program includes static calls to the standard Db2 DSNTIAR routine to retrieve formatted SQL error message text when SQL errors occur.

Note: If portability to other platforms is important, then these calls can be omitted. In this case, only SQL error codes are returned when SQL errors occur.

Multi-row FETCH
Use this field to specify whether multi-row processing occurs. Enter `Y` to take advantage of multi-row processing or `N` to specify data is fetched one row at a time. The default value is `N`. If this field is set to `Y`, use the **Number of Rows** field to specify the number of rows that are fetched.

If you enable multi-row FETCH processing, then SAVE DATA (if specified) uses multi-row INSERT processing with the same number of rows as specified for the FETCH.

Number of Rows
Use this field to specify the number of rows that are fetched if the **Multi-row FETCH** option is enabled. Enter an asterisk (*), or leave blank, to specify the default number of rows that are allowed to be fetched. You can also specify a specific number of rows to fetch.

If you enable multi-row FETCH processing, then SAVE DATA (if specified) uses multi-row INSERT processing with the same number of rows as specified in this field.

Specifying the data processing options

Enter / next to the **Data Processing Options** field on the Generation Options panel to display the Data Processing Options pop-up window, on which you can specify additional options related to how the program should read or manipulate data.

About this task

Save Data
You can generate programs with source code to emulate the operation of the **SAVE DATA** command of QMF. The data fetched by the program saves to the specified Db2 table. If the table does not exist, it is created. If the table exists, the generated program checks that the column layout of

the query's SELECT clause matches the table. If it does not, program execution terminates with an error. Otherwise, the existing data optionally deletes (depending on the ACTION parameter to the **SAVE DATA** command), and the new data inserts.

Enter Y to generate a program that saves retrieved data to a Db2 table, mimicking the QMF **SAVE DATA** command, and specify the table name in the **Table** field. You must set this option to N for a TSO or CICS print program. This option is disabled for a data layer program and for a non-SELECT query.

Notes:

1. If the input to the generation process was a procedure that contained a **SAVE DATA** command, then the options specified on the command displays as the default in the pop-up window.

2. If the **SAVE DATA** table name is unqualified, then it is qualified with the package or plan OWNER or QUALIFIER parameters specified at bind time (if using static SQL) or with the CURRENT SQLID of the user at runtime (if using dynamic SQL). It is possible to generate a program that uses static SQL for most of its processing, but to use dynamic SQL specifically for **SAVE DATA** processing. This allows the qualification of the **SAVE DATA** table name to be based on the runtime user, without forcing the rest of the program to use dynamic SQL.

3. Programs that perform the **SAVE DATA** operation incur additional overhead, because they contain DDL statements (to create the table) and DML statements (to delete existing data and insert new data). When binding the plan for such a program, VALIDATE(RUN) must be specified if the processing uses static SQL, rather than VALIDATE(BIND). In addition, the user running such a program must have permission to create, delete from, insert into, and comment on the target table.

4. TSO and CICS display programs that perform the **SAVE DATA** operation must read all of the data for the report from Db2 before displaying a report. This ensures that the data is saved before exiting the program. This also avoids Db2 holding locks while a user is browsing a report, potentially for a long time.

5. Data layer programs cannot include **SAVE DATA** functionality.

Table Enter the name of the table in which to save retrieved data. The specified table must not be referenced in the input query. If the name is unqualified, it is qualified by the package or plan OWNER or QUALIFIER parameter (if using static SQL) or by the CURRENT SQLID of the user at runtime (if using dynamic SQL). This option is ignored if the **Save Data** flag is N.

Table Space

Enter the name of the table space in which the SAVE DATA table must be created. Any text entered in this field is included in the IN clause of the CREATE TABLE statement used to create the table. The default value is the value of your QMF profile SPACE parameter. Alternatively, enter *USERPROF to indicate that the value of the SPACE parameter for the user at runtime must be dynamically retrieved and used. This option is ignored if the **Save Data** flag is N.

Action

Enter R to replace any existing data in the SAVE DATA table. Enter A to append to the table. Enter P to make this determination at runtime. For batch programs, a positional parameter can be passed in the PARM field to specify the disposition of existing data. For TSO programs, a panel is

displayed on which the user can choose the disposition. This parameter must be R or A for CICS programs. This option is ignored if the **Save Data** flag is N.

SQL Type

Enter S to generate a program that performs SAVE DATA processing using static SQL. Enter D to generate a program that performs SAVE DATA processing using dynamic SQL. This option must be D if the program uses dynamic SQL for all other SQL or if *USERPROF is specified in the **Table space** field. This option is ignored if the **Save Data** flag is N.

Erase Table(s)

Enter Y to generate a program that drops the specified Db2 table or tables at the end of its run, mimicking the QMF ERASE TABLE command. At the end of a successful run of the program, the specified table is dropped from Db2 by executing a DROP TABLE SQL statement. A table name must be specified in the **Table(s)** field.

Notes:

1. This option must be set to N for a TSO or CICS print program. This option is disabled for a data layer program and for a non-SELECT query.

2. This operation deletes data from the table and drops the table.

3. If the input to the generation process was a procedure that contained an ERASE TABLE command, then the table name specified displays as the default on the Data Processing Options pop-up window. If the procedure contained more than one **ERASE TABLE** command, then the string *MULTIPLE displays as the default on the window, and the field is protected. The names of the tables being dropped cannot be changed.

4. If the input was not a procedure or if it was a procedure that did not contain **ERASE TABLE** commands, you can build a program that performs an **ERASE TABLE** by manually specifying a table name on the Data Processing Options pop-up window. Only one table can be specified.

Table(s)

If the input to the generation process was a procedure that contained more than one **ERASE TABLE** command for this report, then this field contains the value *MULTIPLE, and is disabled. In this case, the names of the tables to be dropped cannot be changed. Otherwise, use this field to enter the name of a table to drop. This option is ignored if the **Erase Table(s)** flag is N.

Read Data from File

You can generate a program that reads data from a file instead of retrieving data from Db2. A query must be specified to generate the program. The query is used to determine the expected column layout of the input file. The program does not include SQL statements to retrieve data using the input query. Instead, it reads the input data from a DD named DATAIN. This option typically reads data from a sequential file that was written by another program generated with the **Write Data To File** option set to **yes**.

Enter Y to read data from the DD named DATAIN rather than from Db2. This option must be set to N for a CICS program. This option must be set to Y for a TSO print program. This option is disabled for a stored procedure or data layer program and for a non-SELECT query.

Notes:

1. Predicates specified in the input query (in its WHERE clause) will **not** be used when reading the data from a sequential file. To obtain the same effect as the SQL statement, the predicates must be manually added to the generated program.

2. TSO print programs are required to enable this option. These programs read data from the RAADATA DD that was written by their corresponding display programs.

3. Stored procedure and data layer programs cannot include **Read Data From File** functionality.

LRECL

Enter the LRECL to use for the DATAIN DD when the **Read Data from File** flag is Y. If this field is blank or contains an asterisk (*), the minimum LRECL dictated by the data will be used. This option is ignored if the **Read Data from File** flag is N.

Write Data to File

You can generate programs with source code to save data to a sequential file, instead of a Db2 table. This allows you to eliminate a significant amount of Db2 processing. All of the DDL and DML associated with saving data to Db2 tables is omitted from the program, which eliminates database locking contention. As with the **SAVE DATA** option, you can select this feature even if you are generating from a query or from a procedure with no **SAVE DATA** command.

Programs generated with this option write the fetched data to a DD named DATAOUT. Program Generator automatically calculates the minimum LRECL for this DD based on each selected column's length and indicator variable. If you want to specify a different LRECL, you can enter it in the **LRECL** field on the Data Processing Options pop-up window. If the **LRECL** field is left blank or contains an asterisk (*), the computed value is used. You can determine the LRECL that is actually used by looking at the generated program.

Enter Y to write retrieved data to the DD named DATAOUT. This is analogous to the SAVE DATA option to write data to a Db2 table. This option must be set to N for a CICS program. This option must be set to Y for a TSO display program if an online print program is specified. This option must be set to N for a TSO print program. This option is disabled for a stored procedure or data layer program and for a non-SELECT query.

Notes:

1. You can SAVE DATA to a table **and** to a sequential file in the same program. These options are not mutually exclusive.

2. TSO display programs that have the print capability are required to enable this option. In this case, the data is written to the RAADATA DD. The print program invoked by the display program then reads from the RAADATA DD to format and print its report. This eliminates the need for the print program to re-read the data from Db2.

3. Stored procedure and data layer programs cannot include **Write Data To File** functionality.

LRECL

Enter the LRECL to use for the DATAOUT DD when the **Write Data to**

File flag is `Y`. If this field is blank or contains an asterisk (*), the minimum LRECL dictated by the data is used. This option is ignored if the **Write Data to File** flag is `N`.

Specifying the report options

About this task

Enter / next to the **Report Options** field on the Generation Options panel to display the Report Options pop-up window, on which you can specify additional options about how the program should produce a report.

Note: The Report Width, Report Length, DATETIME, and PAGENO options are taken from any PRINT REPORT commands in an input procedure or (in the case of WIDTH and LENGTH) from the QMF profile. You can, however, override the values used for these options during the generation process.

Report Width
Enter the page width (from 22 to 999) to use when generating the report. This field is disabled for a non-print program and for a non-SELECT query.

Report Length
Enter the page length to use when generating the report. Length can be CONT, meaning the report should contain no page breaks, or from 1 to 999 lines. This field is disabled for a non-print program and for a non-SELECT query.

DATETIME
Enter `Y` to include the date and time in a printed report's page footing. Enter `N` to omit the date and time. This field is disabled for a non-print program and for a non-SELECT query.

Use Column Label
Enter `Y` to use column labels as the default column headings in the report. Enter `N` to use column names as the default column headings.

PAGENO
Enter `Y` to include the page number in a printed report's page footing. Enter `N` to omit the page number. This field is disabled for a non-print program and for a non-SELECT query.

Print Program Name
If this program is a TSO or CICS display program, then specify the name of the program that is invoked when a user enters the **PRINT** command from the display program. The program invoked must be an online print program for the same query and form, using the same host variables (if any). Leave this field blank for a batch program or a non-display program. This field is disabled for a non-SELECT query.

Notes:
1. Online print programs provide print functionality from TSO and CICS display programs. While viewing a report online, you can request a printed version of the report by entering the PRINT command. The display program (if it has been so enabled) invokes the online print program to print the report to the RAAPRINT DD or a GDDM printer (for TSO programs) or to a CICS temporary storage or transient data queue (for CICS programs).
2. For TSO programs, you can specify a GDDM printer nickname on the **PRINT** command; otherwise, the report is written to the RAAPRINT

DD. For CICS programs, you can specify the name and type of the desired queue on the **PRINT** command; otherwise, the report is written to a temporary storage queue named RAAP*nnnn*, where *nnnn* is the terminal ID.

3. For TSO programs, the syntax of the **PRINT** command is: PRINT (PRINTER=nickname where nickname is the name of a GDDM printer. The (PRINTER=nickname parameter is optional. If the nickname is omitted, the report is written to the RAAPRINT DD (which must be allocated before issuing the PRINT command).

4. For CICS programs, the syntax of the **PRINT** command is: PRINT queuename queuetype where queuename is the name of the CICS data queue (up to eight characters) used to contain the printed report and queuetype is the type of that queue (TS or TD). If queuetype is omitted, it defaults to TS. If queuename is omitted, it defaults to RAAP*nnnn*.

5. Follow these steps to achieve print functionality:

    a. Generate an online print program (a program with TSO or CICS for environment and print for report presentation type) with a particular name, such as Q1PRINT.

    b. Generate a TSO or CICS display program, such as Q1DISP.

    c. Fill in the **Print Program Name** field on the Report Options pop-up window with Q1PRINT, specifying Q1PRINT as the print program.

6. For CICS programs, PPT entries for the display and print programs must be defined to CICS.

Report DD Prefix

This option allows the user to specify a unique prefix for a printed report DD name. The unique prefix can be up to 6 characters. The default value for this prefix is REPORT. This option is used for batch and stored procedure programs.

Specifying the host variable options

About this task

Enter / next to the **Host Variable Options** field on the Generation Options panel to display the Host Variable Options pop-up window to specify additional options about how the program must use host variables.

Host Variable File LRECL

Batch programs that use host variables read values for those variables from the HOSTVARS DD. Enter the LRECL that must be used for the HOSTVARS DD at runtime. The default value is 80. You must set this field to 80 in order to subsequently register the program with the End User Facility.

Format

Host variable values in the HOSTVARS DD can be specified in columnar format, with one value per record, or in tabular format, with all the values on one record, separated by a delimiter character, which can be specified as part of the generation process.

More than one set of host variable values can be specified in the HOSTVARS DD. Batch programs that use host variables continues reading the HOSTVARS DD as long as variable values are available, producing multiple versions of the report for each set of variable values. If the values are specified in columnar format, the report is generated for each block of

records in the HOSTVARS DD that form a complete host variable set. If the values are specified in tabular format, the report is generated for each record in the HOSTVARS DD.

This option determines how host variable values are specified to the generated program. Enter `T` to specify the values on a single record separated by a specified delimiter character. Enter `C` to specify one value per record. You must set this field to `C` to subsequently register the program with the End User Facility.

Delimiter
Enter the character that is used to separate multiple host variable values on a single record. This field is only used when the **Format** flag is set to `T`.

Specifying the data layer options
About this task

Enter / next to the **Data Layer Options** field on the Generation Options panel to display the Data Layer Options pop-up window, on which you can specify additional options specific to data layer programs.

SELECT INTO
Enter `Y` to generate a program that uses the SQL statement **SELECT INTO** to retrieve a single row of data. Enter `N` to generate a program that uses the SQL statements `DECLARE CURSOR`, `OPEN`, `FETCH`, and `CLOSE` to retrieve multiple rows of data. This field is disabled for a non-SELECT query.

Host Variables Copybook Data Set
Enter the data set (which must be a PDS) to which a copybook containing working storage definitions of the host variables used by the program must be written. If the data set does not exist, the Allocate Data Set pop-up window is displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. You can leave this field blank to include the host variable definitions in the generated source code, rather than in a copybook.

Host Variables Copybook Member
Enter the member in the specified Host Variables Copybook Data Set to which a copybook containing working storage definitions of the host variables used by the program must be written. You can leave this field blank to include the host variable definitions in the generated source code, rather than in a copybook. Leave this field blank if the **Host Variables Copybook Data Set** field is blank.

Table Declarations Copybook Data Set
Enter the data set (which must be a PDS) to which a copybook containing the declarations of the tables referenced by the program (DCLGENs) must be written. If the data set does not exist, the Allocate Data Set pop-up window is displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. Leave this field blank to include the table declarations in the generated source code, rather than in a copybook.

Table Declarations Copybook Member
Enter the member in the specified Table Declarations Copybook Data Set to which a copybook containing the declarations of the tables referenced by the program (DCLGENs) must be written. Leave this field blank to include

the table declarations in the generated source code, rather than in a copybook. Leave this field blank if the **Table Declarations Copybook Data Set** field is blank.

Linkage Section Copybook Data Set
Enter the data set (which must be a PDS) to which a copybook containing the linkage section of the program must be written. If the data set does not exist, the Allocate Data Set pop-up window is displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. Leave this field blank to include the linkage section in the generated source code, rather than in a copybook.

Linkage Section Copybook Member
Enter the member in the specified Linkage Section Copybook Data Set to which a copybook containing the linkage section of the program must be written. Leave this field blank to include the linkage section in the generated source code, rather than in a copybook. Leave this field blank if the **Linkage Section Copybook Data Set** field is blank.

Specifying the stored procedure options
About this task

Enter / next to the **Stored Procedure Options** field on the Generation Options panel to display the Stored Procedure Options pop-up window, on which you can specify additional options for stored procedure programs.

Note: Many of the stored procedure options correspond directly to options on the Db2 SQL statement CREATE PROCEDURE. Consult the SQL Reference manual for the Db2 product you are using for more information on these options.

Procedure Name
Enter the name of the stored procedure to generate. This is the name that is specified in the CREATE PROCEDURE statement, and is the name by which client applications must CALL the generated program.

Return Data Result Set
Use this field to specify whether or not the data that the stored procedure retrieves from Db2 (if any) must be returned as a result set to the calling application. Enter Y to return the retrieved data or N to not return the data. This option is disabled for a non-SELECT query.

Return Report Result Set
Use this field to specify whether or not the data that the stored procedure retrieves from Db2 (if any) must be returned formatted as a report. Enter Y to return the result data formatted as a report or N to not return the result data set as a report. This option is disabled for a non-SELECT query.

Print Report
Use this field to specify whether or not the data that the stored procedure retrieves from Db2 (if any) must be retrieved, formatted as a report and printed. Enter Y to retrieve the data, format the report and print the report or N to not retrieve, format or print. This option is disabled for a non-SELECT query.

Diagnostic Parms
The generated stored procedure program automatically includes input parameter definitions for each of the host variables used by the query. You can optionally add output parameters to return general error message text

or SQL error message text. Enter 1 to add no additional diagnostic parameters, 2 to add a single output parameter for general error message text, or 3 to add output parameters for both general error message text and SQL error message text.

Parameter Style
> Enter D to use the DB2SQL parameter style in the generated program, G to use the GENERAL parameter style, or N to use the GENERAL WITH NULLS parameter style.

DBINFO
> Enter Y to include parameters in the generated program to receive environmental information when the procedure is invoked. You must specify N if the **Parameter Style** field is G or N.

WLM Environment
> Enter the WLM environment in which the stored procedure must execute. This parameter affects the generated CREATE PROCEDURE statement only.

Deterministic
> Enter Y to specify that the stored procedure is deterministic or N to specify that it is not. This parameter affects the generated CREATE PROCEDURE statement only.

Collection ID
> Enter the collection ID that is to be used when the stored procedure is executed. This parameter affects the CREATE PROCEDURE statement only.

ASU Time Limit
> Enter the total amount of processor time, in CPU service units, that a single invocation of the stored procedure can run. A value of 0 implies no limit. This parameter affects the CREATE PROCEDURE statement only.

Stay Resident
> Enter Y to specify that the stored procedure load module is to remain resident in memory when the stored procedure ends. This parameter affects the CREATE PROCEDURE statement only.

Run-time Options
> Enter the Language Environment® run-time options to be used for the stored procedure. This parameter affects the CREATE PROCEDURE statement only.

Program Type
> Enter M to specify that the stored procedure should run as a main routine or S to specify that it should run as a subroutine. This parameter affects the CREATE PROCEDURE statement only.

Security
> Select how the stored procedure must interact with security resources outside of Db2, Enter D to use the authorization ID of the stored procedure's address space, U to use the run-time authorization ID, or F to use the definer's (i.e., your) authorization ID. This parameter affects the CREATE PROCEDURE statement only.

Commit on Return
> Enter Y to specify that Db2 must commit the transaction immediately on return from the stored procedure. This parameter affects the CREATE PROCEDURE statement only.

Special Registers

Enter `D` to have special registers initialized to default values or `I` to inherit values from the calling environment. This parameter affects the CREATE PROCEDURE statement only.

Call on Null Input

Enter `Y` to specify that the stored procedure must be called even if any of its input parameters is null. This parameter affects the CREATE PROCEDURE statement only.

Specifying the miscellaneous options
About this task

Enter / next to the **Miscellaneous Options** field on the Generation Options panel to display the Miscellaneous Options pop-up window, on which you can specify additional miscellaneous options for the program.

HPO/Sort

Enter `Y` to replace an `ORDER BY` clause in the query with a COBOL internal sort. If you enter `N`, any `ORDER BY` clause is not replaced. This option must be set to `N` for a CICS program or a TSO print program. This option is not available for a stored procedure program, a data layer program, or a non-SELECT query.

Notes:

1. If the HPO/Sort option is specified, Program Generator automatically removes (by commenting out) any ORDER BY clause in the input query, and generates a program that invokes a COBOL internal sort. This feature can greatly reduce CPU time consumption, as an internal sort is typically more efficient than Db2 sorting. However, because Db2 can use indexes and clustering to effect a sort without actually sorting, use this option with caution. If you know that Db2 will invoke a sort to satisfy an ORDER BY clause, replacing it with an internal sort will usually reduce CPU usage.

2. This option causes the generated program to read and release to the sort program the entire set of qualifying rows. These rows are sorted and returned to the generated program, then the report processing continues. You should be familiar with the sort program (for example, DFSORT) that is enabled at your site. You may need to include additional file input to set in-core sort sizes and other sort parameters to make the program as efficient as possible.

3. For documentation purposes, the query embedded in the generated program will still contain the ORDER BY clause in the form of a comment.

HPO/Runtime

Enter `Y` to generate a program that requires the HPO runtime modules. Enter `N` to generate a program that is fully standalone (that is, does not require the HPO runtime modules). Set this option to `N` for a CICS program. Also, set this option to `N` for a TSO display program if an online print program is specified, or for a TSO print program. This option is not available with a stored procedure program, a data layer program, or a non-SELECT query.

Notes:

1. If the HPO/Runtime option is specified, Program Generator generates a program that makes calls to HPO-supplied runtime routines in order to format the report. The program contains fewer lines of code, as most of the data processing is performed in the common routines. Because the program has fewer lines of code, it is easier to maintain.

2. If you do not specify this option, Program Generator generates a program that does not rely on **any** support routines at runtime. In fact, this type of program does not have any special linkage requirements. You can generate a completely self-contained, standalone program. This type of program has more lines of code because all data processing is performed in the program.

3. The Spill File and Buffering parameters affect the execution and performance of HPO/Runtime programs, but cannot be set from the Generation Options panel. They can only be changed by manually modifying the generated source code. They are **not** applicable to standalone programs.

    *   **Spill File**

        Most HPO/Runtime programs require a fixed amount of memory to run. However, HPO/Runtime programs generated from forms that contain certain QMF form usage codes require all of the data to be fetched before the report can be written. These programs will perform this function automatically, however, the data must be buffered as it is read. This buffering is done in memory by default, due to efficiency concerns. For very large tables, though, memory may be exhausted before all of the data is read. Because of this, a program can be directed to use a spill file for buffering the data. This is done by setting the value of the USE-SPILL-FILE variable in the generated program. A value of 0 for this variable (the default) indicates that buffering should be done in memory. A value of 1 indicates that a spill file should be used.

        When a program that uses a spill file runs, it uses a DD named RAASPILL for the spill file. This DD should be defined as a temporary file, for example:

        ```
        //RAASPILL  DD    UNIT=SYSDA,SPACE=(CYL,(50,50))
        ```

    *   **Buffering**

        When an HPO/Runtime program runs, it repeatedly calls the HPO runtime modules to process the fetched data. On each call to the runtime modules, the program passes a buffer containing some number of rows of data, along with a count of how many rows are in the buffer. The number of rows in each buffer passed to the library has a direct impact on the performance of the program because each call to the library incurs an overhead cost. Thus, if the library is called every time a row is fetched, a substantial cost in overhead is incurred. If some number of rows are buffered together, the number of calls is reduced, and so is the overhead associated with the calls. As a result, a large buffer size should be used to improve performance.

        Alternatively, the buffer size is limited by the amount of memory available to the executing program. (Additionally, some compilers put a restriction on the maximum size of objects defined in programs, which limits the size of the buffer.) The buffer size must be set as large as possible, within any such limits.

        To change the number of rows per buffer in a COBOL program, three items in the working storage section must be set to that number: the

value of the variable FB-INDEX-MAX, and the OCCURS clause on the FETCH-BLOCK and INDICATORS-BLOCK variables. This specifies the number of rows per buffer, **not** the total buffer size (the total buffer size is the number of rows per buffer multiplied by the size of each row).

RAACPY Calls

Enter Y to include static calls to the RAACPY routine in the generated program to further improve the program's performance. Enter N to omit those calls, so that the generated program is fully standalone. This option is disabled for a data layer program and for a non-SELECT query.

Note: The use of this option sacrifices portability in favor of improved performance. COBOL source code for the RAACPY routine is provided in QMFHPO.SRAASAMP.

Skeleton Member

Enter the name of a member to use as the skeleton for the generated program. If you leave this field blank, the default member is used. Program Generator searches for this member in the following locations:
- RAASLIB DD (if allocated)
- ISPSUSR DD (if allocated and LIBDEF for ISPSLIB activated)
- LIBDEF for ISPSLIB (if active)
- ISPSLIB DD (if allocated)
- QMFHPO.SRAASKEL data set (if not found in any of the other locations)

Author

Enter the value to use as the program author in the generated program.

Description

Enter comment text to include as a description in the generated program. Any text entered is included verbatim in the source code, starting in column 8.

Specifying data set information for the generated program
About this task

Use the Write Source Code To fields in the Generation Options panel to specify where the generated program is written.

Source Code Data Set

Enter the data set to which the generated program must be written. If the data set does not exist, the Allocate Data Set pop-up window is displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name.

Source Code Member

If the specified **Source Code Data Set** is a PDS, this is the member to which the generated program must be written. If you leave this field blank, then the value in the **Program/Plan Name** field is used. Leave this field blank if the **Source Code Data Set** is not a PDS.

Source Code SELECT Member

This is the member to which the generated program for the SELECT statement must be written. If you leave this field blank, then the value in the **SELECT Program Name** field is used.

Specifying post generation actions
About this task

After you generate a program, the Actions After Generation pop-up window displays.

```
Command ===>

Review program?......................... ===>    (B=Browse, E=Edit, N=None)
Review CREATE PROCEDURE statement?...... ===>    (B=Browse, E=Edit, N=None)
Issue CREATE PROCEDURE statement?....... ===>    (Y=Yes, N=No)
Register program with End User Facility? ===>    (Y=Yes, N=No)
Compile program?........................ ===>    (Y=Yes, N=No)
Run program?............................ ===>    (Y=Yes, N=No)
```

Figure 12. Commands in the Actions After Generation pop-up window

From the Actions After Generation pop-up window:

- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the window is displayed again with an error message. If no errors are detected, and the actions that you specified are performed in sequence. After the actions are performed, you return to the Report List panel.
- If you press **PF3**, all input fields are ignored and you proceed to the next panel. No actions are performed.

The fields on the window are:

Review program?
> Enter B to browse the generated program, E to edit the program, or N to do neither. If you are generating from a multistatement query with SELECT, then options B and E will display the main program followed by the SELECT program.

Review CREATE PROCEDURE statement?
> Enter B to browse the generated CREATE PROCEDURE statement, E to edit the statement, or N to do neither. This option is only available for a stored procedure program.

Issue CREATE PROCEDURE statement?
> Enter Y to execute the generated CREATE PROCEDURE statement (after review) or N to bypass execution. This option is only available for a stored procedure program.

Register program with End User Facility?
> Enter Y to proceed to the Register Program panel after generation. Enter N if you do not want to register the program with the End User Facility. You must set this option to N for a stored procedure program.

Compile program?
> Enter Y to proceed to the Compile Programs panel after generation. Enter N if you do not want to compile the program.

Run program?
> Enter Y to proceed to the Run Programs panel after generation. Enter N if you do not want to run the program. You must set this option to N for a stored procedure program, a CICS program, or a data layer program.

Setting procedure program generation options
About this task

If the input to the generation process is a procedure object, you can generate a procedure program. This type of program acts as a driver to run each of the procedure object's report programs in sequence.

Note: To generate a procedure program, you must generate each of the report programs it will run. In addition, the report programs must have the same characteristics. For example, they must all be batch programs, all TSO programs, or all CICS programs.

If you set the **Generate Proc Program?** flag on the Report List panel to Y, the Proc Program Generation Options panel displays.

•

```
DB2P / DB2PLOCATION -- Proc Program Generation Options -------------- 12.1.0
Command ===>
Procedure :
------------------------------------------------------------------
Options...
Program/Plan Name......... ===>
Environment............... ===>     (B=Batch, T=TSO, C=CICS, S=Stored Procedure)
Attachment Facility....... ===>     (T=TSO, C=CAF, R=RRSAF)
CAF Module Usage.......... ===>     (D=Db2, H=HPO)
Author.................... ===>
Select All Report Programs ===>     (Y=Yes, N=No)

Write Source Code To:
Data Set ===>
Member.. ===>             (blank=Program/Plan Name)
```

Figure 13. Proc Program Generation Options panel

From the Proc Program Generation Options panel:
- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel is displayed again with an error message.
- If the **Select All Report Programs** flag is set to N, you proceed to the Select Report Programs panel (see "Selecting report programs" on page 36 for more information on the Select Report Programs panel). Otherwise, the program is generated with the specified options. After generation, the Actions After Generation pop-up window displays, allowing you to specify subsequent actions to take. If there is a processing error, you return to the Report List panel.
- If you press **PF3**, all input fields are ignored and you return to the Report List panel. No generation takes place.
- If you type ABORT and press **Enter**, all input fields are ignored and you return to the Report List panel. No generation takes place.

The fields on the panel are:

Program/Plan Name
Enter the name of the program to generate. The name entered must conform to plan and program ID naming rules.

Environment
Enter B to generate an MVS™ batch program, T to generate an online TSO program, C to generate an online CICS program or an S to generate a Stored Procedure.

Attachment Facility

Enter T to generate a program that uses the TSO attachment facility, C to generate a program that uses the call attachment facility, or R to generate a program that uses the RRS attachment facility (RRSAF). This option must be T or C for a TSO program. This option is ignored for a CICS program.

CAF Module Usage

Enter D to generate a program that uses the Db2 call attachment module (DSNALI) or H to generate a program that uses the HPO call attachment module (AACAF). This option is ignored if **Attachment Facility** is not C.

Author

Enter the value to use as the program author in the generated program.

Select All Report Programs

Enter Y if the generated program must run all of the reports in the current Report List. If you enter N, a selection list is displayed allowing you to select the reports the procedure program should run.

Source Code Data Set

Enter the data set to which the generated program must be written. If the data set does not exist, the Allocate Data Set pop-up window is displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name.

Source Code Member

If the specified **Source Code Data Set** is a PDS, this is the member to which the generated program must be written. If you leave this field blank, then the value in the **Program/Plan Name** field is used. If the **Source Code Data Set** is not a PDS, this field must be left blank.

Selecting report programs
About this task

If you set the **Select All Report Programs** flag on the Proc Program Generation Options panel to N, the Select Report Programs panel is displayed. From this panel, you can select the reports the procedure program must run.

```
DB2P / DB2PLOCATION -- Select Report Programs ----------------------- 12.1.0
Command ===>                                          Scroll ===> PAGE
Use Y or N to select report programs.
Press ENTER to process.
Type CAN or CANCEL or press PF3 to end.
Browse Procedure? (Y/N) ===>
                                                      Program
Num Query                       Form                  Name     Select?
--- --------------------------- --------------------------- -------- -------
***************************** Bottom of data *****************************
```

Figure 14. Select Report Programs panel

From the Select Report Programs panel:

• If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel is displayed again with an error message. Otherwise, the procedure program is generated for the selected reports. After generation, any actions for after generation that you selected on the Proc Program Generation Options panel are processed, and you return to the Report List panel.

- If you press **PF3**, all input fields are ignored and you return to the Report List panel. No generation takes place.
- If you type ABORT and press **Enter**, all input fields are ignored and you return to the Report List panel. No generation takes place.

The fields on the panel are:

Browse Procedure?
> If this flag is set to Y, then a browse session is started displaying the input procedure. If it is set to N, the input procedure is not browsed.

Select?
> Enter Y to include this report in those that the procedure program runs. All report programs run by the procedure program must have the same characteristics, for example, they must all be batch programs, all TSO programs, or all CICS programs.

Specifying post generation actions for procedure programs
About this task

After you generate a program, the Actions After Generation pop-up window is displayed.

```
Command ===>
Review program?........................ ===>    (B=Browse, E=Edit, N=None)
Register program with End User Facility? ===>   (Y=Yes, N=No)
Compile program?....................... ===>    (Y=Yes, N=No)
Run program?........................... ===>    (Y=Yes, N=No)
```

Figure 15. Actions After Generation pop-up window for procedure programs

From the Actions After Generation pop-up window for procedure programs:

- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the window is displayed again with an error message. If no errors are detected, and the actions that you specified are performed in sequence. After the actions are performed, you return to the Report List panel.
- If you press **PF3**, all input fields are ignored and you proceed to the next panel. No actions are performed.

The fields on the panel are:

Review program?
> Enter B to browse the generated program, E to edit the program, or N to do neither.

Register program with End User Facility?
> Enter Y to proceed to the Register Program panel. Enter N if you do not want to register the program with the End User Facility.

Compile program?
> Enter Y to proceed to the Compile Programs panel. Enter N if you do not want to compile the program.

Run program?
> Enter Y to proceed to the Run Programs panel. Enter N if you do not want to run the program. This option must be set to N for a CICS program.

Generating programs with the short dialog
About this task

When you select option 2 from the Program Generator Menu the Generate Programs (Short Dialog) panel displays. This panel can also be reached by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO 2'
```

The Short Dialog option follows the same procedure as the Full Dialog option. However, it suppresses all panel displays for locating queries and forms, exporting queries, processing Report List entries, generating programs, preparing programs, and running programs. When you press **Enter** on the Generate Programs (Short Dialog) panel, all specified report programs are generated, prepared, and run according to the default parameter settings and current generation options.

The only panel that **will** be displayed is the Edit Variables panel. If any query specified as input uses substitution variables, or if the input to the generation process is a procedure that contains **SET GLOBAL** commands, the Edit Variables panel is displayed allowing values to be specified for all substitution variables.

Note: This form of generation is recommended only for the more advanced user because a potentially large amount of processing can take place without any opportunity for interruption.

```
DB2P / DB2PLOCATION -- Generate Programs (Short Dialog) -------------- 12.1.0
Command ===>

Use % and _ as wildcard characters to produce a list of objects.
Press ENTER to generate program(s).
Type CAN or CANCEL or press PF3 to end.

Generate programs from one of the following:

1. Query Name.... ===>

2. Query Name.... ===>
   Form Name..... ===>

3. Procedure Name ===>
```

Figure 16. Generate Programs (Short Dialog) panel

From the Generate Programs (Short Dialog) panel:

- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel is displayed again with an error message. Otherwise, the entire program generation process is performed.
- If you press **PF3**, all input fields are ignored and you return to the Program Generator Menu.

Generating programs with batch JCL

Programs can also be generated using batch JCL. The batch JCL executes TSO (IKJEFT01) and issues the ISPSTART command to run the main program named RAAMAIN under ISPF. The input query, or query and form, are passed as parameters into RAAMAIN.

About this task

The option settings usually displayed and set on the Program Generator panels are obtained from the ISPF profile data set allocated to the ISPPROF DD. Generating programs in batch is like generating programs using the short dialog. After the input query and form are specified, the program is generated, compiled, and run according to the default settings.

The following parameters can be specified. All other parameters are taken from the ISPF profile data set.

- CO — required
- =BATCH — required
- =QUERY=*query name* — optional
- =FORM=*form name* — optional

Important: A space is required between parameters.

Values for variables that are usually specified on the Edit Variables panel are supplied in the DD named RAAVARS. Each line of this file must be of the form:

&VARNAME=VARVALUE

where &VARNAME is the name of the variable and VARVALUE is the value to supply for that variable. Do not insert spaces on either side of the equal sign (=). The RAAVARS file must be sorted alphabetically. Any variables for which values are not supplied use the default value.

The following JCL sample generates a program from a query named QUERY1 and a form named FORM1. The first parameter passed to RAAMAIN is CO. This tells RAAMAIN to run Program Generator. This JCL contains values for two variables in the RAAVARS DD, &VAR1 and &VAR2. This JCL also allocates the necessary DDs for QMF and Db2. Because the facility may have to start QMF and export objects, the QMF and Db2 libraries must be allocated appropriately.

```
//QMFHPOC   EXEC  PGM=IKJEFT01,DYNAMNBR=30,REGION=2M
//SYSTSIN   DD    *
  ISPSTART PGM(RAAMAIN) NEWAPPL(RAAX) +
        PARM(CO =BATCH =QUERY=QUERY1 =FORM=FORM1)
/*
//RAAVARS   DD    *
&VAR1=20
&VAR2=:HOSTVAR1 SMALLINT
/*
//SYSTSPRT  DD    SYSOUT=*
//STEPLIB   DD    DSN=QMFHPO.SRAALOAD,DISP=SHR
//          DD    DSN=QMF.SDSQEXIT,DISP=SHR
//          DD    DSN=QMF.SDSQLOAD,DISP=SHR
//          DD    DSN=DSN.SDSNLOAD,DISP=SHR
//SYSPROC   DD    DSN=QMFHPO.SRAACLST,DISP=SHR
//          DD    DSN=QMFHPO.SRAAEXEC,DISP=SHR
//          DD    DSN=QMF.SDSQCLTE,DISP=SHR
//          DD    DSN=DSN.SDSNCLST,DISP=SHR
//SYSEXEC   DD    DSN=QMFHPO.SRAAEXEC,DISP=SHR
//          DD    DSN=QMF.SDSQEXCE,DISP=SHR
//ISPLOG    DD    SYSOUT=*,
//            DCB=(LRECL=133,RECFM=VBA,BLKSIZE=137)
//ISPPROF   DD    DSN=USER.ISPF.ISPPROF,DISP=SHR
//ISPMLIB   DD    DSN=QMFHPO.SRAAISPM,DISP=SHR
//          DD    DSN=QMF.SDSQMLBE,DISP=SH
//          DD    DSN=DSN.SDSNSPFM,DISP=SHR
//ISPPLIB   DD    DSN=QMFHPO.SRAAISPP,DISP=SHR
```

```
//          DD    DSN=QMF.SDSQPLBE,DISP=SHR
//          DD    DSN=DSN.SDSNSPFP,DISP=SHR
//ISPTLIB   DD    DSN=QMF.SDSQTLBE,DISP=SHR
//DSQDEBUG  DD    SYSOUT=*,
//             DCB=(RECFM=FBA,LRECL=121,BLKSIZE=12100)
//RAADEBUG  DD    SYSOUT=*,
//             DCB=(RECFM=FBA,LRECL=121,BLKSIZE=12100)
//ADMGGMAP  DD    DSN=QMF.DSQMAPE,DISP=SHR
```

Prepare programs

After you generate program source code, you must prepare it before you can run the program. There are three methods to prepare programs:

- Online preparation without prompting

  After the program is generated, you can prepare it online while you wait. A CLIST named RAADSNH is distributed that passes parameters to the Db2 DSNH command. Without customization, RAADSNH passes a small subset of parameters to DSNH (such as PLAN and HOST). RAADSNH can be customized during the installation process to pass any set of parameters to DSNH.

- Online preparation with prompting

  You can prepare the program online with prompting for parameter values. With this option, the RAADSNH CLIST invokes DB2I Program Preparation, which prompts you for library names, library concatenations, bind parameters, and so on, before DSNH is executed.

- Batch preparation

  Batch JCL to prepare programs can be automatically generated, edited, and submitted.

When you request an online preparation, the RAADSNH CLIST is invoked and it is passed with the information that was specified on the Compile Programs panel. If a non-prompted prepare was specified, the Db2 DSNH command is invoked, passing on the information. If a prompted prepare was specified, the information is placed into ISPF shared pool variables. The DB2I Program Preparation option is then invoked, which uses those variable values.

There is one important difference between prompted and non-prompted compiles. When DSNH is invoked, it is passed the names of system libraries, such as your site's COBOL load library (which is optionally specified to the HPO Configuration Dialog). When DB2I Program Preparation is invoked, this information cannot be specified. In this case, the default values for these parameters (as specified in the DSNH CLIST) are used.

The following topics describe preparing programs:

Related tasks:

"Specifying fields for the Compile Programs panel" on page 41

"Setting batch job parameters" on page 43

Related reference:

"Specifying Enterprise COBOL program requirements" on page 45

Specifying fields for the Compile Programs panel
About this task

Select option 3 from the Program Generator Menu to display the Compile Programs panel. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO 3'
```

Specify basic information about the program to prepare. This information is used to invoke the preparation process.

```
DB2P / DB2PLOCATION -- Compile Programs ---------------------------- 12.1.0
Command ===>

Press ENTER to compile program.
Type CAN or CANCEL or press PF3 to bypass this compilation.
  1. Compile Type........ ===>          (P=Prompted, N=Non-prompted, B=Batch)
  2. Source Data Set..... ===>
  3. Source Member....... ===>
  4. Environment......... ===>          (B=Batch, T=TSO, C=CICS, S=Stored procedure)
  5. Attachment Facility. ===>          (T=TSO, C=CAF, R=RRSAF)
  6. CAF Module Usage.... ===>          (D=Db2, H=HPO)
  7. Compile Options..... ===>
  8. DBRM Library........ ===>
  9. Bind Type.......... ===>          (1=Package, 2=Plan, 3=No bind)
 10. Collection ID....... ===>
 11. Plan Name.......... ===>
 12. Bind OWNER......... ===>
 13. Bind VALIDATE...... ===>          (BIND or RUN)
 14. Target Load Library. ===>
 15. Link Edit Options... ===>
 16. DSNH PRINT Parameter ===>          (Prompted and Non-prompted only)
```

Figure 17. Compile Programs panel

From the Compile Programs panel:
- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel is displayed again with an error message. Otherwise, the specified compilation is invoked online, or the Batch Job Information panel is displayed, after which the JCL to compile the program is edited or submitted.
- Depending on how you reached this panel, two things can happen after the compilation:
  - If this panel was displayed by selecting the Compile Programs option from the Program Generator Menu, it is displayed again after the compilation.
  - If it was displayed due to a request to compile a program after generation (on the Generation Options panel), the next panel in the generation process is displayed.
- If you press **PF3**, all input fields are ignored and you return to the Program Generator Menu or proceed with the generation process. No compilation takes place.
- If you type `ABORT` and press **Enter**, all input fields are ignored and you return to the Program Generator Menu or the Report List panel. No compilation takes place.

The fields on the panel are:

Compile Type
> Enter `P` to invoke a prompted compilation, via the Program Preparation

option of Db2 Interactive (DB2I). Enter N to invoke a non-prompted compilation by invoking the DSNH command. Enter B to tailor JCL to compile the program in batch.

Source Data Set
Enter the data set containing the source program to compile. The data set must exist. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name.

Source Member
If the specified **Source Data Set** is a PDS, this is the member that contains the source program to compile. For multistatement queries with SELECT, there is an extra field for the **SELECT Program Member**.

Environment
Enter B if the program to be compiled is an MVS batch program, T if it is an online TSO program, or C if it is an online CICS program.

Attachment Facility
Enter T if the program to be compiled uses the TSO attachment facility, C if it uses the call attachment facility (CAF), or R if it uses the RRS attachment facility (RRSAF). This option is ignored for a CICS program.

CAF Module Usage
Enter D if the program to be compiled uses the Db2 call attachment module (DSNALI), or H if it uses the HPO call attachment module (AACAF).

Compile Options
Enter compile options. Additional options required by Program Generator are appended to whatever is specified in this field.

DBRM Library
Enter the library for the DBRM output of the Db2 precompiler. If the data set does not exist, the Allocate Data Set pop-up window is displayed, allowing you to allocate it. The data set must be a PDS. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name.

Bind Type
If compiling a report program, enter 1 to bind a package, 2 to bind a plan or 3 to bind neither

If compiling a proc program, enter 2 to bind a plan specifying all report program packages or 3 to not bind a plan.

If compiling a report program as part of a proc program, enter 1 to bind a package, 2 to bind a plan or 3 to bind neither.

Collection ID
Enter the name of the collection ID to be used with the **Bind Type** option. The name must conform to Collection ID naming rules.

Plan Name
Enter the name of the plan to be created by the bind process for this program. The name entered must conform to plan and program ID naming rules.

Bind OWNER
> Enter the OWNER parameter to be used by the bind process. If you leave this field blank, no OWNER is specified for the bind, and your primary authorization ID is used.

Bind VALIDATE
> Enter the VALIDATE parameter to be used by the bind process. Enter BIND to validate SQL authorization and determine access path selection during the BIND process. Specify RUN to defer this processing until the plan is executed. You must specify RUN if this program uses static SQL that refers to nonexistent tables (for example, SAVE DATA tables).

Target Load Library
> Enter the data set in which to create the load module for this program. If the data set does not exist, the Allocate Data Set pop-up window is displayed, allowing you to allocate it. The data set must be a PDS or PDSE. For example, COBOL V5 requires a PDSE as an output load library. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix will be used to qualify the name.

Link Edit Options
> Enter link edit options. Additional options required by Program Generator are appended to that which is specified in this field.

DSNH PRINT Parameter
> Enter the value to use for the DSNH PRINT parameter. This field is used for prompted and non-prompted compiles (which invoke DSNH).

Setting batch job parameters
About this task

Before a batch compile is invoked (or a batch run, as discussed in "Run programs" on page 45), the Batch Job Information panel is displayed to obtain more information about the job to submit. After specifying these additional batch parameters, JCL is generated, and submitted or edited.

```
DB2P / DB2PLOCATION -- Batch Job Information ----------------------- 12.1.0
Command ===>

Press ENTER to generate JCL.
Type CAN or CANCEL or press PF3 to cancel this run.

1. Job Cards...
           ===>
           ===>
           ===>
           ===>
2. Report DCB Parameters...
   SYSOUT class.............. ===>
   LRECL..................... ===>
   DEST...................... ===>
   COPIES.................... ===>
3. Enter Host Variable Values? ===>     (Y=Yes, N=No)
4. Write JCL To...
   Data Set ===>
   Member.. ===>
5. Edit or Submit JCL?........ ===>     (E=Edit, S=Submit)
```

Figure 18. Batch Job Information panel

From the Batch Job Information panel:

- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel is displayed again with an error message. Otherwise, JCL is generated and it is edited or submitted, depending on the value of the **Edit or Submit JCL?** flag on this panel.
- If you press **PF3**, all input fields are ignored and you return to the previous panel or proceed with the generation process. No JCL generation takes place.

The fields on the panel are:

Job Cards
> Enter valid job cards for the job. At least one line must be entered. Any lines specified are used exactly as entered in the generated JCL.

Report DCB Parameters
> If this job runs a generated program, the following four fields, **SYSOUT class**, **LRECL**, **DEST**, and **COPIES**, are enabled and are used to specify the characteristics of the REPORTnn DDs. If this job compiles a generated program, these fields are disabled and ignored.

SYSOUT class
> Specify the SYSOUT class for the REPORTnn DDs. If you leave this field blank, a system default value is used.

LRECL
> Specify the LRECL for the REPORTnn DDs. If you leave this field blank, 133 is used.

DEST Specify the DEST for the REPORTnn DDs. If you leave this field blank, a system default value is used. If no system default value exists, the DEST parameter is omitted.

COPIES
> Specify the COPIES for the REPORTnn DDs. This number must be between 1 and 254. If you leave this field blank, the COPIES parameter is omitted.

Enter Host Variable Values?
> If this job runs a generated program, enter Y to display the Enter Host Variable Values pop-up window on which you can specify values to be generated for the HOSTVARS or PROCVARS DD. Enter N if the program does not require any input host variable values. This field is disabled and ignored if this job compiles a generated program.

Data Set
> Enter the data set to which the generated JCL must be written. If the data set does not exist, the Allocate Data Set pop-up window is displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field. You can also enter *TEMP to specify that a temporary data set must be created for the JCL.

Member
> If the specified **Data Set** is a PDS, enter the name of the member to which the generated JCL must be written. Leave this field blank if the **Data Set** is not a PDS or is *TEMP.

Edit or Submit JCL?
> Enter E to edit the generated JCL or S to automatically submit it after it is generated.

Specifying Enterprise COBOL program requirements

If you use a method other than the Compile Programs option to prepare Enterprise COBOL programs (for example, by creating your own batch JCL), the following requirements must be observed:

- **Precompiler options**
  - APOST
  - DATE(ISO)
  - HOST(COB2)
  - TIME(ISO)
- **Bind parameters**
  - VALIDATE(RUN) for SAVE DATA programs
  - VALIDATE(BIND) for all other types of programs
- **CICS translator options**
  - APOST
- **Compiler options**
  - APOST
  - NODYNAM (only required for HPO/Runtime programs)
  - OPTIMIZE
  - RESIDENT (only required for HPO/Runtime programs)
- **Link**
  - For standalone programs using user-defined edit routines or any programs using the HPO call attachment module or the RAACPY option, QMFHPO.SRAALOAD must be included in the concatenation for SYSLIB.

Run programs

After you have generated and compiled the program you can run the program using:

- the Run Programs option if it is an online TSO program.
- generated JCL if it is a batch program.
- an alternate facility.
- the End User Facility.

The method to use depends primarily on the type of user. The Run Programs option is intended for use by experienced technical users who are familiar with the concepts of programs, plans, JCL, etc. The End User Facility is intended to be used by non-technical end users.

The following topics describe the different methods that you can use to run programs and the various tasks that must be performed before you run the programs:

Related concepts:

"Generate JCL to run a batch program" on page 48

"Specifying TSO program requirements" on page 51

Related tasks:

"Using the Run Programs option" on page 46

"Entering host variable values" on page 47

Related reference:

Using the Run Programs option
About this task

Select option 4 from the Program Generator to display the Run Programs panel. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO 4'
```

On this panel, specify basic information about the program to run. This information is used to run an online program or generate JCL to run a batch program.

```
DB2P / DB2PLOCATION -- Run Programs -------------------------------- 12.1.0
Command ===>

Press ENTER to run program.
Type CAN or CANCEL or press PF3 to bypass this run.

1. Load Library....... ===>
2. Program Name....... ===>
3. Plan Name.......... ===>

4. Environment........ ===>    (B=Batch, T=TSO)
5. Attachment Facility ===>    (T=TSO, C=CAF, R=RRSAF)

6. Additional User Load Libraries...
     Load Library 1.... ===>
     Load Library 2.... ===>

7. Additional User EXEC Libraries...
     EXEC Library 1.... ===>
     EXEC Library 2.... ===>
```

Figure 19. Run Programs panel

From the Run Programs panel:
- If you press **Enter**, all input fields are validated. If errors are detected during input validation, the panel is displayed again with an error message. Otherwise, if a TSO program was specified, it runs. If a batch program was specified, the Batch Job Information panel is displayed, after which the JCL to run the program is edited or submitted.
- Depending on how this panel was reached, two things can happen after the run. If this panel was displayed by selecting the Run Programs option from the Program Generator Menu, it is displayed again after the run. If this panel was displayed due to a request to run a program after generation (on the Generation Options panel), the next panel in the generation process is displayed.
- If you press **PF3**, all input fields are ignored and you return to the Program Generator Menu or you proceed with the generation process. No run takes place.
- If you type ABORT and press **Enter**, all input fields are ignored and you return to the Program Generator Menu or the Report List panel. No run takes place.

The fields on the panel are:

Load Library
> Enter the name of the data set containing the load module to run. The data set must exist and must be a PDS. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your

current TSO profile prefix is used to qualify the name. This parameter is optional. If you specify a load library and not a program name, a member list for the library is displayed from which you can select a program.

Program Name
Enter the program to run. If you specified a load library, you can leave this field blank, and a member list for the library is displayed from which you can select a program. If you specify both a load library and a program name, the program must exist in the library.

Plan Name
Enter the name of the plan to run with this program. This field is optional. If you leave this field blank, the plan name is not specified on the run (which usually results in it defaulting to the program name).

Environment
Enter B if the program to be run is a batch program or T if it is an online TSO program.

Attachment Facility
Enter T if the program uses the TSO attachment facility, C if it uses the call attachment facility (CAF), or R if it uses the RRS attachment facility (RRSAF).

Additional User Load Libraries
Enter the names of any additional load libraries required for the run.

Additional User EXEC Libraries
Enter the names of any additional EXEC libraries required for the run.

Entering host variable values
About this task

When you run a batch program, you can specify, on the Batch Job Information panel, that you want to enter input host variable values for the generated JCL If you set the **Enter Host Variable Values?** flag to Y, the Enter Host Variable Values pop-up window is displayed.

Note: Using the Enter Host Variable Values pop-up window results in host values being included as an in-stream data set in the generated JCL. This is appropriate only if the program you are running is defined to read host variables from a file whose LRECL is 80. The program appends if you use this method to specify host variables for a program that uses a different LRECL.

The End User Facility provides more comprehensive support for running programs that use host variables, including support for validating the format of variable values and using a host variable file whose LRECL is not 80.

```
Command ===>

Press ENTER to accept these host variable values.
Type CAN or CANCEL or press PF3 to return to the previous panel.

Host Variable DD ===>     (H=HOSTVARS, P=PROCVARS)
Host Variable Values:
===>
===>
===>
===>
===>
===>
===>
===>
===>
===>
===>
```

Figure 20. Enter Host Variable pop-up window

From the Enter Host Variable pop-up window:

- If you press **Enter**, the host variable values that you entered are saved and you return to the Batch Job Information panel.
- If you press **PF3**, all input fields are ignored and you return to the Batch Job Information panel.

The fields on the panel are:

Host Variable DD
> If you are running a report program, enter H to specify that the host variable values you enter must be included in the HOSTVARS DD in the generated JCL. If you are running a procedure program, enter P to specify that the host variable values you enter must be included in the PROCVARS DD in the generated JCL.

Host Variable Values
> Enter values for the host variables used by the program you are running. The text you enter is included verbatim in the generated JCL. No validation is performed on the values you enter; you must enter values that are of the type and format expected by the program you are running.

Generate JCL to run a batch program

When you specify a batch program to run, this facility can submit the JCL or allow you to edit the JCL it generates. If you specify an online TSO program, the RAARUN CLIST is invoked to run the program. This CLIST invokes the program (if it uses the call attachment facility), or it invokes the DSN command and issues the DSN sub commands to invoke the program.

If you generate a program that uses the TSO attachment facility, it must be run under the DSN command processor of TSO. If you generate a program that uses the call attachment facility or the RRS attachment, you can run the program.

If you use a method other than the Run Programs option to run programs (for example, by creating your own batch JCL), the following topics describe the requirements that must be observed:

Related concepts:

"Specifying report DDs" on page 49

"Specifying miscellaneous DDs" on page 49

Specifying report DDs

REPORT01

The primary report is written to the DD named REPORT01. RECFM must be set to FBA, because the first character of each record that is written to this DD is reserved for carriage control. For standalone programs, the LRECL must equal the LRECL specified in the program. For HPO/Runtime programs, any LRECL may be specified. A typical DD declaration is:

```
//REPORT01  DD    SYSOUT=*,
//                DCB=(RECFM=FBA,LRECL=133,BLKSIZE=1330)
```

REPORTnn

If the report horizontally spans multiple pages, then these additional pages are written to a series of DDs named REPORT02, REPORT03, and so on. Up to 99 of these sub pages are supported. A typical DD declaration is:

```
//REPORT02  DD    SYSOUT=*,
//                DCB=(RECFM=FBA,LRECL=133,BLKSIZE=1330)
//REPORT03  DD    SYSOUT=*,
//                DCB=(RECFM=FBA,LRECL=133,BLKSIZE=1330)
```

In an HPO/Runtime program, you can control the width of a report page two different ways:

- Assign a value to the `PAGE-WIDTH` variable governing the page width in the generated program.

  For example, if you set the PAGE-WIDTH variable to 132, then no more than 132 characters **of report data** appear on each line of the report. One additional character is included in each report row to handle carriage control. In the previous example, even though the page width is set to 132, there are actually 133 characters written to the report file.

- Use the `LRECL DCB` parameter on the REPORT01 DD in your run JCL. The LRECL value sets an additional limit on the width of the report.

  For example, if you set LRECL=133, then at most 133 characters appear on each record of the report file (132 characters of report data and one character of carriage control).

These settings are taken into account when calculating the width of a report page and determining whether to split a report row across multiple pages:

```
report page width = minimum(page width variable value, LRECL - 1).
```

The LRECL is obtained from the REPORT01 DD. If you have more than one REPORTnn DD defined in your JCL, ensure that they all have the same LRECL value.

Specifying miscellaneous DDs

HOSTVARS

This DD is used to pass runtime host variable values to batch report programs. The LRECL must match the LRECL specified when the program was generated. If the program was generated to use a tabular host variable format, each record in this file must contain a complete set of host variable values for the program. Each value must be separated by the delimiter character specified when the program was generated. If the program was generated to use a columnar host variable format, each record in this file contains only one host variable value.

The order of values must match (in order and type) the host variables as defined in the program. Host variables are defined in alphabetical order in the program. If there is any mismatch in data types, a runtime error causes the program to exit.

This file is read repeatedly and a report is generated for each complete set of host variable values read. If an incomplete set of values is read, the program terminates with an error.

A typical DD declaration (for non-tabular host variables) is:

```
//HOSTVARS   DD     *
host variable value 1
.
.
.
host variable value n
/*
```

PROCVARS

Procedure programs that run batch report programs that use host variables use the PROCVARS DD as described for the HOSTVARS DD. The host variable values for each of the report programs run must be listed in the PROCVARS DD in sequence. These programs also need the HOSTVARS DD defined as a temporary file. A typical DD declaration (for non-tabular host variables) is:

```
//PROCVARS   DD     *
program 1 host variable value 1
.
.
.
program 1 host variable value n
program 2 host variable value 1
.
.
.
program 2 host variable value n
/*
//HOSTVARS   DD    UNIT=SYSDA,SPACE=(TRK,(1,1))
```

DATAOUT

If you generate a program that writes data to a sequential file, the DD that is opened for output is named DATAOUT. The only DCB parameter that must be in sync with the program is the LRECL. The length of the output record must exactly match the LRECL of the data set assigned to this DD. A typical DD declaration is:

```
//DATAOUT    DD    DSN=data.set.name,DISP=disp
```

DATAIN

If you generate a program that reads data from a sequential file, the DD that is opened for input is named DATAIN. The only DCB parameter that must be in sync with the program is the LRECL. The length of the output record must exactly match the LRECL of the data set assigned to this DD. A typical DD declaration is:

```
//DATAIN     DD    DSN=data.set.name,DISP=disp
```

RAASPILL

When an HPO/Runtime program that uses a spill file runs, it uses a DD named RAASPILL for the spill file. This DD must be defined as a temporary file. This DD is not used by standalone programs. A typical DD declaration is:

```
//RAASPILL   DD    UNIT=SYSDA,SPACE=(CYL,(50,50))
```

SYSEXEC

When an HPO/Runtime program that makes use of the QMF FORM.CALC or FORM.COND features runs, it repeatedly evaluates a REXX EXEC named RAARCXPR, which is in QMFHPO.SRAAEXEC. The DD named SYSEXEC is searched for this EXEC at runtime, so SYSEXEC must be allocated to QMFHPO.SRAAEXEC. A typical DD declaration is:

```
//SYSEXEC   DD    DSN=QMFHPO.SRAAEXEC,DISP=SHR
```

STEPLIB

If the program to be run is an HPO/Runtime program, your JCL must allocate QMFHPO.SRAALOAD in JOBLIB or STEPLIB. This is not required for standalone programs.

In addition, you may have to include the Db2 load library and sort load library if they are not included in your site's link list. This is true of both HPO/Runtime programs and standalone programs.

Specifying EXEC parameters

For programs using the call attachment facility or RRS attachment facility, default values for the Db2 subsystem ID and the plan name are generated in the program source code. You can override these settings at runtime by passing parameters on the EXEC card. Here is an example:

```
//GO        EXEC  PGM=QUERY1,PARM='DSN,QUERY2'
```

The following is an example of how to specify only the Db2 subsystem ID and not the plan name:

```
//GO        EXEC  PGM=QUERY1,PARM='DSN'
```

Programs that include SAVE DATA processing where the **Action** parameter specified was P (prompt), a positional parameter can be specified to indicate the desired disposition of data existing in the SAVE DATA table, with a value of R to indicate that this data must be replaced, or A to indicate that this data must be retained (and appended).

For programs using the call attachment facility or the RRS attachment facility, this parameter is included after the parameters in the previous example:

```
//GO        EXEC  PGM=QUERY1,PARM='DSN,QUERY2,R'
```

Otherwise, it appears first in the PARM field:

```
//GO        EXEC  PGM=QUERY1,PARM='R'
```

Specifying TSO program requirements

If you generate a program that uses the TSO attachment facility, it must be run under the DSN command processor of TSO. If you generate a program that uses the call attachment facility, you can run the program from the TSO command prompt. You can also build an ISPF menu that lists each of the report programs that you generate and allows the user to select a report to run.

Regardless of how the program is run, the following DDs must be allocated so that support routines, panels, and messages can be found by the program and ISPF:

STEPLIB

For HPO/Runtime programs, QMFHPO.SRAALOAD must be allocated to the STEPLIB DD.

ISPPLIB

QMFHPO.SRAAISPP must be allocated to the ISPPLIB DD. There are 6

panels in the panel library that are referenced in the generated program:
RAATSO1, RAATSO2, RAATSO3, RAATSO4, RAATSO5, and RAATSOH.

ISPMLIB

QMFHPO.SRAAISPM must be allocated to the ISPMLIB DD. There are 3
members in the message library that are referenced in the generated
program: RAAB00, RAAB01, and RAAB02.

RAAPRINT

For programs that have print capability (such as, this with an associated
TSO print program), RAAPRINT must be allocated before attempting to
print a report. A typical DD declaration is:

```
//RAAPRINT  DD    SYSOUT=*
```

RAADATA, SYSUTn

For programs that have print capability (such as, those with an associated
TSO print program), these DDs are dynamically allocated and freed as
needed. They must **not** be pre-allocated.

Host variable values

When you run a TSO program, you are prompted for host variable values.
Each host variable in the program is displayed on an ISPF table panel
along with its data type. You must specify a value for each variable on this
panel.

Specifying CICS program requirements

Read through these requirements before running a generated CICS program. CICS
documentation and your site's CICS administration staff are the authoritative
source for information on how to set up CICS tables and startup JCL.

CICS startup job stream

You must allocate QMFHPO.SRAALOAD (which contains the BMS maps
used by the generated programs) to the CICS Module Load Library list
(DFHRPL). The load library that contains the programs that you generate
and prepare must also be allocated.

PPT entries

All generated CICS programs interact with the user via the following three
BMS maps:

- RAAMAP1 (to browse the formatted report)
- RAAMAP2 (to display formatted SQL error messages)
- RAAMAP3 (to prompt user for host variable input values)

Generated programs refer to each of these maps in a single mapset named
RAAM330. This module can be found in QMFHPO.SRAALOAD.

PPTs for all of these maps must be assembled and added to the
appropriate CICS regions. These PPT entries can be found in
QMFHPO.SRAASAMP.

PPTs for programs that you generate and prepare must also be assembled
and added to your CICS session.

PCT entries

You must add transaction IDs for the programs you generate.

RCT entries

You must add resource control entries for the programs you generate.

Passing runtime values to host variables

When running a CICS program, you are prompted for host variable values,

one at a time, in sequence. Each host variable in the program is displayed on a CICS map along with its data type. You must specify a value for each variable.

Understanding data queue storage requirements

Generated CICS programs are completely pseudo-conversational. They terminate the task (EXEC CICS RETURN...) each time that a map is sent. Because Db2 automatically closes cursors at task termination, these programs must read all of the Db2 data before the first screen of data is displayed. In fact, the data is read from Db2, formatted according to the form specifications, and placed in auxiliary temporary storage for browsing.

This implementation has many advantages. For example, when browsing the report, you are actually browsing the data stored in temporary storage. All of the Db2 I/O has finished by the time the first screen of report data is displayed. Because the cursor is closed, all shared page locks are released by this time.

Because of this implementation, however, there is a restriction on the number of rows of report data. CICS limits the number of rows that can be written to temporary storage queues to 32767. This limits the report to 32767 lines. To enhance the performance of generated CICS programs, CICS system programmers must verify that auxiliary temporary storage is properly allocated and tuned to handle these programs.

Register and maintain End User Facility reports

The End User Facility provides a convenient interface through which you can run reports. Before you can run a report in this way, it must be registered with the End User Facility via the Maintain End User Facility Reports option (or via the **Register Program?** post-generation action on the Generation Options panel).

A report is defined as one of the following:
- A compiled program, most likely converted from a QMF query, query and form, or procedure.
- A non-compiled QMF query, query and form, or procedure.

A report is uniquely identified by the combination of owner and name, similar to how QMF objects are identified. However, if the report owner is of the form `T=tranid` where `tranid` is a valid CICS transaction identifier, the report is associated with that transaction rather than with a particular owner.

Reports are registered in two Db2 tables. The first table, named Q.REPORTS, stores information about the characteristics of a report. There is one row in Q.REPORTS for each registered report. The second table, named Q.REPORT_VARIABLES, stores information about the runtime variables used by each registered report. There is one row in Q.REPORT_VARIABLES for each host variable or variable used by each report in Q.REPORTS.

The following topics describe registering and maintaining reports using the End User Facility:

Related tasks:

"Specifying fields for the End User Facility Report Maintenance panel" on page 54

"Building a selection list of reports" on page 54

Specifying fields for the End User Facility Report Maintenance panel

About this task

Select option 5 from the Program Generator menu to display the End User Facility Report Maintenance panel. All report maintenance is performed from the End User Facility Report Maintenance panel. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO 5'
```

```
DB2P / DB2PLOCATION -- End User Facility Report Maintenance --------- 12.1.0
Command ===>

Action................. ===>

Report Owner........... ===>
Report Name............ ===>

Drop Confirmation? (Y/N) ===>




-------------------------------------------------------------------------------
Valid Actions Are...
B  Browse
C  Create
D  Drop
E  Edit
L  Display Selection List
-------------------------------------------------------------------------------
```

Figure 21. End User Facility Report Maintenance panel

From the End User Facility Report Maintenance panel:

- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel is displayed again with an error message.
- If you press **PF3**, all input fields are ignored and you return to the Program Generator Menu.

Building a selection list of reports

About this task

To build a selection list of report entries from the End User Facility Report Maintenance panel, you must enter values in the following fields:

Action
        Enter L (for list).

Report Owner
        Enter the report owner (up to 8 characters). The value entered must be a

valid primary or secondary SQLID or must be of the form `T=tranid`, where `tranid` is a valid CICS transaction identifier. If using a `tranid`, reports associated with that transaction are selected, rather than reports with a particular owner. If you leave this field blank, your current SQLID is used as a default.

Report Name

Enter the report name (up to 18 characters). If **Action** is not `C`, you can use a percent (%) or an underscore (_) as wildcard characters in the name to process multiple reports. If you leave this field blank, a percent (%) character is used as the default.

Drop Confirmation?

Enter `Y` to request drop confirmations or `N` to suppress them. If left blank, this flag defaults to `Y`.

When you enter `L` (for list) on the End User Facility Report Maintenance panel, the Report Selection List panel is displayed. This panel contains a list of all report entries that match the input specifications entered on the End User Facility Report Maintenance panel.

```
DB2P -- Report Selection List For QMFUSER ----------------------------- 12.1.0
Command ===>                                                   Scroll ===> PAGE

Valid Actions Are...
B  Browse                      C  Create Like
D  Drop                        E  Edit
-------------------------------------------------------------------------------
  Report Name        Description
  -----------------  -------------------------------------------------------

****************************** Bottom of data ********************************
```

Figure 22. Report Selection List panel

From the Report Selection List panel:

- If you press **Enter**, all rows that are selected with an action code are processed. After all selected rows are processed, the panel is displayed again.
- If you press **PF3**, all input fields are ignored and you return to the End User Facility Report Maintenance panel.
- If you press **PF7** or **PF8**, the panel scrolls backward or forward.

Browsing for a report
About this task

You can browse for a report from:

- the End User Facility Report Maintenance panel.
- a selection list.

To browse a report entry from the End User Facility Report Maintenance pane, enter values in the following fields:

Action

Enter `B` (for browse).

Report Owner

Enter the report owner (up to 8 characters). The report owner must be a valid primary or secondary SQLID or must be of the form `T=tranid`, where `tranid` is a valid CICS transaction identifier. If using a `tranid`, reports

associated with that transaction are selected, rather than those with a particular owner. If you leave this field blank, your current SQLID is used as a default.

Report Name

Enter the report name (up to 18 characters). You can use a percent (%) or underscore (_) as wildcard characters in the name to process multiple reports. If you leave this field blank, a percent (%) character is used as the default.

To browse a report entry from the Report Selection List panel, you must enter a value in the following field:

Action

Enter B (for browse).

The Browse Report Registration panel is a browse-only panel; you cannot change displayed attribute values from this panel.

```
DB2P / DB2PLOCATION -- Browse Report Registration ------------------- 12.1.0
Command ===>

Owner..................... :
Name...................... :
Description:
Shared?................... :
Program Name.............. :
Load Library.............. :
Plan Name................. :
Environment............... :
Program Type.............. :
Attachment Facility....... :
Uses Variables?........... :
Host Variable File LRECL... :
Input Data LRECL.......... :
Output Data LRECL......... :
Report LRECL.............. :
Number of Report Files..... :
Query Name................ :
Form Name................. :
Procedure Name............ :
```

Figure 23. Browse Report Registration panel

From the Browse Report Registration panel:

- If you press **Enter**, and this report uses any variables, you proceed to the Browse Variables panel (see "Selecting a report from the Browse Variables panel" for more information on this panel). Otherwise, you proceed to the next panel or you return to the previous panel if no more actions have been requested.
- If you press **PF3**, you proceed to the next panel or return to the previous panel if no more actions have been requested.
- If you type ABORT and press **Enter**, you return to the previous panel.

Selecting a report from the Browse Variables panel
About this task

The Browse Variables panel is a browse-only panel; you cannot change displayed variable definitions from this panel.

```
DB2P / DB2PLOCATION -- Browse Variables For QMFUSER.REPORT ----------- 12.1.0
Command ===>                                                    Scroll ===> PAGE


Variable Name                      Type
------------------------------     ---------------


****************************** Bottom of data ******************************
```

Figure 24. Browse Variables panel

From the Browse Variables panel:
- If you press **Enter** or **PF3**, you proceed to the next panel or you return to the previous panel if no more actions have been requested.
- If you press **PF7** or **PF8**, the panel scrolls backward or forward.
- If you type ABORT and press **Enter**, you return to the previous panel.

Creating a report
About this task

You can create a report from:
- the End User Facility Report Maintenance panel.
- a selection list.

To create a report entry from the End User Facility Report Maintenance panel, you must enter values in the following fields:

Action
> Enter C (for create).

Report Owner
> Enter the owner for this report. The owner entered must be a valid primary or secondary SQLID or must be of the form T=tranid, where tranid is a valid CICS transaction identifier. In the latter case, the report is associated with that transaction, rather than with a particular owner.

Report Name
> Enter the name for this report. No spaces are allowed in the report name. The combination of report owner and name must be unique.

To create a report entry from the Report Selection List panel, you must enter a value in the following field:

Action
> Enter C (for create). This action is treated as a Create Like... The attributes of the profile entry selected with the action of C are used as default attribute values on the Create Report Registration panel.

In both cases the Create Report Registration panel opens. If you are creating a report from the End User Facility Report Maintenance panel, this panel lists default attribute values when it is first displayed. If you are creating a report from the Report Selection List panel, this panel lists the attribute values from the report that was selected.

```
DB2P / DB2PLOCATION -- Create Report Registration ------------------- 12.1.0
Command ===>

Owner.................. ===>
Name................... ===>
Description ===>
Shared?................ ===>
Program Name........... ===>
Load Library........... ===>
Plan Name.............. ===>
Environment............ ===>
Program Type........... ===>
Attachment Facility..... ===>
Uses Variables?......... ===>
Host Variable File LRECL ===>
Input Data LRECL........ ===>
Output Data LRECL....... ===>
Report LRECL............ ===>
Number of Report Files.. ===>
Query Name.............. ===>
Form Name............... ===>
Procedure Name.......... ===>
```

Figure 25. Create Report Registration panel

From the Create Report Registration panel:

- If you press **Enter**, the attribute values are validated. If any errors are detected during input validation, the panel is displayed again with an error message. Otherwise, if the **Uses Variables?** field is set to YES, you proceed to the Edit Variables panel. If the **Uses Variables?** field is set to NO, the report is created (an entry will be inserted into Q.REPORTS), and you proceed to the next panel or return to the previous panel if no more actions have been requested.
- If you press **PF3**, the attribute values are ignored and the report is not created. You proceed to the next panel or return to the previous panel if no more actions have been requested.
- If you type ABORT and press **Enter**, the attribute values are ignored, the report is not created, and you return to the previous panel.

The fields on the panel are:

Owner
　　Enter the owner for this report. The value entered must be a valid primary or secondary SQLID or must be of the form T=tranid, where tranid is a valid CICS transaction identifier. For a tranid, this report is associated with that transaction rather than with a particular owner. This field is disabled if the report is being updated.

Name　Enter the name for this report. No spaces are allowed in the name. The combination of owner and name must be unique. This field is disabled if the report is being updated.

Description
　　Enter a report description (55 characters maximum).

Shared?
　　Enter YES if this report must be visible to all users or NO if it must be visible only to users with authority to SET CURRENT SQLID to the report owner.

Program Name
　　If this report runs a program, enter the program name. Leave this field blank if this report runs a QMF query or procedure.

Load Library

If this report runs a program, you can enter the name of the load library where the program is located. Leave this field blank if this report runs a QMF query or procedure.

Plan Name

If this report runs a program, you can enter the name of the plan to run with the program. Leave this field blank if this report runs a QMF query or procedure.

Environment

Enter `BATCH`, `TSO`, or `CICS`, depending on the environment in which this report must run. Set this field to `TSO` if this report runs a QMF query or procedure.

Program Type

Enter `P` (print), `D` (display), `N` (no report), `L` (data layer), or `R` (proc), depending on the type of program. Set this field to `P` or `D` if this report runs a QMF query or procedure.

Attachment Facility

If this report runs a program, enter `TSO`, `CAF`, `RRSAF`, or `CICS`, depending on the attachment facility used by the program. Leave this field blank if this report runs a QMF query or procedure.

Uses Variables?

If this report runs a program that uses host variables, enter `YES`. If this report runs a QMF query or procedure that uses variables, and you want the End User Facility to prompt for variable values, enter `YES`. Otherwise, enter `NO`. If you enter `YES`, a subsequent panel is displayed on which you can specify the variable names and data types.

Host Variable File LRECL

If this report runs a batch program that uses host variables, enter the LRECL to use for the HOSTVARS or PROCVARS DD at runtime. Otherwise, this field is set to `0` and is ignored.

Input Data LRECL

If this report reads data from an input file, enter the LRECL of that file; otherwise, set this field to `-1`.

Output Data LRECL

If this report writes data to an input file, enter the LRECL of that file; otherwise, set this field to `-1`.

Report LRECL

Enter the LRECL of the report written by this program; otherwise, set this field to `-1` if it is not known or not applicable.

Number of Report Files

Enter the number of REPORTnn DDs written by this report, or enter `-1` if it is not known or not applicable.

Query Name

If this report runs a program that was generated from a query or runs a QMF query, enter the name of the query. Otherwise, leave this field blank.

Form Name

If this report runs a program that was generated from a query and form or runs a QMF query and form, enter the name of the form. Otherwise, leave this field blank.

Procedure Name

If this report runs a program that was generated from a procedure or runs a QMF procedure, enter the name of the procedure. Otherwise, leave this field blank.

Entering variable definitions for report
About this task

When you create a new report, this panel does not list variable definitions. When you edit an existing report, this panel initially lists the current variable definitions for that report. Enter variable definitions for the report on this panel.

```
DB2P / DB2PLOCATION -- Edit Variables For QMFUSER.REPORT ------Row 1 to 10 of 10
Command ===>                                              Scroll ===> PAGE

Valid Actions Are...
D  Delete
I  Insert
R  Repeat
-----------------------------------------------------------------------------—-
       Variable Name                     Type
       -----------------------------  ---------------


***************************** Bottom of data ******************************
```

Figure 26. Edit Variables panel

From the Edit Variables panel:

- If you press **Enter**, line commands and variable definitions are validated and processed. If any errors are detected during input validation, the panel is displayed again with an error message. Otherwise, if any line commands are processed, the panel is displayed again. If there are no line commands, the variable definitions are created (entries are inserted into Q.REPORT_VARIABLES), and you proceed to the next panel or you return to the previous panel if no more actions have been requested.
- If you press **PF3**, the variable definitions are ignored and the report is not created. You proceed to the next panel or return to the previous panel if no more actions have been requested.
- If you press **PF7** or **PF8**, the panel scrolls backward or forward.
- If you type ABORT and press **Enter**, the variable definitions are ignored, the report is not created, and you return to the previous panel.

The fields on the panel are:

Line commands

Enter any of the following the characters as line commands:

- D to delete a line
- I to insert a line
- R to repeat a line

Variable Name

Enter the name of the variable. Omit the colon (:) at the beginning of host variable names and omit the ampersand (&) at the beginning of QMF variable names.

Type   Enter the data type of the variable. Valid data types are `SMALLINT`, `INTEGER`, `DECIMAL(p,s)`, `DECIMAL(p)`, `DECIMAL`, `FLOAT`, `CHAR(n)`, `VARCHAR(n)`, `DATE`, `TIME`, and `TIMESTAMP`.

Editing a report
About this task

You can edit a report from:
- the End User Facility Report Maintenance panel.
- a selection list.

To edit a report entry from the End User Facility Report Maintenance panel, enter information in the following fields:

Action
Enter `E` (for edit).

Report Owner
Enter the report owner (up to 8 characters). The report owner must be a valid primary or secondary SQLID or must be of the form `T=tranid`, where `tranid` is a valid CICS transaction identifier. For a `tranid`, reports associated with that transaction are selected, rather than those with a particular owner. If you leave this field blank, your current SQLID is used as a default.

Report Name
Enter the report name (up to 18 characters). You can use a percent (%) or an underscore (_) as wildcard characters in the name to process multiple reports. If you leave this field blank, a percent (%) is used as the default.

To edit a report entry from the Report Selection List panel, you must enter a value in the following field:

Action
Enter `E` (for edit).

In both cases, the Edit Report Registration panel opens. You can change attribute values from the Edit Report Registration panel. You cannot change the key values (report owner and report name) from this panel.

```
DB2P / DB2PLOCATION -- Edit Report Registration -------------------- 12.1.0
Command ===>

Owner..................... :
Name...................... :
Description ===>
Shared?................. ===>
Program Name............ ===>
Load Library............ ===>
Plan Name............... ===>
Environment............. ===>
Program Type............ ===>
Attachment Facility..... ===>
Uses Variables?......... ===>
Host Variable File LRECL ===>
Input Data LRECL........ ===>
Output Data LRECL....... ===>
Report LRECL............ ===>
Number of Report Files.. ===>
Query Name.............. ===>
Form Name............... ===>
Procedure Name.......... ===>
```

Figure 27. Edit Report Registration panel

From the Edit Report Registration panel:

- If you press **Enter**, the attribute values are validated. If any errors are detected during input validation, the panel is displayed again with an error message. Otherwise, if the **Uses Variables?** field is set to YES, you proceed to the Edit Variables panel. If the **Uses Variables?** field is set to NO, the report is updated, and you proceed to the next panel or you return to the previous panel if no more actions have been requested.

- If you press **PF3**, the attribute values are ignored and the report is not updated. You proceed to the next panel or you return to the previous panel if no more actions have been requested.

- If you type ABORT and press **Enter**, the attribute values are ignored, the report is not updated, and you return to the previous panel.

Dropping a report
About this task

You can drop a report from:
- the End User Facility Report Maintenance panel.
- a selection list.

To drop a report entry from the End User Facility Report Maintenance panel, enter information in the following field:

Action
>Enter D (for drop).

Report Owner
>Enter the report owner (up to 8 characters). The report owner must be a valid primary or secondary SQLID or must be of the form T=tranid, where tranid is a valid CICS transaction identifier. In the latter case, reports associated with that transaction are selected, rather than those with a particular owner. If you leave this field blank, your current SQLID is used as a default.

Report Name
>Enter the report name (up to 18 characters). You can use % and _ as

wildcard characters in the name to process multiple reports. If you leave this field blank, % is used as the default.

To drop a report entry from the Report Selection List panel, you must enter a value in the following field:

Action

Enter D (for drop).

In both cases the Report Registration Drop Confirmation panel opens. The name of the report to be dropped is displayed on the Report Registration Drop Confirmation panel, along with the number of database rows that are deleted as a result of this drop command.

```
DB2P / DB2PLOCATION -- Report Registration Drop Confirmation ---------- 12.1.0
Command ===>

Press ENTER to confirm this DROP request.
Type CAN or CANCEL or press PF3 to cancel this DROP request.

Report Owner............... :
Report Name................ :

Number of rows to be deleted from Q.REPORTS......... :
Number of rows to be deleted from Q.REPORT_VARIABLES :
```

Figure 28. Report Registration Drop Confirmation panel

From the Report Registration Drop Confirmation panel:

- If you press **Enter**, the report identified on the panel is dropped from the database. Then you proceed to the next panel or return to the previous panel if no more actions have been requested.
- If you press **PF3**, the drop command is ignored (the report remains in the database). Then you proceed to the next panel or return to the previous panel if no more actions have been requested.
- If you type ABORT and press **Enter**, the drop command is ignored (the report remains in the database), and you return to the previous panel.

Setting default parameters

About this task

All Program Generator options use a collection of default parameter settings. These default settings are saved from session to session in your ISPF profile data set (under an application ID of RAAX). You can set these default parameters by selecting option D from the Program Generator Menu.

```
DB2P / DB2PLOCATION -- Set Default Parameters ----------------------- 12.1.0
Command ===>

 1. Export Queries?..... ===>     (Y=Yes, N=No)
    Query Data Set...... ===>
    Query Member........ ===>
 2. Export Forms? ...... ===>     (Y=Yes, N=No)
    Form Data Set....... ===>
    Form Member......... ===>
 3. Export Procs? ...... ===>     (Y=Yes, N=No)
    Procedure Data Set.. ===>
    Procedure Member.... ===>
    Review Proc? ....... ===>     (B=Browse, E=Edit, N=No)
 4. Source Code Data Set ===>
 5. Source Code Data Set Disposition ===>      (OLD, SHR, or MOD)
 6. Confirm Query/Form Locations?... ===>      (Y=Yes, N=No)
 7. Confirm Exports?................ ===>      (Y=Yes, N=No)
 8. QMF/REXX Initialization Program. ===>
 9. Current SQLID................... ===>
10. QMF Profile Key ................ ===>      (T=TSOID, P=PRIMEID)
11. Translation.................... ===>
12. Table Name Customization Exit... ===>
13. Column Name Customization Exit.. ===>
14. Host Variable Customization Exit ===>
```

Figure 29. Set Default Parameters panel

From the Set Default Parameters panel:

- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel is displayed again with an error message. If there are no errors, then these default values are saved and you return to the Program Generator Menu.

- If you press **PF3**, all input fields are ignored and you return to the Program Generator Menu. The previous default values are restored.

The fields on the panel are:

Export Queries?
Enter Y to direct Program Generator to automatically export your queries. Enter N if your queries have been exported.

Query Data Set
If the **Export Queries?** flag is set to N, this is the data set that contains your queries.

If the **Export Queries?** flag is set to Y, this is the data set into which your queries must be exported (in which case it must have RECFM=FB and LRECL=79).

If the data set does not exist, the Allocate Data Set pop-up window is displayed, allowing you to allocate it.

If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Query Member** field. You can also enter the name *TEMP to specify that temporary data sets should be created for exporting your queries.

Query Member
If the specified **Query Data Set** is a PDS, this is the member into which your queries must be exported, or the member that contains your queries.

If you leave this field blank, the member name is derived from the query name if the **Query Data Set** is a PDS. Leave this field blank if the **Query Data Set** is not a PDS or is *TEMP.

Export Forms?

Enter Y to direct Program Generator to automatically export your forms. Enter N if your forms have already been exported.

Form Data Set

If the **Export Forms?** flag is set to N, this is the data set that already contains your forms. If the **Export Forms?** flag is set to Y, this is the data set into which your forms must be exported (in which case it must have RECFM=V and LRECL between 81 and 7290 for QMF V2 or between 161 and 7290 for QMF V3). If the data set does not exist, the Allocate Data Set pop-up window is displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Form Member** field. You can also enter the name *TEMP to specify that temporary data sets should be created for exporting your forms.

Form Member

If the specified **Form Data Set** is a PDS, this is the member into which your forms must be exported, or this is the member that contains your forms. If you leave this field blank, the member name is derived from the form name if the **Form Data Set** is a PDS. Leave this field blank if the **Form Data Set** is not a PDS or is *TEMP.

Export Procs?

Enter Y to direct Program Generator to automatically export your procedures. Enter N if your procedures have been exported.

Procedure Data Set

If the **Export Procs?** flag is set to N, this is the data set that contains your procedures. If the **Export Procs?** flag is set to Y, this is the data set into which your procedures must be exported (in which case it must have RECFM=FB and LRECL=79). If the data set does not exist, the Allocate Data Set pop-up window is displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Procedure Member** field. You can also enter the name *TEMP to specify that temporary data sets must be created for exporting your procedures.

Procedure Member

If the specified **Procedure Data Set** is a PDS, this is the member into which your procedures must be exported, or the member that contains your procedures. If you leave this field blank, the member name is derived from the procedure name if the **Procedure Data Set** is a PDS. Leave this field blank if the **Procedure Data Set** is not a PDS or is *TEMP.

Review Proc?

Enter B to browse input procedures before generation, E to edit them, or N to do neither.

Source Code Data Set

Enter the data set to which generated programs must be written. If the data set does not exist, the Allocate Data Set pop-up window is displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is

taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name.

Source Code Data Set Disposition
Enter the disposition for the source code data set on output. Valid values are `OLD`, `SHR`, or `MOD`.

Confirm Query/Form Locations?
If you enter `Y`, the Confirm Query/Form Locations panel is displayed during the generation process. Use this panel to confirm the location of every query and form used as input. If you enter `N`, default values are used to determine the location of each query and form.

Confirm Exports?
If you enter `Y`, the Export Confirmation panel is displayed during the generation process. Use this panel to confirm each QMF export command before it is issued. Entering `N` causes exports to proceed without confirmation.

QMF/REXX Initialization Program
Enter the name of the REXX program used to set default QMF startup parameters, if your site does not use the default REXX program, DSQSCMDE.'

Current® SQLID
Enter a 1-to-8 character SQLID to be used to qualify query, form, procedure, and table names. The value entered must be a valid primary or secondary SQLID. If this value is left blank, your current SQLID is used to qualify object names.

QMF Profile Key
QMF provides the ability to select your profile based on your TSO logon ID or your primary SQLID. Set this flag is set to `T` use your TSO ID; otherwise, set this flag to `P` to use your primary SQLID.

Translation
Enter the QMF translation value to use to select your profile. Valid values are: ENGLISH , UPPERCASE, FRANCAIS CANADIEN , DANSK , FRANCAIS , DEUTSCH , ITALIANO , NIHONGO, HANGEUL , PORTUGUES , ESPANOL , SVENSKA , FRANCAIS (SUISSE) , and DEUTSCH (SCHWEIZ).

Note: Leave this field blank or enter an asterisk (*) to use the system default.

Table Name Customization Exit
Enter the name of an exit to be used to customize the appearance of database table names and declarations in generated source code. To invoke a CLIST as the exit, precede the name with a percent sign (%). Otherwise, Program Generator assumes that the you entered name refers to an executable load module. The RAATXL member in the QMFHPO.SRAACLST library contains a sample CLIST exit. No customization is performed if value is entered in this field.

Column Name Customization Exit
Enter the name of an exit to be used to customize the appearance of database column names in generated source code. To invoke a CLIST as the exit, precede the name with a percent sign (%). Otherwise, Program Generator assumes that the entered name refers to an executable load

module. The RAACXL member in the QMFHPO.SRAACLST library
contains a sample CLIST exit. If no value is entered in this field, no
customization is performed.

Host Variable Customization Exit

Enter the name of an exit to be used to customize the declaration and use
of host variables in generated source code. To invoke a CLIST as the exit,
precede the name with a percent sign (%). Otherwise, Program Generator
assumes that the entered name refers to an executable load module. The
RAAHXL member in the QMFHPO.SRAACLST library contains a sample
CLIST exit. If no value is entered in this field, no customization is
performed.

Allocating data sets

About this task

If you enter the name of a data set that does not exist, the Allocate Data Set
pop-up window is displayed, providing an interface by which you can allocate it.

```
Command ===>

This data set does not exist:


Specify allocation parameters below and press ENTER to allocate it.
Type CAN or CANCEL or press PF3 to cancel the allocation.

Unit.............. ===>
Space Units....... ===>        (C=Cylinders, T=Tracks, B=Blocks)
Primary Quantity.. ===>        (in above units)
Secondary Quantity ===>        (in above units)
Directory Blocks.. ===>        (0 for a sequential data set, LIB for a PDSE)
Record Format..... ===>
Record Length..... ===>
Block Size........ ===>
```

Figure 30. Allocate Data Set pop-up window

From the Allocate Data Set pop-up window:

- If you press **Enter**, all input fields are validated. If any errors are detected
  during input validation, the window is displayed again with an error message.
  If there are no errors, then the data set is allocated with the specified parameters
  and you return to the previous panel.

- If you press **PF3**, all input fields are ignored and you return to the previous
  panel. The data set is not allocated.

The fields on the window are:

Unit   Enter the device type to which the data set must be allocated, for example,
SYSDA.

Space Units

Enter C to express the size of the data set in cylinders, T to express the size
in tracks, or B to express the size in blocks.

Primary Quantity

Enter the primary space allocation for the data set, in the specified **Space
Units**.

Secondary Quantity
> Enter the secondary space allocation for the data set, in the specified **Space Units**.

Directory Blocks
> Enter the number of directory blocks for the data set, which is a PDS as a result. Enter `LIB` to allocate PDSE instead of PDS. Enter `0` to allocate a sequential data set.

Record Format
> This field displays the record format required for the type of data set being allocated. You cannot change this value.

Record Length
> This field displays the record length required for the type of data set being allocated. You cannot change this value.

Block Size
> Enter the block size for the data set. For data sets with a fixed record format, this must be a multiple of the record length. For data sets with a variable record format, this must be at least four greater than the record length. For data sets with an undefined record format, this must be a value greater than zero.

Chapter 3. Use the End User Facility

The End User Facility provides a convenient interface through which you can run reports. Reports are:

- Compiled programs, typically converted from a QMF query, query and form, or procedure
- Non-compiled QMF queries, queries and forms, or procedures

Before you can run a report, it must be registered with the End User Facility through Program Generator. You can run reports by selecting them from a list. If the report uses input variables, a subsequent panel is displayed on which you can specify runtime values for the variables.

The End User Facility has a version for TSO and another version for CICS. These two versions are similar in appearance and behavior. In either environment, online reports are automatically run online, and the report is displayed to the user. In either environment, the user can print the report. Under TSO, if the selected report is a batch program, JCL to run it is automatically generated and submitted (or edited if desired). Under TSO, non-compiled QMF queries, queries and forms, and procedures can be run online.

The following topics describe how to access the End User Facility, and how to use it to select report programs, provide variable values to those programs, and run those programs:

Related concepts:

"Selecting a report under TSO" on page 72

"Selecting a report under CICS" on page 72

"Supplying runtime variable values for batch reports" on page 73

Related tasks:

"Starting the End User Facility"

"Running reports from a list" on page 70

"Supplying runtime variable values for online reports" on page 76

"Specifying an input data set" on page 77

"Specifying an output data set" on page 78

"Setting default parameters (TSO only)" on page 79

Starting the End User Facility

About this task

You can start the End User Facility from:

- TSO

  You can start the End User Facility from TSO by selecting option 2 from the Compiler Selection Menu, or by issuing the following TSO command:

  ```
  CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'EU'
  ```

  When you invoke the End User Facility from TSO, you can pass a parameter that is used to set the current report owner. This eliminates the need to use the Set Default Parameters panel to set this value. Here is an example of how to invoke the End User Facility and set the current report owner to USER1:

```
                            CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'EU (OWNER=USER1'
```
This is the End User Facility Selection Menu. It is displayed only from the TSO version of the End User Facility.

```
QMF HPO/Compiler -- End User Facility Selection Menu ----- 12.1.0
Option ===>
                                          Db2 SSID ===> DB2P
                                          User ID:
                                          Date
                                          Time:
------------------------------------------------------------------------
1  Run Reports From List
D  Set Default Parameters
Q  QMF
X  Exit
```

Figure 31. QMF HPO/Compiler End User Facility Selection Menu panel

- CICS

  You can start the End User Facility from CICS by using the transaction identifier assigned during installation. The default value for this identifier is RAAE; however, there is no requirement to use the default name.

Running reports from a list

About this task

The Report Selection List panel can be displayed with or without extended information. The first time that you use the End User Facility, the Report Selection List panel is displayed without extended information. To switch between the two versions of the panel, press **PF10** or enter the SWAPVIEW command. The version of the panel that was displayed when you last exited the End User Facility is displayed the next time you enter the facility.

You can invoke the Report Selection List panel from:

- TSO

  Under ISPF, you can display the Report Selection List panel by selecting option 1 from the End User Facility Selection Menu, or by issuing one of the following TSO commands:

  ```
  CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'EU 1'
  ```

  ```
  CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'EU L'
  ```

  If you enter the second command, the End User Facility Selection Menu is not displayed when you leave the Report Selection List. Instead, you exit the End User Facility.

- QMF session

  You can also invoke the Report Selection List panel from a QMF session by issuing the QMF command synonym LIST REPORTS. You can pass the owner parameter with this command.

  ```
  LIST REPORTS
  ```

  ```
  LIST REPORTS (OWNER=USER1
  ```

  See "Step 2a. Creating Compiler command synonyms" on page 195 for information about how to enable the LIST REPORTS command synonym.

- CICS

  Under CICS, running the End User Facility transaction brings you to the Report Selection List panel.

Using the Report Selection List panel
About this task

The Report Selection List panel can be displayed with or without extended information. The first time that you use the End User Facility, the Report Selection List panel is displayed without extended information. To switch between the two versions of the panel, press PF10 or enter the SWAPVIEW command. The version of the panel that was displayed when you last exited the End User Facility is displayed the next time you enter the facility.

```
DB2P -- Report Selection List For QMFUSER ------------------- Row 1 to 1 of 1
Command ===>                                             Scroll ===> PAGE

Use S to select report.
Press ENTER to run selected report.
Press PF10 to show extended information.
Type CAN or CANCEL or press PF3 to exit.

  Report          Description
------------------  --------------------------------------------------

**************************** Bottom of data **************************
```

Figure 32. Report Selection List panel

```
DB2P -- Report Selection List For QMFUSER ------------------- Row 1 to 1 of 1
Command ===>                                             Scroll ===> PAGE

Use S to select report.
Press ENTER to run selected report.
Press PF10 to hide extended information.
Type CAN or CANCEL or press PF3 to exit.

  Report          Mode   Compiled? Description
------------------ ------ --------- ------------------------------
 
**************************** Bottom of data *******************************
```

Figure 33. Extended Report Selection List panel

To select a report, position the cursor to the left of the report name. When the cursor is positioned, enter S to select the report. If the report requires variable input, a panel on which to enter input variable values are displayed. If the report is an online program, then it runs automatically and the report is displayed. If the report is a batch program, then the JCL is generated and submitted automatically. Under TSO, you can enter E to select a batch report. This allows you to edit the JCL after it is generated.

The following keys and commands are available from both forms of the Report Selection List panels:

- If you press **Enter**, the first row selected with S is processed.

  If a row is selected with a code other than S, the panel is displayed again with an error message. After the first selected row is processed, the panel is displayed again. Under TSO, you can also select a row with E (to edit generated batch JCL).

- Under TSO, if you press **PF3**, all input fields are ignored and you return to the End User Facility Selection Menu. Under CICS, if you press **PF3** or **CLEAR**, all input fields are ignored and you exit the transaction.

- If you enter SELECT <name> on the command line, where <name> is the name of a report in the list, that report is selected. You can use any abbreviation of the word SELECT, for example, S <name>.

- If you enter LOCATE <name> on the command line, the displayed list is repositioned to the report named <name>. You can use any abbreviation of the word LOCATE, for example, L <name>.

- Under TSO, if you enter EDIT <name> on the command line, where <name> is the name of a batch report in the list, the JCL for that report is generated and edited. You can use any abbreviation of the word EDIT, for example, E <name>. This command cannot be used on a non-batch report.

- Under TSO, if you press **PF10** or enter SV or SWAPVIEW on the command line, you toggle between displaying and not displaying extended information.

Selecting a report under TSO

Three attributes are assigned when a TSO report is created that determine whether it appears in a user's selection lists:

Environment
> This attribute defines the environment in which the report can run. Only TSO programs and batch programs appear in selection lists when using the End User Facility under TSO.

Shared Status
> This attribute defines the authorization level of the report. Shared reports are available to all users. If a report is defined as restricted, then use of the report is limited to authorized users.

Report Owner
> Users are authorized to use a report (regardless of its Shared Status) if they can set their CURRENT SQLID to the owner of the report.
>
> Therefore, if the current report owner (CURRENT-REPORT-OWNER) is a valid CURRENT SQLID, then this SQL statement is used to select reports from Q.REPORTS:
>
> ```
> SELECT ...
> FROM Q.REPORT
> WHERE ENVIRONMENT IN ('T', 'B'
>    AND REPORT_OWNER = :CURRENT-REPORT-OWNED
> ```
>
> If the current report owner is not a valid CURRENT SQLID, then this SQL statement is used to select reports from Q.REPORTS:
>
> ```
> SELECT ...
> FROM Q.REPORTS
> WHERE ENVIRONMENT IN ('T', 'B')
>    AND REPORT_OWNER = :CURRENT-REPORT-OWNER
>    AND SHARED = 'Y'
> ```

Selecting a report under CICS

When a CICS report is created, two attributes are assigned that determine in which selection lists it is included:

Environment
> This attribute defines the environment in which the report can run. Only CICS programs appear in selection lists when using the End User Facility under CICS.

Report Owner

Users are authorized to use a report (regardless of its Shared Status) if they can set their CURRENT SQLID to the owner of the report. In addition, under CICS a user is authorized to use a report if the Report Owner matches the transaction ID used to invoke the End User Facility. For example, if the End User Facility transaction ID is RAAE, any user authorized to run that transaction can use reports whose Report Owner is T=RAAE.

Based on this description, the following sample SQL statement is used to obtain the reports to display in the selection list:

```
SELECT ...
FROM Q.REPORTS
WHERE ENVIRONMENT = 'C'
   AND (REPORT_OWNER = CURRENT SQLID
       OR REPORT_OWNER = 'T='||EIBTRANID)
```

Because Shared Status is ignored for CICS reports, it is recommended that CICS sites register all reports with a Shared Status of **no** and a Report Owner of the form T=tranid. This forces report list selection to be tied to transaction ID authorization.

Supplying runtime variable values for batch reports

When you select a batch report that uses runtime variables, a series of panels are presented based on the requirements of the report. The panels that can be presented are:

- the Assign Values to Variable Set panel if the report requires multiple sets of runtime variables.
- the Assign Values to Variables panel if the report allows only one runtime variable.
- the Specify Report Destination panel where you specify the destination of the report.

The following topics describe the panels:

Related tasks:

"Specifying multiple variable sets"

"Specifying a single variable set" on page 74

"Specifying a report destination" on page 75

Specifying multiple variable sets
About this task

If the program does not read data from an input file or write data to an output file, you can supply multiple sets of runtime variables on the Assign Values to Variable Set panel.

```
DB2P -- Assign Values To Variable Set #1 -------------------- Row 1 to 1 of 1
Command ===>                                               Scroll ===> PAGE

Press ENTER to accept input for this variable set.
Type CANCEL or press PF3 to end variable prompting and run this report.
Type ABORT to cancel this report request.

Variable :                                  Type :
Value ===>
***************************** Bottom of data ******************************
```

Figure 34. Assign Values to Variable Set panel

From the Assign Values to Variable Set panel:

- If you press **Enter**, this indicates that all runtime variable values for the current variable set have been supplied. All input data for the current variable set is validated. If you enter any values that do not conform to the listed data types, the panel is displayed again with an error message. If there are no errors, prompting resumes for the next variable set.

- If you press **PF3**, all input data for the current variable set is ignored. The Specify Report Destination panel is displayed.

- If you type ABORT and press **Enter**, no JCL is generated and you return to the Report Selection List panel.

Specifying a single variable set
About this task

If the program reads data from an input file or writes data to an output file, then only one set of runtime variables can be specified per run. The Assign Values to Variables panel is similar to the Assign Values to Variable Set panel.

```
DB2P -- Assign Values To Variables ----------------------------------- 12.1.0
Command ===>                                               Scroll ===> PAGE

Press ENTER to accept these values and continue.
Type CAN or CANCEL or press PF3 to cancel.

Variable :                                  Type :
Value ===>
***************************** Bottom of data ******************************
```

Figure 35. Assign Values to Variables panel for a single variable set

From the Assign Values to Variables panel:

- If you press **Enter**, this indicates that all runtime variable values have been supplied. All input data for these variable sets is validated. If you enter any values that do not conform to the listed data types, the panel is displayed again with an error message. Otherwise, if the selected program reads data from an input file, the Specify Input Data Set panel is displayed. If it writes data to an output file, the Specify Output Data Set panel is displayed. Otherwise, the Specify Report Destination panel is displayed.

- If you press **PF3**, no JCL is generated and you return to the Report Selection List panel.

Specifying a report destination

About this task

The destination for the report output from the program (for example, SYSOUT or a data set) is specified on the Specify Report Destination panel.

```
DB2P -- Specify Report Destination -------------------------------- 12.1.0
Command ===>

Press ENTER to continue.
Type CAN or CANCEL or press PF3 to cancel processing.

Specify where the program (or a program it calls) should write its report.

Write To SYSOUT... ===>        (Y=Yes, N=No)
If not writing to SYSOUT, enter data set parameters.
Data Set.......... ===>
Member............ ===>
Disposition....... ===>        (N=NEW, S=SHR, O=OLD, M=MOD)
If disposition is NEW, also enter allocation parameters.
Unit.............. ===>
Space Units....... ===>        (C=Cylinders, T=Tracks, B=Blocks)
Primary Quantity.. ===>        (in above units)
Secondary Quantity ===>        (in above units)
Directory Blocks.. ===>        (0 for a sequential data set)
Record Format..... ===>        (FA, FBA, VA, or VBA)
Record Length..... ===>
Block Size........ ===>
```

Figure 36. Specify Report Destination panel

From the Specify Report Destination panel:

- If you press **Enter**, all input data is validated. If any errors occur during validation, the panel is displayed again with an error message. If there are no errors, the JCL is generated and edited or submitted.
- If you press **PF3**, no JCL is generated and you return to the Report Selection List panel.

The fields on the panel are:

Write To SYSOUT
> Enter Y if the program must write its report output to a SYSOUT data set. Enter N if the program must write report output to a specified data set.

Data Set
> Enter the name of the data set to which the report output for the program must be written. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field.

Member
> If the specified data set is a PDS, enter the member to which the program must write its report output. Leave this field blank if the specified data set is not a PDS.

Disposition
> Enter N if the specified data set does not exist. If the data set does exist, enter S to allocate it with disposition SHR, O to allocate it with disposition OLD, or M to allocate it with disposition MOD.

Unit Enter the device type to which the data set must be allocated, for example, SYSDA.

Space Units
> Enter C to express the size of the data set in cylinders, T to express the size in tracks, or B to express the size in blocks.

Primary Quantity
> Enter the primary space allocation for the data set, in the defined Space Units.

Secondary Quantity
> Enter the secondary space allocation for the data set, in the defined Space Units.

Directory Blocks
> Enter the number of directory blocks for the data set, which is a PDS as a result. Enter 0 to allocate a sequential data set.

Record Format
> Enter the record format for the data set.

Record Length
> This field displays the record length required by the program. You cannot change this value.

Block Size
> Enter the block size for the data set. For data sets with a fixed record format, this must be a multiple of the record length. For data sets with a variable record format, this must be at least four greater than the record length.

Supplying runtime variable values for online reports

About this task

When you select an online report that uses runtime variables, a panel on which you can enter values for those variables is displayed before the report is run. The Assign Value to Variables panel is used to supply runtime variable values.

```
DB2P -- Assign Values to Variables -------------------------- Row 1 to 1 of 1
Command ===>                                                  Scroll ===> PAGE

Press ENTER to accept these values and continue.
Type CAN or CANCEL or press PF3 to cancel.

Variable :                               Type :
Value ===>

***************************** Bottom of data *********************************
```

Figure 37. Assign Values to Variables panel

From the Assign values to Variables panel:

• If you press **Enter**, this indicates that all runtime variable values have been supplied. All input data for these variable sets is validated. If you enter any values that do not conform to the listed data types, the panel is displayed again with an error message. Otherwise, if the selected program reads data from an input file, the Specify Input Data Set panel is displayed. If it writes data to an output file, the Specify Output Data Set panel is displayed. Otherwise, the program is run.

After the report ends, you return to this panel and all previous variable values are displayed again. If you want to run the report again with different input variables, specify the new variable values and press **Enter** again.

- If you press **PF3**, all input data is ignored and you return to the Report Selection List panel. Under CICS, pressing **CLEAR** performs the same function.

Specifying an input data set

About this task

If the selected program reads input data from a file, the Specify Input Data Set panel is displayed.

```
DB2P -- Specify Input Data Set ------------------------------------- 12.1.0
Command ===>

Press ENTER to continue.
Type CAN or CANCEL or press PF3 to cancel processing.

Specify where the program (or a program that it calls) should read its
input data.

Data set... ===>
Member..... ===>
Disposition ===>      (S=SHR, O=OLD)

The data set must exist.
```

Figure 38. Specify Input Data Set panel

From the Specify Input Data Set panel:

- If you press **Enter**, all input data is validated. If any errors occur during validation, the panel is displayed again with an error message. Otherwise, if the selected program writes data to an output file, the Specify Output Data Set panel is displayed. Otherwise, for batch programs, the Specify Report Destination panel is displayed. For online programs, the program runs.
- If you press **PF3**, no JCL is generated and no program runs and you return to the Report Selection List panel.

The fields on the panel are:

Data Set
> Enter the name of the data set containing the input data for the program. The data set must exist. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field.

Member
> If the specified data set is a PDS, enter the member from which the program must read its input data. Leave this field blank if the specified data set is not a PDS.

Disposition
> Enter S to allocate the specified data set with disposition SHR or O to allocate it with disposition OLD.

Specifying an output data set

About this task

If the selected program writes output data to a file, the Specify Output Data Set panel is displayed.

```
DB2P -- Specify Output Data Set ------------------------------------ 12.1.0
Command ===>

Press ENTER to continue.
Type CAN or CANCEL or press PF3 to cancel processing.

Specify where the program (or a program it calls) should write its
output data.

Data Set.......... ===>
Member............ ===>
Disposition....... ===>      (N=NEW, S=SHR, O=OLD, M=MOD)
If disposition is NEW, also enter allocation parameters.
Unit.............. ===>
Space Units....... ===>      (C=Cylinders, T=Tracks, B=Blocks)
Primary Quantity.. ===>      (in above units)
Secondary Quantity ===>      (in above units)
Directory Blocks.. ===>      (0 for a sequential data set)
Record Format..... ===>      (F, FB, V, or VB)
Record Length..... ===>
Block Size........ ===>
```

Figure 39. Specify Output Data Set panel

From the Specify Output Data Set panel:

- If you press **Enter**, all input data is validated. If any errors occur during validation, the panel is displayed again with an error message. If there are no errors, for batch programs, the Specify Report Destination panel is displayed. For online programs, the program runs.

- If you press **PF3**, no JCL is generated and you return to the Report Selection List panel.

The fields on the panel are:

Data Set

    Enter the name of the data set to write output data for the program. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here. Instead, use the **Member** field.

Member

    If the specified data set is a PDS, enter the member to which the program must write its output data. Leave this field blank if the specified data set is not a PDS.

Disposition

    Enter N if the specified data set does not exist. If the data set does exist, enter S to allocate it with disposition SHR, O to allocate it with disposition OLD, or M to allocate it with disposition MOD.

Unit Enter the device type to which the data set must be allocated, for example, SYSDA.

Space Units
Enter C to express the size of the data set in cylinders, T to express the size in tracks, or B to express the size in blocks.

Primary Quantity
Enter the primary space allocation for the data set, in the defined Space Units.

Secondary Quantity
Enter the secondary space allocation for the data set, in the defined Space Units.

Directory Blocks
Enter the number of directory blocks for the data set, which is a PDS as a result. Enter 0 to allocate a sequential data set.

Record Format
Enter the record format for the data set.

Record Length
This field displays the record length required by the program. You cannot change this value.

Block Size
Enter the block size for the data set. For data sets with a fixed record format, this must be a multiple of the record length. For data sets with a variable record format, this must be at least four greater than the record length.

Setting default parameters (TSO only)

About this task

Under TSO, the End User Facility uses a collection of default parameter settings. These default settings are saved from session to session in your ISPF profile data set (under an application ID of RAAX). You can set these default parameters by selecting option D from the End User Facility Selection Menu.

```
DB2P -- Set Default Parameters -------------------------------------- 12.1.0
Command ===>

1. Report Owner........................ ===>
2. Report DCB Parameters...
      SYSOUT CLASS..................... ===>
      LRECL............................ ===>
      DEST............................. ===>
      COPIES........................... ===>
3. Job Parameters (used only if Job Cards are left blank)...
      CLASS............................ ===>
      MSGCLASS......................... ===>
4. Job Cards...
   ===>
   ===>
   ===>
   ===>
5. Write JCL To...
      Data Set ===>
      Member.. ===
6. QMF/REXX Initialization Program..... ===>
7. QMF Profile Key (T=TSOID, P=PRIMEID) ===>
```

Figure 40. Set Default Parameters panel

From the Set Default Parameters panel:

- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel is displayed again with an error message. If there are no errors, then these default values are saved.
- If you press **PF3**, all input fields are ignored and you return to the End User Facility Selection Menu. The previous default values are restored.

The fields on the panel are:

Report Owner
Use this field to control which reports are included in the selection list. If you leave this field blank, your current SQLID is used as the default owner.

SYSOUT class
Specify the SYSOUT class for the REPORTnn DDs. If you leave this field blank, a system default value is used.

LRECL
Specify the LRECL for the REPORTnn DDs. If you leave this field blank,133 is used.

DEST Specify the DEST for the REPORTnn DDs. If you leave this field blank, a system default value is used. If no system default value exists, the DEST parameter is omitted.

COPIES
Specify the COPIES for the REPORTnn DDs. This number must be between 1 and 254. If you leave this field blank, the COPIES parameter is omitted.

CLASS
Specify the value to use for the job CLASS parameter. If you leave this field blank, a system default value is used.

MSGCLASS
Specify the value to use for the job MSGCLASS parameter. If you leave this field blank, a system default value is used.

Job Cards
These job cards are used when generating JCL for batch programs. If left blank, system default job cards are used.

Data Set
Enter the data set to which the generated JCL must be written. The data set must exist. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field. You can enter the name *TEMP to specify that a temporary data set must be created for the JCL.

Member
If the specified **Data Set** is a PDS, enter the name of the member to which the generated JCL must be written. Leave this field blank if the **Data Set** is not a PDS or is *TEMP.

QMF/REXX Initialization Program
If your site uses a REXX program other than the default (DSQSCMDE) to set default QMF startup parameters, enter its name here.

QMF Profile Key
QMF provides the ability to select your profile based on your TSO logon

ID or your primary SQLID. If this field is set to T, your TSO ID is used. If
it is set to P, your primary SQLID is used.

Chapter 4. Work with QMF HPO/Manager

QMF HPO/Manager includes the following system utilities for managing and administering the IBM Query Management Facility (QMF):

- The HPO/Governor module

  The HPO/Governor module replaces the QMF sample governor and it is the direct interface into QMF processing. This enhanced governor module offers many more features than the QMF governor and services the following facilities:

  - The Object Manager tracks QMF session activity. It records information about the commands and objects being processed and writes this information to the HPO Activity Log.

  - The Governor controls QMF session activity. It obtains thresholds and controls from resource groups in the same way as the QMF sample governor, but it provides a much wider and more flexible set of controls. These controls enforce proper use of resources in QMF sessions.

  - The Monitor supplies a real time user interface to QMF session activity information. It accepts administrator commands and passes them on to the HPO/Governor module. This facility can only be activated for QMF/TSO sessions.

  - The Query Analyzer provides preemptive governing capabilities. It traps queries before they are processed by Db2 and estimates their resource consumption. Queries that are judged too intensive can be canceled before they run. This facility can only be activated for QMF/TSO sessions.

  Note: When running QMF under TSO, QMF looks for a governor module named DSQUEGV1. When running QMF under CICS, QMF looks for a governor module named DSQUEGV3. The HPO/Governor modules and the QMF sample governor modules have the same name. "Step 5a. Allocating HPO libraries" on page 197 explains what is necessary to ensure that QMF finds the HPO/Governor modules instead of the sample governor modules.

- The HPO Activity Log

  The HPO Activity Log is a repository for QMF session activity and object usage information. The HPO/Governor module writes to the HPO Activity Log data sets. You must run a batch job periodically to copy the HPO Activity Log data sets to the HPO Activity Log tables. You can use the HPO Activity Log JCL facility to create the JCL to run the batch job.

- Online facilities

  HPO/Manager online facilities help organize and simplify the administration and management of QMF.

Issue the following TSO command to display the HPO/Manager Selection Menu panel:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'M2'
```

```
QMF HPO/Manager -- Selection Menu --------------------------- 12.1.0
Option ===>
                                     Db2 SSID ===>
                                     Location ===>
                                     User ID:
                                     Date:
                                     Time:
-------------------------------------------------------------------
 1 Object Manager    5 User Profile        9 QMF Start-Up Parameters
 2 Governor          6 Error Log          10 Object Manager Reports
 3 Monitor           7 Spill File          X Exit
 4 Query Analyzer    8 HPO Activity Log JCL
-------------------------------------------------------------------
IBM* Rocket**
Licensed Materials - Property of IBM. 5615-Db2 5697-P43
@ Copyright IBM Corp. 1994, 2013
@ Copyright Rocket Software, Inc. 1990, 2013
*Trademark of International Business Machines
**Trademark of Rocket Software. Inc.
```

Figure 41. QMF HPO/Manager Selection Menu

You can invoke each of the online facilities by selecting the corresponding menu option using the one-character selection codes. The online facilities available from the Selection Menu panel are:

- Object Manager: Select this facility to track and manage QMF objects.
- Governor: Select this facility to review and manipulate resource groups.
- Monitor
- Query Analyzer
- User Profile
- Error Log
- Spill file
- HPO Activity Log JCL
- QMF Startup Parameters
- Object Manager Reports

The following topics describe working with QMF HPO/Manager:

Related concepts:

Chapter 5, "Track and manage QMF objects," on page 87

Chapter 6, "Control QMF resource usage," on page 119
The Governor provides the necessary functions for QMF and Db2 database administrators to effectively manage, control, and restrict QMF resource usage. The HPO/Governor module provides the Governor's direct interface into QMF processing.

Chapter 7, "View QMF session activity in real time," on page 141
You can view QMF session activity in real time with Monitor. You can monitor who is currently using QMF, determine what types of actions are being performed, assess CPU time utilization and number of rows fetched for any action requiring database activity, and even view the SQL text associated with a long running query.

Chapter 8, "Analyze queries," on page 149
Query Analyzer provides you with preemptive governing capabilities required to automatically prohibit resource intensive or inefficient QMF queries from being processed by Db2. By providing you with a resource profile for your query that is more meaningful than the TIMERON value, you can make decisions about whether a query must run or be canceled before it runs.

Chapter 9, "Work with user profiles," on page 163
Every QMF user is required to have a user profile to start a QMF session.

Chapter 10, "Use the error log," on page 173
When QMF detects a system or resource error, it writes an entry to the Q.ERROR_LOG table. Errors are logged by user and message number and are date and time stamped. System programmers and troubleshooters refer to error log entries to resolve outstanding QMF problems.

Chapter 11, "Specify the spill file allocation," on page 181
QMF uses a spill file when there is no more room in virtual storage for the current data object. The spill file is a temporary storage area utilized by QMF when virtual storage is not large enough to hold the current data object.

Chapter 12, "Generate JCL for HPO Activity Log batch job," on page 183
The HPO Activity Log is a repository for QMF session activity and object usage information. Periodically a batch job is run to copy the HPO Activity Log data sets to the HPO Activity Log tables. The HPO Activity Log JCL facility generates the JCL for this batch job. This JCL can be generated once and then added to your job scheduling system.

Chapter 13, "Using the QMF Startup Parameters panel," on page 191
You can control the characteristics of a QMF session that you start by passing parameters to it. For example, there are parameters to identify the Db2 environment, the QMF plan, and other performance-related parameters. Tuning these parameters typically requires manual changes to CLISTs and EXECs. You can tune and customize these parameters by using the QMF Start-Up Parameters panel. You can specify values for the QMF startup parameters, and you can start a QMF session using those parameters.

Chapter 5. Track and manage QMF objects

As users build QMF objects (queries, forms, analytics, and procedures), the QMF object tables become more populated. There is a negative impact on performance as the object tables increase in size. As an administrator, you must maintain control over the QMF objects; you must know who owns what objects, what objects are obsolete, what objects must be transferred to new owners and Db2 subsystems, and so on.

As users leave your environment, they typically leave behind a set of queries, forms, analytics, and procedures. With Object Manager you can quickly and efficiently transfer those objects to a new owner or drop the unowned objects

Object Manager includes the integrated components that provide the necessary functions for QMF and Db2 database administrators to effectively track and manage QMF objects. The HPO/Governor module provides Object Manager's direct interface into QMF processing.

Object Manager comprises three main components:
- The HPO Activity Log
- Online facilities
- Reports

Related concepts:

"Recording object usage information" on page 88

"Use the online facilities" on page 88

"Use the Object Manager reports" on page 109
The following reports, based on the HPO tracking data, are available to assist in managing a QMF environment.

Related tasks:

"Starting Object Manager" on page 89

"Building a selection list of objects" on page 90
To build a selection list of QMF objects from the Object Manager panel, you must enter values in the following fields:

"Viewing the object list" on page 94
When you enter L (for list) on the Object Manager panel, the Object Manager Selection List panel is displayed. This panel contains a list of all QMF objects that match the input specifications entered on the Object Manager panel and, if specified, the List Filter Specification panel.

"Browsing an object" on page 94
You can browse a QMF object (and optionally analyze a QMF query) from a selection list or from the Object Manager panel. You can browse SQL or PROMPTED queries, and procedures. You cannot browse ad hoc queries (*ADHOC).

"Dropping an object" on page 95
You can drop a QMF object or multiple objects (with the same owner) from a selection list or from the Object Manager panel. Ad hoc objects (*ADHOC) cannot be dropped.

You can copy QMF objects from a selection list or from the Object Manager panel. The Copy action does not drop or delete the originally specified object (or set of objects). Ad hoc objects (*ADHOC) cannot be copied.

You can transfer QMF objects from a selection list or from the Object Manager panel. The Transfer action drops or deletes the originally specified object (or set of objects). Ad hoc objects (*ADHOC) cannot be transferred.

You can rename QMF objects from a selection list or from the Object Manager panel; however, you can only rename one object at a time. Ad hoc objects (*ADHOC) cannot be renamed.

You can toggle the restricted status of a QMF object between restricted and shared from a selection list or from the Object Manager panel. Ad hoc objects (*ADHOC) cannot have their status modified.

You can view QMF object statistics, view object remarks, and add or modify object remarks from a selection list or from the Object Manager panel. You can view statistics collected for ad hoc objects (*ADHOC) from this panel.

You can use this action to review QMF usage statistics such as CPU consumption, rows fetched, and query execution counts. Statistics can be summarized by resource group, date, time, mode, and environment.

Recording object usage information

The HPO Activity Log is a repository for QMF session activity and object usage information. For example, when an object is erased from the system, the object name, the user ID of the person who issued the erase command, and the date and time are recorded. All QMF object activity, including ad hoc activity, is tracked.

The HPO/Governor module writes to the HPO Activity Log data sets. A batch job, automatically generated by the HPO Activity Log JCL facility, is run periodically to copy the HPO Activity Log data sets to the HPO Activity Log tables.

An exit is provided from the HPO/Governor module to allow custom processing against the activity log records before they are written to the HPO Activity Log data sets. Each log record can be examined and marked for inclusion into or exclusion from the log. This exit can be used to selectively track QMF object activity. Sample assembler source code for this exit is provided in QMFHPO.SRAASAMP in the member named RAAOBJX.

Use the online facilities

You can review and manipulate QMF objects using the Object Manager online facilities. You can use the Object Manager's online facilities to operate on a single object, or to operate on a set of objects.

The following actions operate on one object at a time:
- Browsing an object
- Viewing the first-used and last-used statistics for an object
- Reviewing historical CPU time consumption and rows fetched for a query
- Reviewing historical CPU time consumption and rows fetched for a procedure

- Reviewing the SQL text associated with the running of a query
- Renaming an object
- Adding or modifying remarks for an object
- Changing the restricted status of an object
- Invoking Program Generator
- Cross referencing objects with their generated programs

The following actions can operate on one or more objects at a time:
- Copying one or more objects
- Transferring one or more objects
- Dropping one or more objects
- Reviewing QMF usage statistics for one or more objects

You can use Object Manager to build selection lists of QMF objects. Lists can be qualified by owner, name, type, and usage statistics. These lists can be used to help you identify dormant objects, frequently used objects, or resource intensive objects. From a list, it is easy for you to drop dormant objects or compile frequently used or resource intensive objects. It is possible to invoke Program Generator from an Object Manager selection list.

Object Manager obtains first-used, last-used, and last-modified statistics and historical query and procedure statistics from the HPO Activity Log tables. In addition, the Object Manager online facilities write to the HPO Activity Log data sets when objects are dropped or added.

Starting Object Manager

About this task

You perform all object management from the Object Manager panel, which you can access by selecting option 1 from the Manager Selection Menu, or by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM O'
```

```
DB2P / DB2PLOCATION -- Object Manager ------------------------ 12.1.0
  Command ===>
  Action................... ===>

  Object Owner.............. ===>
  Object Name............... ===>
  Object Type (Q/P/F/A/%)... ===>

  Additional List Filtering? ===>
  Specify Sort Order? (Y/N). ===>
  Drop Confirmation? (Y/N).. ===>

  ------------------------------------------------------------------
  Valid Actions Are...
  B  Browse                      Q  QMF Activity Summary
  H  Detail History              R  Change Restricted Status
  N  Rename                      V  View Statistics and Remarks
  P  Invoke Program Generator    X  Objects/Reports Cross Reference

  These actions support % and _ wildcard characters in Object Name...
  C  Copy                        L  Display Selection List
  D  Drop                        T  Transfer
  ------------------------------------------------------------------
```

Figure 42. Object Manager

From the Object Manager panel:

- If you press **Enter**, all input fields are processed. If any errors are detected during input validation, the panel is displayed again with an error message.
- If you press **PF3**, all input fields are ignored and you return to the previous menu.

Building a selection list of objects

To build a selection list of QMF objects from the Object Manager panel, you must enter values in the following fields:

About this task

Action
> Enter L (for list).

Object Owner
> Enter the owner of the object you want to list. You can use a percent sign (%) or an underscore (_) as wildcard characters in the owner to select objects from multiple owners.

Object Name
> Enter the name of the object you want to list. You can use a percent sign (%) or an underscore (_) as wildcard characters in the name to select multiple objects. If you leave this field blank, a percent sign (%) is used as a default.

Object Type
> Enter Q, P, F or A to list queries, procedures, forms, or analytics only. For all object types, enter a percent sign (%). If you leave this field blank, a percent sign (%) is used as a default.

Additional List Filtering?
> Enter Y to further qualify the objects to include in the selection list. If further qualification is requested, the List Filter Specification panel is

displayed. Enter N to bypass additional list filtering. See "Specifying additional filtering for object list" for more information on filtering lists.

Specify Sort Order?

Enter Y to request whether or not the selection list is sorted according to additional sort options. If sorting is requested, the Sort Order Specification panel is displayed. Enter N to bypass specifying sort options. N is the default. See "Specifying sort options for object list" on page 93 for more information on sort options.

Drop Confirmation?

Enter Y to request drop confirmations or N to suppress them. This value is carried forward to all actions performed from the selection list. If this flag is left blank, Y is used as a default.

Specifying additional filtering for object list

When you enter L (for list) on the Object Manager panel and the **Additional List Filtering?** flag is set to Y, the List Filter Specification panel is displayed. This panel displays the set of filters that you can use to further qualify the object selection list. An object must pass all of the enabled filters to be included in the selection list.

About this task

```
DB2P / DB2PLOCATION -- List Filter Specification ------------- 12.1.0
  Command ===>

  Enable? Description
  ------- ----------------------------------------------------------
          Show only queries/procs that ran more than (CPU seconds)...
          Show only queries/procs run more than (number of times)....
          Show only queries/procs that have ever been canceled.
          Show only queries/procs run by user (TSO ID)..............
          Show only queries/procs run by user (SQLID)...............
          Show only objects       that have not been used since......
          Show only objects       that have been used on or since....
          Show only queries/procs that have not been run since.......
          Show only queries/procs that have been run on or since.....
          Show only objects       that include the text listed below.
          (Warning: resource intensive filter)......

          Carry filtering through to History panel? (Y/N)....... ===>
```

Figure 43. List Filter Specification

From the List Filter Specification panel:

- If you press **Enter**, all enabled filters are processed. An object must pass all enabled filters to be included in the selection list. That is, if more than one filter is enabled, these conditions are combined with the 'AND' operator.
- If you press **PF3**, all input fields are ignored and you return to the Object Manager panel.

The fields on the panel are:

Show only queries that ran more than * CPU seconds.

Enter Y in the **Enable**? column to enable this filter. A query must have run for more than the specified number of CPU seconds in order for it to be included in the selection list. This is useful for identifying resource intensive queries. Enter N in the **Enable**? column to disable this filter.

Show only queries/procs run more than * times.
Enter Y in the **Enable**? column to enable this filter. A query or procedure must have been run more than the specified number of times in order for it to be included in the selection list. This is useful for identifying frequently used queries and procedures. Enter N in the **Enable**? column to disable this filter.

Show only queries/procs that have ever been canceled.
Enter Y in the **Enable**? column to enable this filter. A query or procedure must have been canceled at least once in order for it to be included in the selection list. This is useful for identifying frequently canceled queries and procedures. Enter N in the **Enable**? column to disable this filter.

Show only queries/procs run by user (TSO ID) *.
Enter Y in the **Enable**? column to enable this filter. This is useful for identifying specific user's actions under QMF. Enter N in the **Enable**? column to disable this filter.

Show only queries/procs run by user (SQLID) *.
Enter Y in the **Enable**? column to enable this filter. This is useful for identifying specific user's actions under QMF. Enter N in the **Enable**? column to disable this filter.

Show only objects that have not been used since YYYY-MM-DD.
Enter Y in the **Enable**? column to enable this filter. An object must not have been used since the specified date in order for it to be included in the selection list. This is useful for identifying dormant objects. Enter N in the **Enable**? column to disable this filter.

Show only objects that have been used on or since YYYY-MM-DD.
Enter Y in the **Enable**? column to enable this filter. An object must have been used on or since the specified date in order for it to be included in the selection list. This is useful for identifying frequently used objects. Enter N in the **Enable**? column to disable this filter.

Show only queries/procs that have not been run since YYYY-MM-DD.
Enter Y in the **Enable**? column to enable this filter. A query or procedure must not have been run since the specified date in order for it to be included in the selection list. This is useful for identifying dormant queries and procedures. Enter N in the **Enable**? column to disable this filter.

Show only queries/procs that have been run on or since YYYY-MM-DD.
Enter Y in the **Enable**? column to enable this filter. A query or procedure must have been used on or since the specified date in order for it to be included in the selection list. This is useful for identifying frequently used queries and procedures. Enter N in the **Enable**? column to disable this filter.

Show only objects that include the text listed below.
Enter Y in the **Enable**? column to enable this filter. An object must contain the text that you specify for it to be included in the selection list. This is useful for locating queries that reference a specific table or column. Enter N in the **Enable**? column to disable this filter.

Note: It is resource intensive to search queries, forms, and procedures for specific text. When you enable this option, expect to wait longer for results to be displayed.

Carry filtering through to History panel?
Enter Y to carry the filter specifications through to the History panel. When you specify an H (history) from the object selection list, the filter

specifications are applied to the historical tracking data before it is displayed. For example, if a date filter is specified, then the tracking data is compared against the date filter and only that data that passed the filter is displayed. Enter N to disable this option. If you leave this field blank, Y is assumed.

Specifying sort options for object list

When you enter L (for list) on the Object Manager panel and the **Specify Sort Order?** flag is set to Y, the Sort Order specification panel is displayed. This panel displays the options that you can use to further sort the object selection list.

About this task

```
DB2P / DB2PLOCATION -- Sort Order Specification ------------- 12.1.0
  Command ===>

Valid Actions Are...
A Ascending Order
D Descending Order

  Act     Sort Field
  ---     -----------------------------------------------------------
          Object Owner / Object Name.................................
          First Used, Date and Time.................................
          Last Used, Date and Time..................................
```

Figure 44. Sort Order Specification panel

From the Sort Order Specification panel:

- If you press **Enter**, the specified sort criteria is used to sort the object selection list.
- If you press **PF3**, all input fields are ignored and you return to the Object Manager panel.

The fields on the panel are:

Object Owner / Object Name
> Enter A in the **Object Owner / Object Name** column to sort the object selection list by object owner and name in ascending order. Enter D in the **Object Owner / Object Name** column to sort the object selection list by object owner and name in descending order.

First used, Date and Time
> Enter A in the **Act** column next to the **First used, Date and Time** column to sort the object selection list by the first used data and time (with a secondary sort by object owner and name) in ascending order. Enter D in the **Act** column next to the **First used, Date and Time** column to sort the object selection list by the first used data and time (with a secondary sort by object owner and name) in descending order.

Last Used, Date and Time
> Enter A in the **Act** column next to the **Last used, Date and Time** column to sort the object selection list by the last used data and time (with a secondary sort by object owner and name) in ascending order. Enter D in the **Act** column next to the **Last used, Date and Time** column to sort the object selection list by the last used data and time (with a secondary sort by object owner and name) in descending order.

Viewing the object list

When you enter L (for list) on the Object Manager panel, the Object Manager Selection List panel is displayed. This panel contains a list of all QMF objects that match the input specifications entered on the Object Manager panel and, if specified, the List Filter Specification panel.

About this task

```
DB2P / DB2PLOCATION -- Object Manager Selection List ---------- Row 1 to 2 of 2
  Command ===>                                         Scroll ===> PAGE

  Valid Actions Are...
  B  Browse                       P  Invoke Program Generator
  C  Copy                         R  Change Restricted Status
  D  Drop                         T  Transfer
  H  Detail History               V  View Statistics and Remarks
  N  Rename                       X  Object/Reports Cross Reference

  ------------ ----------------------------- <--First Used--> <--Last Used--->
  Act       Object Owner  / Object Name T R Date      Time  Date      Time
  ---       -------------------------- - - ---------- ----- ---------- -----

  ****************************** Bottom of data ********************************
```

Figure 45. Object Manager Selection List panel

From the Object Manager Selection List panel:

- If you press **Enter**, all rows that are selected with an action code are processed. After all selected rows are processed, the panel is displayed again with an informative message on each row (such as *UPDATE or *NODROP). This message appears in the space between the **Act** and **Object Owner** columns.
- You can LOCATE an object by object name only from the command line. Enter any abbreviation of the word "locate" (e.g., "L" or "LOC") followed by the object name to automatically scroll down to the desired object.

  Note: If multiple object owners are included in this list, only the first owner's list is searched.
- If you press **PF3**, all input fields are ignored and you return to the Object Manager panel.
- If you press **PF8** or **PF7**, the panel scrolls forward or backward after all selected rows have been processed.

Browsing an object

You can browse a QMF object (and optionally analyze a QMF query) from a selection list or from the Object Manager panel. You can browse SQL or PROMPTED queries, and procedures. You cannot browse ad hoc queries (*ADHOC).

About this task

To browse a QMF object from the Object Manager panel, enter values in the following fields:

Action
        Enter B (for browse).

Object Owner
Enter the owner of the object. No wildcard characters are allowed.

Object Name
Enter the name of the object. No wildcard characters are allowed.

Object Type
Enter `Q` or `P` to specify query or procedure. If the type is unknown, enter a percent sign (%).

To browse a QMF object from the Object Manager Selection List panel, enter the following:

Action
Enter `B` (for browse).

The object is displayed in ISPF view.

From the Object Browse ISPF view:
* If you enter the command `ANALYZE` on the command line and press **Enter**, Query Analyzer is invoked with the QMF query identified on this panel. This command is only valid for QMF queries. When you exit Query Analyzer, you return to this panel.
* If you press **PF3**, you return to the previous panel.
* If you press **PF8** or **PF7**, the panel scrolls forward or backward.

Dropping an object

You can drop a QMF object or multiple objects (with the same owner) from a selection list or from the Object Manager panel. Ad hoc objects (*ADHOC) cannot be dropped.

About this task

To drop a QMF object from the Object Manager panel, enter values in the following fields:

Action
Enter `D` (for drop).

Object Owner
Enter the owner of the object. No wildcard characters are allowed.

Object Name
Enter the name of the object. You can use a percent sign (%) or an underscore (_) as wildcard characters in the name to copy multiple objects. If you leave this field blank, a percent sign (%) is used as a default.

Object Type
Enter `Q`, `P`, `F`, or `A` to drop queries, procedures, forms, or analytics only. For all object types, enter a percent sign (%). If you leave this field blank, a percent sign (%) is used as a default.

Drop Confirmation?
Enter `Y` to request a drop confirmation panel or `N` to suppress one. If this flag is left blank, `Y` is used as a default.

To drop a QMF object from the Object Manager Selection List panel, enter a value in the following field:

Action

> Enter D (for drop).

The number of objects to be dropped is shown on the Object Drop Confirmation panel.

```
DB2P / DB2PLOCATION -- Object Drop Confirmation-------------- 12.1.0
  Command ===>

  Press ENTER to confirm this DROP request.
  Type CAN or CANCEL or press PF3 to cancel this DROP request.

  Object Owner.. :
  Object Name... :
  Object Type... :

  Number of objects to be deleted :
```

Figure 46. Object Drop Confirmation panel

From the Object Drop Confirmation panel:

- If you press **Enter**, the QMF objects identified on the panel are dropped from the database, the HPO Activity Log is updated, and you return to the previous panel.
- If you press **PF3**, the drop command is ignored, the QMF objects remain in the database, and you return to the previous panel.

Copying an object

You can copy QMF objects from a selection list or from the Object Manager panel. The Copy action does not drop or delete the originally specified object (or set of objects). Ad hoc objects (*ADHOC) cannot be copied.

About this task

To copy a QMF object or multiple objects using the Object Manager panel, enter values in the following fields:

Action

> Enter C (for copy).

Object Owner

> Enter the owner of the object. You can use a percent sign (%) or an underscore (_) as wildcard characters in the owner to copy objects from multiple owners.

Object Name

> Enter the name of the object. You can use a percent sign (%) or an underscore (_) as wildcard characters in the name to copy multiple objects. If you leave this field blank, a percent sign (%) is used as a default.

Object Type

> Enter Q, P, F or A to copy queries, procedures, forms or analytics only. For all object types, enter a percent sign (%). If you leave this field blank, a percent sign (%) is used as a default.

To copy a QMF object from the Object Manager Selection List panel, enter a value in the following field:

Action

Enter C (for copy).

The number of QMF objects that are copied is listed in the Copy Object panel. The source and destination information for the copy is also displayed.

```
DB2P / DB2PLOCATION -- Copy Object-------------------------- 12.1.0
  Command ===>

  Press ENTER to process this COPY request.
  Type CAN or CANCEL or press PF3 to cancel this COPY request.

  From Db2 Subsystem......... :
       Location.............. :
       Object Owner.......... :
       Object Name........... :
       Object Type (Q/P/F/A/%) :
       Object Count.......... :

  To   Local Db2 Subsystem. ===>
       Location............ ===>
       New Owner........... ===>
       New Name............ ===>
       Replace Duplicates?. ===>
```

Figure 47. Copy Object panel

From the Copy Object panel:

- If you press **Enter**, the QMF objects identified on the panel are processed, the database is updated, the HPO Activity Log is updated, and you return to the previous panel.
- If you press **PF3**, the command is ignored, the objects remain unchanged, and you return to the previous panel.

The fields on the panel are:

From Db2 Subsystem and Location
These fields identify the source QMF system of the original objects. **Location** is only specified if DDF is active.

To Db2 Subsystem and Location
These fields identify the QMF system in which a copy of the source objects are created. You can value in the **Location** field if DDF is active. You can leave the **To Db2 Location** field blank to specify the default location for the **To Db2 Subsystem.**

New Owner
Enter a value to create a new set of objects with a different owner from the **From Object Owner**.

New Name
Enter a value to create a new object with a different name than the **From Object Name**. You can enter a value in this field only when you are processing one object (that is, when **Object Count** is equal to 1). You cannot use any of the following QMF reserved words as the new name: ANALYTICS, CHART, DATA, FORM, FORM., PROC, PROFILE, QUERY, REPORT, and TABLE.

Replace Duplicates?
This flag determines what happens if an object exists with the same name as one you are trying to create. If you enter Y, the new object replaces the object with the same name. If you enter N, the new object is not created.

Transferring an object

You can transfer QMF objects from a selection list or from the Object Manager panel. The Transfer action drops or deletes the originally specified object (or set of objects). Ad hoc objects (*ADHOC) cannot be transferred.

About this task

To transfer a QMF object or multiple objects using the Object Manager panel, you must enter values in the following fields:

Action
> Enter T (for transfer).

Object Owner
> Enter the owner of the object. No wildcard characters are allowed.

Object Name
> Enter the name of the object. You can use a percent sign (%) or an underscore (_) as wildcard characters in the name to transfer multiple objects. If you leave this field blank, a percent sign (%) is used as a default.

Object Type
> Enter Q, P, F or A to transfer queries, procedures, forms or analytics. For all object types, enter a percent sign (%). If you leave this field blank, a percent sign (%) is used as a default.

To transfer a QMF object from the Object Manager Selection List panel, you must enter a value in the following field:

Action
> Enter T (for transfer).

The number of QMF objects that are transferred is listed in the Transfer Object panel. The source and destination information for the transfer is also displayed.

```
DB2P / DB2PLOCATION -- Transfer Object ---------------------- 12.1.0
  Command ===>

  From Db2 Subsystem......... :
       Location.............. :
       Object Owner.......... :
       Object Name........... :
       Object Type (Q/P/F/A/%):
       Object Count.......... :

  To   Db2 Subsystem...... ===>
       Location........... ===>
       New Owner.......... ===>
       New Name........... ===>
       Replace Duplicates? ===>
```

Figure 48. Transfer Object panel

From the Transfer Object panel:

- Press **ENTER** to process this TRANSFER request. If you press **Enter**, the QMF objects identified on the panel are processed, the database is updated, the HPO Activity Log is updated, and you return to the previous panel.
- Type CAN or CANCEL or press **PF3** to cancel this TRANSFER request.
- If you press **PF3**, the command is ignored, the objects remain unchanged, and you return to the previous panel.

The fields on the panel are:

New Owner

> If you are transferring a set of objects, enter the new owner for the objects. You must specify a different owner from the **From Object Owner.** If you are transferring only one object, enter the new owner for the object, or specify the same owner as the **From Object Owner**, in which case you must specify a different object name in the **New Name field**.

New Name

> If you are transferring a set of objects, you cannot enter a value in this field. If you are transferring only one object, enter the new name for the object. If the object is being transferred to a different owner, you can specify the same name as the **From Object Name**. Otherwise, you must specify a different name. You cannot use any of the following QMF reserved words as the new name: ANALYTICS, CHART, DATA, FORM, FORM., PROC, PROFILE, QUERY, REPORT, and TABLE.

Replace Duplicates?

> This flag controls what happens if an object exists with the same name as one you are trying to create. If you enter Y, the new object replaces the object having the same name. If you enter N, the new object is not created.

Renaming an object

You can rename QMF objects from a selection list or from the Object Manager panel; however, you can only rename one object at a time. Ad hoc objects (*ADHOC) cannot be renamed.

About this task

To rename a QMF object using the Object Manager panel, you must enter values in the following fields:

Action

> Enter N (for name).

Object Owner

> Enter the owner of the object. No wildcard characters are allowed.

Object Name

> Enter the name of the object. No wildcard characters are allowed.

Object Type

> Enter Q, P, F, or A to rename queries, procedures, forms, or analytics. For all object types, enter a percent sign (%). If you leave this field blank, a percent sign (%) is used as a default.

To rename a QMF object from the Object Manager Selection List panel, you must enter a value in the following field:

Action

> Enter N (for name).

The **From** information is displayed along with the number of QMF objects that are processed.

```
DB2P / DB2PLOCATION -- Rename Object ----------------------- 12.1.0
  Command ===>

  Press ENTER to process this RENAME request.
  Type CAN or CANCEL or press PF3 to cancel this RENAME request.

  From Db2 Subsystem......... :
       Location.............. :
       Object Owner.......... :
       Object Name........... :
       Object Type (Q/P/F/A/%):
       Object Count.......... :

  To   Db2 Subsystem...... ===>
       Location.......... ===>
       New Owner......... ===>
       New Name.......... ===>
       Replace Duplicates? ===>
```

Figure 49. Rename Object panel

From the Rename Object panel:

- If you press **Enter**, the QMF object identified on the panel are processed, the database is updated, the HPO Activity Log is updated, and you return to the previous panel.
- If you press **PF3**, the command is ignored, the object remains unchanged, and you return to the previous panel.

The fields on the panel are:

New Name
> Enter the new name of the object. You must specify a different value from the **From Object Name**. You cannot use any of the following QMF reserved words as the new name: ANALYTICS, CHART, DATA, FORM, FORM., PROC, PROFILE, QUERY, REPORT, and TABLE.

Replace Duplicates?
> This flag controls what happens if an object exists with the same name as one you are trying to create. If you enter Y, the new object replaces the object with the same name. If you enter N, the new object is not created.

Toggling the restricted status of an object

You can toggle the restricted status of a QMF object between restricted and shared from a selection list or from the Object Manager panel. Ad hoc objects (*ADHOC) cannot have their status modified.

About this task

To toggle the restricted status of a QMF object from the Object Manager panel, you must enter values in the following fields:

Action
> Enter R (for restricted status).

Object Owner
> Enter the owner of the object. No wildcard characters are allowed.

Object Name
> Enter the name of the object. No wildcard characters are allowed.

Object Type

Enter Q, P, F, or A to specify a query, procedure, form, or analytic. If the type is unknown, enter a percent sign (%).

To toggle the restricted status of a QMF object from the Object Manager Selection List panel, you must enter a value in the following field:

Action

Enter R (for restricted status).

Viewing object statistics and remarks

You can view QMF object statistics, view object remarks, and add or modify object remarks from a selection list or from the Object Manager panel. You can view statistics collected for ad hoc objects (*ADHOC) from this panel.

About this task

To view QMF object statistics from the Object Manager panel, you must enter values in the following fields:

Action

Enter V (for view statistics).

Object Owner

Enter the owner of the object. No wildcard characters are allowed.

Object Name

Enter the name of the object. No wildcard characters are allowed.

Object Type

Enter Q, P, F or A to specify a query, procedure, form, or analytics. If the type is unknown, enter a percent sign (%).

To view QMF object statistics from the Object Manager Selection List panel, you must enter a value in the following field:

Action

Enter V (for view statistics).

Object statistics and remarks are displayed in the View Statistics and Remarks panel.

```
DB2P / DB2PLOCATION -- QMFUSER.QUERY1 ---------------------- 12.1.0
  Command ===>

  Overtype remarks to change.
  Press ENTER to save new remarks.
  Type CAN or CANCEL or press PF3 to leave remarks unchanged.


  Remarks ===>

  Type.................. :            Subtype................ :
  Restricted Status...... :           Model.................. :
  Object Level........... :           Number of Times Run..... :
  Number of Times Used... :           Number of Times Canceled :

  Object Activity           First Used    Last Used   Last Modified
  Date.................. :                 .....       .....
  Time.................. :                 .....       .....
  TSOID................. :                 .....       .....
  Current SQLID......... :                 .....       .....
  Environment........... :                 .....       .....
  Mode.................. :                 .....       .....
  QMF Command........... :                 .....       .....
```

Figure 50. View Statistics and Remarks panel

From the View Statistics and Remarks panel:

- If you enter the command COMPILE on the command line and press **Enter**, Program Generator is invoked with the QMF object identified on this panel. This command is only valid for QMF queries and procedures. When you exit Program Generator, you return to this panel.

  Note: You can invoke Program Generator only if Compiler is installed on your system. A message is displayed if Compiler is not installed.
- If you press **Enter** and you modify the **Remarks** field, the remarks for this object are modified and you return to the previous panel.
- If you press **Enter** and you do not modify the **Remarks** field, the remarks for this object remain unchanged and you return to the previous panel.
- If you press **PF3**, you return to the previous panel and the remarks for this object remain unchanged.

The field on the panel is:

Remarks
    Enter the remarks for this object.

Viewing detail history

You can view QMF detail history for queries and procedures from a selection list or from the Object Manager panel. You can view statistics collected for ad hoc queries (*ADHOC), ad hoc forms (*ADHOCF), and ad hoc procedures (*ADHOCP) from this panel as well.

About this task

To view QMF detail history from the Object Manager panel, you must enter values in the following fields:

Action
    Enter H (for history).

Object Owner
Enter the owner of the query or procedure. No wildcard characters are allowed.

Object Name
Enter the name of the query or procedure. No wildcard characters are allowed.

Object Type
Enter Q to specify a query or P to specify a procedure.

To view QMF detail history from the Object Manager Selection List panel, you must enter a value in the following field:

Action
Enter H (for history).

If the object that you selected is a query, the history is displayed on the Query History panel. See "Viewing query detail history" for information of the Query History panel fields.

If the object that you selected is a procedure, the history is displayed on the Procedure History panel. See "Viewing procedure detail history" on page 105 for more information of the Procedure History panel fields.

Viewing query detail history
About this task

```
DB2P / DB2PLOCATION -- Query QMFUSER.QUERY1 ------------------ 12.1.0
  Command ===>                                    Scroll ===> PAGE
  Valid Actions Are...
  B  Browse SQL Text

  Total number of times run............:
  Rows: Minimum :            Average :          Maximum :
  CPU : Minimum :            Average :          Maximum :


                                                      M
  A                                               E O C S
  C          Start   Elapsed                      N D A Q
  T  Date    Time    Time    TSOID    SQLID  Rows  CPU   V E N L
     -----   -----   -----   -----    -----  ----  ---   - - - -

****************************BOTTOM OF DATA****************************
```

Figure 51. Query History panel

From the Query History panel:
- If you press **Enter**, all rows that are selected with an action code of B (to browse query text) are processed and then opened in ISPF view. If there is no query text to browse for the selected row, the row is bypassed. After all selected rows are processed, the panel is displayed again.
- If you press **PF3**, all input fields are ignored and you return to the previous panel.
- If you press **PF8** or **PF7**, the panel scrolls forward or backward after all selected rows have been processed.

The fields on the panel are:

Total number of times run
This field indicates the number of times this query has been run. If additional list filtering has been carried forward, the number of detail records displayed on this panel can be less than this value. If additional list filtering has been carried forward, an information message is displayed on the panel's message line.

ACT (Action): Set this field to B to browse SQL text. The SQL text is displayed in ISPF view. See "Viewing the SQL text for query objects" for more information on the panel fields.

ENV (Environment): This column indicates the environment under which the object was run. T indicates TSO, C indicates CICS, and O or H indicates the action was performed in HPO Object Manager.

MODE
This column indicates the mode under which the object was run. O indicates online and B indicates batch.

CAN (Cancel code): This column indicates whether or not the query was canceled. If it was not canceled, a zero is displayed. If it was canceled, a one character code is displayed. See Appendix H, "HPO/Governor cancel codes," on page 241 for a list of the values that can appear in this column.

SQL (SQL text indicator): This column indicates whether or not there is any SQL text available for browsing. If SQL text is available, this flag is set to Y. If no text is available, this flag is set to N. SQL text is only available for queries in which CPU consumption exceeds an installation-defined threshold. For more information about this threshold and SQL text tracking, see "Step 3h. Setting the HPO/Governor module parameters" on page 210.

Viewing the SQL text for query objects

The text for the selected query is displayed in ISPF view. This is the actual SQL statement that was run in QMF. For queries stored in QMF, this can be different from the current SQL statement stored in QMF. This is the only screen from which you can browse ad hoc query text.

About this task

```
VIEW        SYS10148.T115431.RA000.PDJN.R0201293           Columns 00001 00072
Command ===>                                                Scroll ===> CSR
****** **************************** Top of Data ******************************
====== ENTER 'ANALYZE' TO INVOKE QUERY ANALYZER
======
====== DATE       TIME     TSOID    SQLID    ENV  MODE   ROWS      CPU
====== ---------- -------- -------- -------- ---- ------ --------- -----------
====== 2010-04-20 13.43.13 MDDEGT   MDDEGT   TSO  ONLINE 4         00:00:00:01
======
000001 SELECT * FROM Q.STAFF WHERE ID=ID AND DEPT=10
000002
****** *************************** Bottom of Data ****************************
```
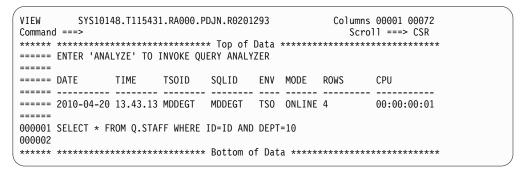
Figure 52. Query object SQL text

Note: The length of the SQL text displayed is determined during the configuration process. Refer to "Step 3h. Setting the HPO/Governor module parameters" on page 210 for more information.

From the SQL Text Browse ISPF view:

- If you enter the command `ANALYZE` on the command line and press **Enter**, Query Analyzer is invoked with the QMF query identified on this panel. This command is only valid for QMF queries. When you exit Query Analyzer, you return to this panel.
- If you press **PF3**, you return to the previous panel.
- If you press **PF8** or **PF7**, the screen scrolls forward or backward.
- If you press **PF10** or **PF11**, the screen moves left or right

The fields on the panel are:

Date This field displays the date on which the command that activated database activity began.

Time This field displays the time on which the command that activated database activity began.

TSOID

For online sessions, this field displays the TSOID of the user who logged on to QMF. For batch sessions, it displays the user ID associated with the batch job.

SQLID

This field displays the CURRENT SQLID at the time the command was initiated.

Mode This field displays the mode in which the command was run, either ONLINE or BATCH.

Rows This field displays the accumulated number of rows fetched at the time that the SQL text was captured for the query.

CPU This field displays the accumulated CPU time consumed at the time that the SQL text was captured for the query.

Cancel Code

This column indicates whether or not the query was canceled. If it was not canceled, a zero is displayed. If it was canceled, a one character code is displayed. See Appendix H, "HPO/Governor cancel codes," on page 241 for a list of the values that can appear in this column.

Viewing procedure detail history

If the object that you selected is a procedure, the history is displayed on the Procedure History Panel.

About this task

```
DB2P / DB2PLOCATION -- Proc QMFUSER.PROC1 -------------------- 12.1.0
  Command ===>                                    Scroll ===> PAGE

  Total number of times run............:
  Rows: Minimum :           Average :           Maximum :
  CPU : Minimum :           Average :           Maximum :
                                                         M
                                                       E O C
          Start   Elapsed                              N D A
  Date    Time    Time   TSOID   SQLID   Rows    CPU   V E N
  -----   ------  -----  ------  ------  -----   -----  - - -

************************* BOTTOM OF DATA************************
```
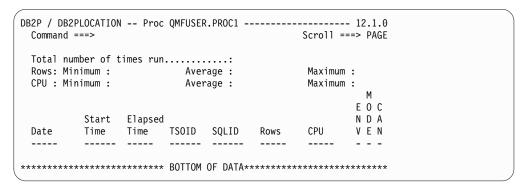
Figure 53. Procedure History panel

From the Procedure History panel:
- If you press **PF3**, you return to the previous panel.
- If you press **PF8** or **PF7**, the panel scrolls forward or backward after all selected rows have been processed.

The fields on the panel are:

TOTAL number of times run
> This field indicates the number of times this procedure has been run.

ENV (Environment): This column indicates the environment under which the object was run: TSO; CICS; or HPO.

Mode This column indicates the mode under which the object was run: ONLINE or BATCH.

CAN (Cancel code): This column indicates whether or not the procedure was canceled. If it was not canceled, a zero is displayed. If it was canceled, a one character code is displayed. See Appendix H, "HPO/Governor cancel codes," on page 241 for a list of the values that can appear in this column.

Invoking Program Generator

You can select a query or a procedure and invoke Program Generator to compile that object into a program. When you exit Program Generator, you return to the panel from which you selected the action.

About this task

Note: You can only invoke Program Generator if HPO/Compiler is installed on your system. A message is issued if it is not installed.

To invoke Program Generator from the Object Manager panel, you must enter values in the following fields:

Action
> Enter P (for Program Generator).

Object Owner
> Enter the owner of the object. No wildcard characters are allowed.

Object Name
> Enter the name of the object. No wildcard characters are allowed.

Object Type
> Enter Q or P to specify a query or a procedure. If the type is unknown, enter a percent sign (%).

To invoke Program Generator from the Object Manager Selection List panel, you must enter a value in the following field:

Action
> Enter P (for Program Generator).

Viewing an object's usage in a program

You can view which objects have been compiled into programs. If the selected object has been compiled and registered into any report programs, then a list of those programs is displayed on the Object/Report Cross Reference panel. If no reports have been generated and registered from this object, then a message is displayed.

About this task

To view the cross reference report from the Object Manager panel, you must enter values in the following fields:

Action
> Enter X (for cross reference).

Object Owner
> Enter the owner of the object. No wildcard characters are allowed.

Object Name
> Enter the name of the object. No wildcard characters are allowed.

Object Type
> Enter Q, P, F, or A to specify a query, procedure, form or analytics. If the type is unknown, enter a percent sign (%).

To view the cross reference report from the Object Manager Selection List panel, you must enter a value in the following field:

Action
> Enter X (for cross reference).

A list of all reports that were generated from the object is displayed on this panel. In addition, the date and time that the program was generated is displayed.

```
DB2P / DB2PLOCATION -- Object/Reports Cross Reference -------------- 12.1.0
  Command ===>                                         Scroll ===> PAGE

  Object Owner......:
  Object Name.......:

  Report Owner     Report Name           Date           Time
  ------------     ------------------    ----------     --------

****************************** BOTTOM OF DATA ******************************
```

Figure 54. Objects/Reports Cross Reference panel

From the Objects/Reports Cross Reference panel:
- If you press **PF3**, you return to the previous panel.
- If you press **PF8** or **PF7**, the panel scrolls forward or backward.

Viewing QMF activity information

You can use this action to review QMF usage statistics such as CPU consumption, rows fetched, and query execution counts. Statistics can be summarized by resource group, date, time, mode, and environment.

About this task

To review QMF usage statistics from the Object Manager panel, only the **Action** field must be entered. All other input fields on this panel are ignored. This action can only be invoked from the Object Manager panel.

Action
> Enter Q (for QMF activity summary).

The selection criteria for reviewing QMF usage statistics by resource group, date, time, mode, and environment are specified on the QMF Activity Summary Filtering panel.

```
DB2P / DB2PLOCATION -- QMF Activity Summary Filtering --------- 12.1.0
  Command ===>


  Required Filtering:
  Resource Group........... ===>                   (*=ALL)
  From Date................ ===>                    (MM/DD/YYYY)
  To Date.................. ===>                    (MM/DD/YYYY)

  Optional Filtering:
  From Time................ ===>                    (HH.MM.SS)
  To Time.................. ===>                    (HH.MM.SS)
  Mode..................... ===>                    (1=ONLINE,2=BATCH)
  Environment.............. ===>                    (3=TSO,5=CICS)
```

Figure 55. QMF Activity Summary Filtering panel

From the QMF Activity Summary Filtering panel:
- If you press **PF3**, you return to the previous panel.
- If you press **Enter**, the selection criteria is processed and the QMF Activity Summary panel is displayed. See "Viewing the QMF activity summary information" on page 109 for more information on the summary fields.

The required fields on the panel are:

Resource Group
> Enter the resource group for which you want to summarize QMF activity. Enter an asterisk (*) for all resource groups.

From Date
> Enter the start date for QMF activity in MM/DD/YYYY format.

To Date
> Enter the end date for QMF activity in MM/DD/YYYY format.

The optional fields on the panel are:

From Time
> Enter the start time for QMF activity in HH.MM.SS format.

To Time
> Enter the end time for QMF activity in HH.MM.SS format. Leave this field blank if you left the **From Time** field blank. Specify a **To Time** if you specified a **From Time**.

Mode Enter 1 to display only online activity. Enter 2 to display only batch activity.

Environment
    Enter 3 to display only TSO activity. Enter 5 to display only CICS activity.

Viewing the QMF activity summary information

The QMF Activity Summary panel is displayed with the results of processing the selection criteria that you specified in the QMF Activity Summary Filtering panel. If **From Time** and **To Time** are specified, usage statistics are summarized and displayed only for the specified time range. If **From Time** and **To Time** filtering is omitted, usage statistics are summarized for 12 predefined time ranges. All filtering criteria are displayed in the panel header.

About this task

```
DB2P / DB2PLOCATION -- QMF Activity Summary -------------------- 12.1.0
  Command ===>                                       Scroll ===> PAGE

  Resource Group....:
  From Date.........:          To Date.....:
  From Time.........:          To Time.....:
  Mode..............:          Environment.:

  Hour            Avg CPU      Max CPU      Avg Rows   Max Rows  Run
  Range           Time         Time         Fetched    Fetched   Count
  --------------  -----------  -----------  ---------  --------- -----




****************************** BOTTOM OF DATA ******************************
```

Figure 56. QMF Activity Summary panel

If you press **PF3** from the QMF Activity Summary panel, you return to the previous panel.

Use the Object Manager reports

The following reports, based on the HPO tracking data, are available to assist in managing a QMF environment.

Object Manager provides the following reports based on the HPO tracking data to help manage a QMF environment. These reports include:
- Cancellation summary
- Cancellation detail for a user
- Performance summary based on maximum CPU
- Performance summary based on average CPU
- Performance summary for a query
- Performance detail for a query
- Resource consumption detail for a user
- Resource usage summary
- Resource usage summary for a time period
- Chargeback summary for a time period

These reports can be run using the Object Manager online facilities. Sample JCL is also provided in QMFHPO.SRAASAMP for batch reporting.

You can invoke the Object Manager reports by selecting option 10 from the Manager Selection Menu, or by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM R'
```

```
DB2P / DB2PLOCATION -- Object Manager Reports ----------------- 12.1.0
  Option ===>

  Select one of the options listed below and press ENTER.

    1  Cancellation summary
    2  Cancellation detail for a user
    3  Performance summary based on maximum CPU
    4  Performance summary based on average CPU
    5  Performance summary for a query
    6  Performance detail for a query
    7  Resource consumption detail for a user
    8  Resource usage summary
    9  Resource usage summary for a time period
   10  Chargeback summary for a time period
    X  Exit
```

Figure 57. Object Manager Reports panel

Related tasks:

"Running the Cancellation summary report" on page 111
This report identifies which users most frequently have their QMF queries canceled. High rates of cancellation can indicate that the user needs more training or that the user needs to be given greater resource privileges. High cancellation rates can often lead to end user dissatisfaction and must be investigated and discussed with the end user.

"Running the Cancellation detail for a user report" on page 112
This report provides details on the queries that were canceled for a specific user, including the query name, SQL text, and reason for cancellation.

"Running the Performance summary based on maximum CPU report" on page 112
This report shows performance data for queries including their maximum CPU time consumed and number of times run. It is sorted in descending order to highlight those queries with the largest CPU consumption. Queries that are frequently run and have high CPU time consumption are the best candidates for converting to static SQL programs with Program Generator because they present the greatest opportunities for cost savings.

"Running the Performance summary based on average CPU report" on page 113
This report shows performance data for queries including their average CPU time consumed and number of times run. It is sorted in descending order to highlight those queries with the largest CPU consumption. Queries that are frequently run and have high average CPU time consumption are the best candidates for converting to static SQL programs with Program Generator because they present the greatest opportunities for cost savings.

"Running the Performance summary for a query report" on page 114
This report shows which users most often execute a specific query and the CPU time that it consumes. It can be used once a problem query is identified to determine which users are most frequently executing that query.

"Running the Performance detail for a query report" on page 115
This report shows detail statistics for each execution of a query. It provides performance information such as CPU time consumed and rows fetched for each execution and an average CPU time consumed in seconds for all executions.

"Running the Resource consumption detail for a user report" on page 115
This report can be run for a specific user to determine which queries are executed
and the resources being consumed by those queries. The query executions are
sorted in descending order by CPU time consumed. This highlights queries that
are most important from a resource consumption standpoint. It can indicate that
resource problems are limited to specific queries, or that resource problems occur
only when running ad hoc queries. The report contains the actual query text at the
time of execution.

"Running the Resource usage summary report" on page 116
This report shows which users are most actively using QMF and consuming the
most resources.

"Running the Resource usage summary for a time period report" on page 117
This report shows which users are most actively using QMF and consuming the
most resources during a specific period of time. Information on the report can be
used for chargeback purpose, trend analysis, or problem identification.

"Running the Chargeback summary for a time period" on page 118
This report allows you to associate a cost with QMF usage for real or informational
chargeback purposes. It allows you to set a cost per unit for CPU seconds
consumed and rows fetched and then it calculates a usage cost per user for the
specified time period.

Running the Cancellation summary report

This report identifies which users most frequently have their QMF queries
canceled. High rates of cancellation can indicate that the user needs more training
or that the user needs to be given greater resource privileges. High cancellation
rates can often lead to end user dissatisfaction and must be investigated and
discussed with the end user.

About this task

The Cancellation Summary report requires no input variables. You can invoke this
report by selecting option 1 from the Object Manager Reports Selection Menu. You
can also run this report in batch by editing the sample JCL member RAAMR01J in
QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on
what modifications are necessary before submitting the batch job.

```
RAAMR01T ------------------------ LINE 0000000 -- COLUMNS 001   080
  Command ===>                                    Scroll ===> PAGE
************************* TOP OF REPORT ****************************
                        QMF USERS
                  NUMBER OF TIMES CANCELED
                  SORTED IN DESCENDING ORDER

  CURRENT           NUMBER OF TIMES      FIRST DATE  LAST DATE
  SQLID     TSO ID      CANCELED          CANCELED   CANCELED
  --------  --------  ---------------    ----------  ----------
  DBPUSR    DBPUSR                12     2099-10-05  2099-10-24
  TSOP100   TSOP100               10     2099-10-05  2099-10-10

************************ BOTTOM OF REPORT *************************
```

Figure 58. Sample Cancellation summary report

Note: The "Cancellation Detail For a User" report provides more specific
cancellation information for a single user.

Running the Cancellation detail for a user report

This report provides details on the queries that were canceled for a specific user, including the query name, SQL text, and reason for cancellation.

About this task

The Cancellation detail for a user report requires the following input variable:

TSOID

Enter the TSO ID for which you want to obtain cancellation detail information.

You can invoke this report by selecting option 2 from the Object Manager Reports Selection Menu. You can also run this report in batch by editing the sample JCL member RAAMR02J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.
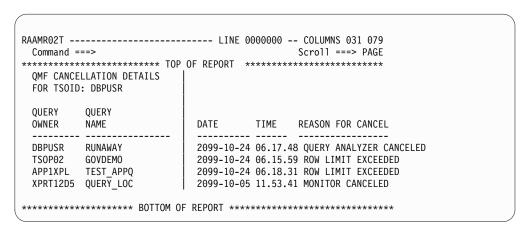
```
RAAMR02T -------------------------- LINE 0000000 -- COLUMNS 031 079
  Command ===>                                    Scroll ===> PAGE
************************* TOP OF REPORT  **************************
  QMF CANCELLATION DETAILS      |
  FOR TSOID: DBPUSR             |
                                |
  QUERY     QUERY               |
  OWNER     NAME                | DATE       TIME    REASON FOR CANCEL
  --------- ----------------    | ---------- ------  -----------------
  DBPUSR    RUNAWAY             | 2099-10-24 06.17.48 QUERY ANALYZER CANCELED
  TSOP02    GOVDEMO             | 2099-10-24 06.15.59 ROW LIMIT EXCEEDED
  APP1XPL   TEST_APPQ           | 2099-10-24 06.18.31 ROW LIMIT EXCEEDED
  XPRT12D5  QUERY_LOC           | 2099-10-05 11.53.41 MONITOR CANCELED
                                |
******************** BOTTOM OF REPORT ****************************
```

Figure 59. Sample Cancellation detail for a user report

Running the Performance summary based on maximum CPU report

This report shows performance data for queries including their maximum CPU time consumed and number of times run. It is sorted in descending order to highlight those queries with the largest CPU consumption. Queries that are frequently run and have high CPU time consumption are the best candidates for converting to static SQL programs with Program Generator because they present the greatest opportunities for cost savings.

About this task

This report requires no input variables.

You can invoke this report by selecting option 3 from the Object Manager Reports Selection Menu. You can also run this report in batch by editing the sample JCL member RAAMR03J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

```
 RAAMR03T --------------------------- LINE 0000000 -- COLUMNS 031 079
  Command ===>                                        Scroll ===> PAGE
*************************** TOP OF REPORT ****************************
 QMF QUERIES                      |
 MAXIMUM CPU AND RUN COUNT        |
 SORTED BY CPU SECONDS (DESC)     |

 QUERY      QUERY                 |    MAXIMUM     NUMBER OF    DATE
 OWNER      NAME                  | CPU (SECONDS)  TIMES RUN  FIRST RUN
 --------   -----------------     | -------------  ---------  ---------
 DBPUSR     Q2Q11                 |    37.28         14       2099-10-05
 USER01     RUNAWAY               |    33.31          2       2099-10-05
 USER01     GGVDEEO               |     4.24          5       2099-10-05
 USER01     QTEST506Q             |     0.34          4       2099-10-12
 USER01     QTEST504Q             |     0.32          8       2099-10-11
 USER01     QTEST507Q             |     0.32          2       2099-10-05
 TSOTEST1   XAAAR02Q              |     0.30          1       2099-10-19
 USER01     XAABR06Q              |     0.27          3       2099-10-20
 USER01     QTEST501Q             |     0.24          1       2099-10-21
 USER01     QTEST505Q             |     0.21          2       2099-10-21
 USER01     QTEST511Q             |     0.21          1       2099-10-21
 USER01     QTEST502Q             |     0.19          2       2099-10-21
```

Figure 60. Sample Performance summary based on maximum CPU report

Note: More information on a specific query's performance can be gathered from the Performance Detail For a Query report and the Resource Consumption Detail For a User reports.

Running the Performance summary based on average CPU report

This report shows performance data for queries including their average CPU time consumed and number of times run. It is sorted in descending order to highlight those queries with the largest CPU consumption. Queries that are frequently run and have high average CPU time consumption are the best candidates for converting to static SQL programs with Program Generator because they present the greatest opportunities for cost savings.

About this task

This report requires no input variables.

You can invoke this report by selecting option 4 from the Object Manager Reports Selection Menu. You can run this report in batch by editing the sample JCL member RAAMR04J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

```
RAAMR04T --------------------------------- LINE 0000000 -- COLUMNS 031 079
  Command ===>                                             Scroll ===> PAGE
***************************** TOP OF REPORT *******************************
  QMF QUERIES                 |
  AVERAGE CPU AND RUN COUNT   |
  SORTED BY CPU SECONDS (DESC)|


  QUERY      QUERY            |   AVERAGE      NUMBER OF          DATE
  OWNER      NAME             | CPU (SECONDS)  TIMES RUN        FIRST RUN
  -------    ---------------  | -------------- --------------- ----------
  USER01     RUNAWAY          |        27.63              2   2099-10-05
  DBPUSR     XKQ1             |        12.46             14   2099-10-05
  USER01     XENDH            |         5.83              2   2099-10-05
  USER01     GGVEEMO          |         1.11              5   2099-10-05
  TSO01P     XAAAR02Q         |         0.30              1   2099-10-19
  USER01     QTEST507Q        |         0.28              2   2099-10-05
  USER01     QTEST501Q        |         0.24              1   2099-10-21
  XND1XY     XAAAR06Q         |         0.22              3   2099-10-20
  USER01     XAAAR011Q        |         0.21              1   2099-10-21
  USER01     QTEST505Q        |         0.21              2   2099-10-21
  USER01     QTEST502Q        |         0.19              2   2099-10-21
  XND1XY     QTEST505Q        |         0.19              1   2099-10-19
  USER01     QTEST506Q        |         0.14              4   2099-10-12
```

Figure 61. Sample Performance summary based on average CPU report

Note: More information on a specific query's performance can be gathered from the Performance Detail for a Query report and the Resource Consumption Detail for a User reports.

Running the Performance summary for a query report

This report shows which users most often execute a specific query and the CPU time that it consumes. It can be used once a problem query is identified to determine which users are most frequently executing that query.

About this task

This report requires the following input variables:

Query Owner
> Enter the owner of the query that you want to obtain performance information.

Query Name
> Enter the name of the query that you want to obtain performance information.

You can invoke this report by selecting option 5 from the Object Manager Reports Selection Menu. You can run this report in batch by editing the sample JCL member RAAMR05J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

```
RAAMR05T ------------------------------------ LINE 0000000 -- COLUMNS 001 080
Command ===>                                              Scroll ===> PAGE
****************************** TOP OF REPORT******************************
                        QMF RESOURCE USAGE BY USER
                         FOR QUERY USER01.XDEVTST


TSOID     SQLID     RUN COUNT    TOTAL CPU TIME
--------  --------  -----------  ------------------
USER01    USER01              2              55.26

***************************** BOTTOM OF REPORT *****************************
```

Figure 62. Sample Performance summary for a query report

Running the Performance detail for a query report

This report shows detail statistics for each execution of a query. It provides performance information such as CPU time consumed and rows fetched for each execution and an average CPU time consumed in seconds for all executions.

About this task

This report requires the following input variables:

Query Owner
Enter the owner of the query that you want to obtain performance information.

Query Name
Enter the name of the query that you want to obtain performance information.

You can invoke this report by selecting option 6 from the Object Manager Reports Selection Menu. You can run the report in batch by editing the sample JCL member RAAMR06J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

```
RAAMR06T ------------------------------------ LINE 0000000 -- COLUMNS 001 080
  Command ===>                                            Scroll ===> PAGE

**************************** TOP OF REPORT ******************************
  QMF RESOURCE STATISTICS
  FOR QUERY USER01.XDEVTST


  TSOID    SQLID   CPU SECONDS   ROWS FETCHED   DATE      TIME     QUERY T
  -------  ------  ------------  -------------- ------    -----    -------
  USER01   USER01        33.31          16245 2099-10-05 11.53.41  SELECT
  USER01   USER01        21.95          10334 2099-10-05 10.41.04  SELECT

  AVERAGE CPU TIME FOR USER01.XDEVTST IS 27.63

**************************** BOTTOM OF REPORT ****************************
```

Figure 63. Sample Performance detail for a query report

Running the Resource consumption detail for a user report

This report can be run for a specific user to determine which queries are executed and the resources being consumed by those queries. The query executions are sorted in descending order by CPU time consumed. This highlights queries that

are most important from a resource consumption standpoint. It can indicate that resource problems are limited to specific queries, or that resource problems occur only when running ad hoc queries. The report contains the actual query text at the time of execution.

About this task

This report requires the following input variable:

TSOID

> Enter the TSO ID that you want to obtain resource consumption information.

You can invoke this report by selecting option 7 from the Object Manager Reports Selection Menu. You can run this report in batch by editing the sample JCL member RAAMR07J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.
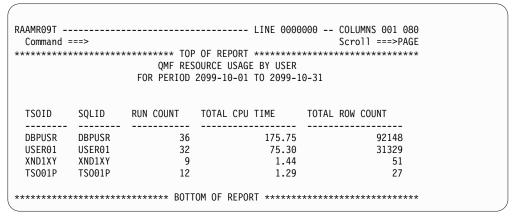
```
RAAMR07T ---------------------------------- LINE 0000000 -- COLUMNS 031 079
  Command ===>                                          Scroll ===> PAGE
**************************** TOP OF REPORT ********************************
  QMF RESOURCE STATISTICS|
  FOR TSOID: USER01       |
                          |
                          |
  QUERY     QUERY         |
  OWNER     NAME          | CPU SECONDS   ROWS FETCHED  DATE        TIME
  ------    -------       | ------------  ------------  --------    -----
  USER01    XDEVTST       | 33.31         16245         2099-10-05  11.53
  USER01    XDEVTST       | 21.95         10334         2099-10-05  10.41
  USER01    XENDH         | 9.16          988           2099-10-05  13.35
  USER01    GGVEEMO       | 4.24          2211          2099-10-24  06.13
  USER01    XENDH         | 2.50          102           2099-10-24  07.10
  USER01    GGVEEMO       | 0.39          401           2099-10-24  06.15
  USER01    GGVEEMO       | 0.39          401           2099-10-05  10.57
  USER01    GGVEEMO       | 0.37          401           2099-10-24  06.16
  USER01    QTEST507Q     | 0.32          4             2099-10-05  13.04
  USER01    QTEST507Q     | 0.24          4             2099-10-05  13.06
  USER01    QTEST501Q     | 0.24          2             2099-10-21  07.48
  USER01    QTEST511Q     | 0.21          14            2099-10-21  08.09
  USER01    QTEST505Q     | 0.21          4             2099-10-24  07.08
  USER01    QTEST505Q     | 0.20          3             2099-10-21  08.00
```

Figure 64. Sample Resource consumption detail for a user report

Running the Resource usage summary report

This report shows which users are most actively using QMF and consuming the most resources.

About this task

This report requires no input variables.

You can invoke this report by selecting option 8 from the Object Manager Reports Selection Menu. You can run this report in batch by editing the sample JCL member RAAMR08J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.
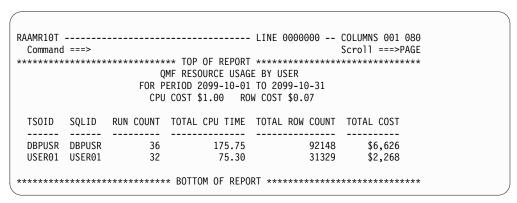
```
RAAMR08T -------------------------------- LINE 0000000 -- COLUMNS 001 080
  Command ===>                                          Scroll ===> PAGE
***************************** TOP OF REPORT *****************************
                    QMF RESOURCE USAGE BY USER

  TSOID     SQLID    RUN COUNT   TOTAL CPU    TIME
  --------  --------  ----------  ----------  -------
  DBPUSR    DBPUSR           36               175.75
  USER01    USER01           32                75.30
  XND1XY    XND1XY            9                 1.44
  TS001P    TS001P           12                 1.29

**************************** BOTTOM OF REPORT****************************
```

Figure 65. Sample Resource usage summary report

Running the Resource usage summary for a time period report

This report shows which users are most actively using QMF and consuming the most resources during a specific period of time. Information on the report can be used for chargeback purpose, trend analysis, or problem identification.

About this task

This report requires the following input variables:

Begin Date
> Enter the beginning date (in YYYY-MM-DD format) that you want to obtain resource usage information.

End Date
> Enter the ending date (in YYYY-MM-DD format) that you want to obtain resource usage information.

You can invoke this report by selecting option 9 from the Object Manager Reports Selection Menu. You can run this report in batch by editing the sample JCL member RAAMR09J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

```
RAAMR09T -------------------------------- LINE 0000000 -- COLUMNS 001 080
  Command ===>                                          Scroll ===>PAGE
***************************** TOP OF REPORT *****************************
                    QMF RESOURCE USAGE BY USER
                 FOR PERIOD 2099-10-01 TO 2099-10-31


  TSOID     SQLID    RUN COUNT   TOTAL CPU TIME     TOTAL ROW COUNT
  --------  --------  ----------  ------------------  ------------------
  DBPUSR    DBPUSR           36              175.75               92148
  USER01    USER01           32               75.30               31329
  XND1XY    XND1XY            9                1.44                  51
  TS001P    TS001P           12                1.29                  27

**************************** BOTTOM OF REPORT ****************************
```

Figure 66. Sample Resource usage summary for a time period report

Running the Chargeback summary for a time period

This report allows you to associate a cost with QMF usage for real or informational chargeback purposes. It allows you to set a cost per unit for CPU seconds consumed and rows fetched and then it calculates a usage cost per user for the specified time period.

About this task

This report requires the following input variables:

Begin Date
> Enter the beginning date (in YYYY-MM-DD format) that you want to obtain resource usage information.

End Date
> Enter the ending date (in YYYY-MM-DD format) that you want to obtain resource usage information.

Dollars per CPU
> Enter the amount (in DECIMAL(5,2) format) which represents the dollar per CPU second consumed cost.

Dollars per Row
> Enter the amount (in DECIMAL(5,2) format) which represents the dollar per row fetched cost.

You can invoke this report by selecting option 10 from the Object Manager Reports Selection Menu. You can also run this report in batch by editing the sample JCL member RAAMR10J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

```
RAAMR10T ---------------------------------- LINE 0000000 -- COLUMNS 001 080
  Command ===>                                            Scroll ===>PAGE
***************************** TOP OF REPORT *******************************
                        QMF RESOURCE USAGE BY USER
                     FOR PERIOD 2099-10-01 TO 2099-10-31
                       CPU COST $1.00   ROW COST $0.07

  TSOID   SQLID   RUN COUNT  TOTAL CPU TIME  TOTAL ROW COUNT  TOTAL COST
  ------  ------  ---------  --------------  ---------------  ----------
  DBPUSR  DBPUSR         36          175.75            92148      $6,626
  USER01  USER01         32           75.30            31329      $2,268

*************************** BOTTOM OF REPORT ******************************
```

Figure 67. Sample Chargeback summary for a time period report

Chapter 6. Control QMF resource usage

The Governor provides the necessary functions for QMF and Db2 database administrators to effectively manage, control, and restrict QMF resource usage. The HPO/Governor module provides the Governor's direct interface into QMF processing.

The Governor defines a number of resources that can be governed during a QMF session. Examples of these resources are:

- access to a QMF session
- types of sessions that can be started
- types of QMF commands and SQL verbs that can be processed
- the number of rows fetched by a query
- the amount of system resources consumed

You enable QMF governing by creating a resource group and assigning the resource group to a user profile.

Note: You must also allocate QMFHPO.SRAALOAD to your TSO session and your CICS session. See "Step 5a. Allocating HPO libraries" on page 197 for more information about this allocation.

The following topics describe the Governor online facilities that you use to create resource groups, assign resource groups to user profiles, and perform other management tasks.

Related tasks:

"Starting the Governor" on page 120
You perform all resource group maintenance from the Governor panel, which you can access by selecting option 2 from the Manager Selection Menu, or by issuing the following TSO command:

"Creating a resource group" on page 120
You create resource groups using the Governor online facilities.

"Creating a resource group using defaults" on page 128
You can create a resource group using predefined system default values.

"Editing a resource group" on page 129
You can edit a resource group from a selection list or from the Governor panel.

"Assigning a resource group to a user profile" on page 131
A resource group has no effect unless it is assigned to at least one user profile. QMF users are mapped to a user profile, through their TSO logon ID, their Db2 primary authorization ID, or through QMF open enrollment. By assigning a resource group to a user profile, you are setting limits and options for all users who map into that profile entry.

"Building the selection list of user profiles" on page 132
Use the Resource Group Assignment panel 1 to build the selection list of user profiles.

"Browsing a resource group" on page 134
You can browse a resource group from a selection list or from the Governor panel.

You can drop a resource group from a selection list or from the Governor panel.

You can display all currently defined schedules for a resource group from a selection list or from the Governor panel.

Related reference:

Starting the Governor

You perform all resource group maintenance from the Governor panel, which you can access by selecting option 2 from the Manager Selection Menu, or by issuing the following TSO command:

About this task

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM G'
```

```
DB2P / DB2PLOCATION -- Governor ----------------------------------- 12.1.0
  Command ===>

  Action................... ===>

  Resource Group........... ===>

  Drop Confirmation? (Y/N).. ===>


----------------------------------------------------------------------------
  Valid Actions Are...
  A  Assign
  B  Browse
  C  Create
  D  Drop
  E  Edit
  L  Display Selection List
  R  Create Using Defaults
  S  Show Schedules
----------------------------------------------------------------------------
```

Figure 68. Governor panel

From the Governor panel:

- If you press **Enter**, all input fields are processed. If any errors are detected during input validation, the panel is displayed again with an error message.
- If you press **PF3**, all input fields are ignored and you return to the previous selection menu.

Creating a resource group

You create resource groups using the Governor online facilities.

About this task

A resource group is a set of related controls that restrict when a QMF session can begin, what type of session can be started, what types of QMF commands and SQL verbs can be processed, and the amount of system resources that can be consumed. For example, a resource group can restrict the number of fetched rows to 500 and prohibit the use of the SAVE DATA command.

Governor supports two types of controls in a resource group:

- Common
- Scheduled

Common controls are common to the entire resource group. Scheduled controls pertain to a specific date, day of the week, and time of day. For example, a QMF session that starts at 10 p.m. on a weekday is controlled by the scheduled controls that are in effect at 10 p.m. on a weekday. Some controls are both common and scheduled. If so, the scheduled control overrides the common control if the common control is enabled. Governor supports up to 255 schedules per resource group. Within each schedule, online controls can be set separately from batch controls.

With Governor, you have the flexibility to control QMF resource consumption by user, date, day of the-week, time of day, and mode of access (online or batch).

Resource groups are stored in the native QMF table named Q.RESOURCE_TABLE. A view named Q.RESOURCE_VIEW must be defined on this table because QMF accesses that view, not the table. For a detailed discussion of this table and view, and their columns and data types see *Installing and Managing Db2 QMF for TSO/CICS*.

You can create a resource group from the:

- Governor panel

  To create a resource group from the Governor panel, you must enter values in the following fields:

  Action

  > Enter C (for create).

  Resource Group

  > Enter the resource group to create. The resource group must not already exist.

- Resource Group Selection List panel

  To create a resource group from the Resource Group Selection List panel, you must enter a value in the following field:

  Action

  > Enter C (for create). This action is treated as a Create Like... The controls of the resource group selected with the action of C are used as a model on the Create Resource Group panel.

The Create Resource Group panel is displayed. This panel is used to create the resource group common controls. You can also create one or more resource group schedules from this panel.

```
DB2P / DB2PLOCATION -- Create Resource Group ----------------------- 12.1.0
Command ===>

Resource Group :

Description... :

Common Control Options:
   Activate Resource Group? (Y/N)....... :
   Log Resource Violations? (Q/R/B/N)... :
   Asynchronous Timer Interval.......... :          (in seconds)

Query Analyzer Options
   REXX Program Name.................... :
   Plan Table Owner/Current SQLID....... :
   Create Plan Table In Database........ :
   Create Plan Table In Table Space..... :

Db2 Subsystem ID for DB2PLOCATION...... :

Schedule Number To Process.......... ===>        (0=none,1-255=sched num)
```

Figure 69. Create Resource Group panel

From the Create Resource Group panel:

- If you press **Enter**, the common controls are created. If the **Schedule Number To Process** field is greater than zero, you proceed to the Schedule Creation panel. If the **Schedule Number To Process** field is equal to zero, you return to the previous panel.

- If you press **PF3**, you return to the previous panel and these controls are ignored.

"Specifying common controls" describes the values you can enter for the fields on this Create Resource Group panel, with the exception of this field:

Schedule Number to Process
> Enter a number between 0 and 255. If you enter 0, then no schedules are created. Otherwise, the value that you enter indicates the number of the first schedule to create. See "Creating resource group schedules" on page 124 for more information on the Schedule Creation panel fields.

Specifying common controls

The following common controls pertain to an entire resource group:

Description
> Although this field is not a control (no actions are taken due to the value supplied), it allows you to record a description about this resource group. The maximum length is 40 characters.

Activate Resource Group?
> This flag controls whether or not this entire resource group is active. Its value must be Y (to activate or enable) or N (to deactivate or disable). When a resource group is disabled, all control schedules are disabled. When a resource group is enabled, only the control schedules that are active are enabled. This is where you define all thresholds and controls.
>
> **Note:** The HPO/Governor module bypasses resource limit checking for any resource group that is not active. One of the scheduled controls is the **Active?** flag. The HPO/Governor module bypasses any schedules within a resource group that are not active. Make sure that the desired resource group and schedules within that resource group are active.

Log Resource Violations?

This flag controls the logging that Governor performs when a resource violation occurs. If it is set to Q, a message is logged to the user's DSQDEBUG data set. If it is set to R, a message is logged to the user's RAADEBUG data set. If it is set to B, messages are logged to both data sets. If it is set to N, no messages are logged.

Asynchronous Timer Interval

There are some scheduled controls that are governed asynchronously. Specifically, CPU and row limits are governed at distinct intervals while QMF is processing commands. The interval at which these controls are checked is specified by this option (in wall-clock seconds). If this value is 0, asynchronous governing is disabled. (CPU time limits are only checked asynchronously, so a value of 0 in this field effectively disables CPU time limit checking.)

REXX Program Name

If you are not using Query Analyzer, this field is ignored. If you are using Query Analyzer, then you can specify the name of an exit routine that Query Analyzer should invoke. If you leave this field blank, then it defaults to the sample exit routine named RAARXQA. If you have written your own exit routine, specify the name here. See "Create an exit routine" on page 154 for a more detailed discussion.

Plan Table Owner/Current SQLID

If you are not using Query Analyzer, this field is ignored. If you are using Query Analyzer, then you can specify the CURRENT SQLID that Query Analyzer must use during query analysis.

The value that you enter here has two effects:

- the ID becomes the owner of the PLAN_TABLE used for the EXPLAIN command issued by Query Analyzer
- it becomes the owner of all unqualified tables in queries that are analyzed

Before setting this value, review the restrictions for setting CURRENT SQLID in the most Db2 documentation.

Create Plan Table In Database

If you are not using Query Analyzer, this field is ignored. Otherwise, you can specify the database in which Query Analyzer must create a PLAN_TABLE for a user if one does not already exist. If you leave this field blank and a PLAN_TABLE does not exist, query analysis is bypassed.

Create Plan Table In Table Space

If you are not using Query Analyzer, this field is ignored. Otherwise, you can specify the table space in which Query Analyzer must create a PLAN_TABLE for a user if one does not exist. You cannot enter a value in this field unless you also enter a value in the **Create Plan In Database** field.

Db2 Subsystem ID for *

This field is used by the HPO/Governor module under CICS and can be ignored if you are not planning to govern or track activity under QMF/CICS. Otherwise, if the location field is non-blank, then you must fill in the name of the Db2 subsystem ID that correlates to this location. If the location field is blank, the subsystem ID of the current Db2 is used internally, but can be explicitly specified here as well.

Creating resource group schedules

If you pressed **Enter** after specifying the common controls for a resource group and the **Schedule Number To Process** field is greater than zero, the Schedule Creation panel is displayed. Use the Schedule Creation panel to create resource group schedules.

About this task

You can create up to 255 schedules for each resource group.

```
DB2P / DB2PLOCATION -- Create Resource Group: GROUP1 ----------------- 12.1.0
Command ===>

Schedule Number. : 1        Next Schedule Number to Process.... ===>
Start Date...===>           Stop Date ===>        (YYYYMMDD)
Start Day....===>           Stop Day. ===>        (1=SUN,2=MON,...)
Start Time...===>           Stop Time ===>        (HHMM)
Active? (Y/N)===>           Use Service Unit Defaults (Y/N).... ===>

Max CPU Seconds (Prompt Limit)...........Online ===>
Max CPU Seconds (Cancel Limit)...........Online ===>          Batch ===>
Max Rows Fetched (Prompt Limit)..........Online ===>
Max Rows Fetched (Cancel Limit)..........Online ===>          Batch ===>
Allow GRANT,REVOKE SQL? (Y/N)............Online ===>          Batch ===>
Allow CREATE,ALTER,DROP SQL? (Y/N).......Online ===>          Batch ===>
Allow INSERT,UPDATE,DELETE SQL? (Y/N)....Online ===>          Batch ===>
Allow TSO/CICS Commands? (Y/N)...........Online ===>          Batch ===>
Allow EXPORT Command? (Y/N)..............Online ===>          Batch ===>
Allow IMPORT Command? (Y/N)..............Online ===>          Batch ===>
Allow SAVE DATA Command? (Y/N)...........Online ===>          Batch ===>
Allow CONNECT Command? (Y/N).............Online ===>          Batch ===>
Enable QMF Access? (Y/N).................Online ===>          Batch ===>
Enable Query Analyzer? (Y/S/N)...........Online ===>          Batch ===>
Service Units in 100s (Cancel limit).....Online ===>          Batch ===>
```

Figure 70. Schedule creation panel

From the Create Resource Groups panel:

- If you press **Enter**, the input data is validated. If any errors are detected, the panel is displayed again with an error message. If all values are valid, then this schedule is created. If the **Next Schedule Number To Process** field is equal to the current schedule number, the previous panel is displayed. If the **Next Schedule Number To Process** field is set to a new schedule number, this panel is displayed again, ready for you to create a new schedule.
- If you press **PF3**, you return to the next panel without creating this schedule.

Specifying resource group scheduled controls

Scheduled controls are active for the duration of a defined schedule. For example, if a schedule starts at 8 p.m. and stops after 5 p.m., then the associated controls is in effect during those times and only those times. Governor supports up to 255 schedules per resource group, providing enough flexibility to properly control resource consumption.

All date, day, and time criteria are inclusive. For example, if the *stop after* time is 5 p.m., then the schedule is active at 17:00:01, 17:00:02, through 17:00:59. The schedule is not ignored until after 17:00:59.

As an administrator, you must define a value for each control. For each control, you can set online values separately from batch values. Again, this must provide enough flexibility to properly control both online resource consumption and batch resource consumption.

Specifying prompt limits and cancel limits

If a cancel limit is exceeded, then the HPO/Governor module cancels the current QMF command. If a prompt limit is exceeded (and the corresponding cancel limit is not exceeded), then a dialog begins with the user. This dialog explains which resource limit has been exceeded and asks the user for a response to one of these questions:

* Should the current command continue running?
* Should the command be canceled?
* Should the command continue through to completion and disable any further prompting?

Notice that there is no batch prompt limit because it is not possible to invoke a dialog with the user in batch mode.

Specifying CPU time limits

Governor can control the amount of CPU time consumed for each distinct command. When a user issues a command, Governor begins to monitor CPU consumption. If a QMF command completes before the defined limits are exceeded, Governor resets its internal counters back to zero and waits for the next command to be issued.

Specifying fetched row limits

Governor can control the number of rows fetched from the database for each distinct command. When a user issues a command, Governor begins to quantify fetched rows. If a QMF command completes before the defined limits are exceeded, Governor resets its internal counters back to zero and waits for the next command to be issued.

However, a command such as RUN can be followed by a series of related commands (such as, DOWN). When related commands are detected, these internal counters are not reset to zero. Instead these related commands are treated as extensions of the primary command.

To understand how Governor behaves, consider a scenario in which a user issues a RUN QUERY command. Assume that you want to limit the number of fetched rows to 1000. When the RUN command is issued, QMF fetches rows from the database until it is ready to display the first screen of data. After the screen is displayed to the user, the RUN command ends. When the user presses PF8 to view the next panel of data, a new command is issued, namely the DOWN command. As the user repeatedly presses PF8 and proceeds down the table, QMF accesses more and more rows from the database.

Governor limits the number of fetched rows from the beginning of the primary command (RUN) until the end of the last related command (DOWN). That is, when related commands are detected, internal counters tracking the number of fetched rows are not reset to zero. The example limit of 1000 is not reached until the sum of rows fetched from the RUN command and subsequent DOWN commands exceeds 1000.

Setting up the active schedules

You can define up to 255 schedules per resource group. The first schedule in which the date, day, and time definition match the current date, day, and time becomes the active schedule. Schedules are checked in numerical order. That is, schedule 1 is checked first, schedule 2 is checked second, and so on (schedule 255 is checked last).

The following list defines the priority of checking to determine which set of controls is active:

1. *Start and Stop Date*
   If the current date is within this specified range, then the day field is checked next.

2. *Start and Stop Day*
   If the current day is within this specified range, then the time field is checked next.

3. *Start and Stop Time*
   If the current time is within this specified range, then this schedule's controls are in effect.

All ranges are inclusive, so that if the Start Date is 20990101, then the schedule becomes active after midnight on 20981231. The order of checking is Date followed by Day Of The Week followed by Time Of Day. Therefore, if the Day does not coincide with the Date, the schedule is never in effect.

If Start and Stop Times wrap around midnight (for example, 5 p.m. through 8 a.m.), this creates, in effect, two separate blocks of time each day that the schedule becomes active. Consider the following schedule as an example:

Table 4. Sample resource group schedule

Control field	Value
Start Date:	20990111 (January 11, 2099)
Stop Date:	20990131 (January 31, 2099)
Start Day:	2 (Monday)
Stop Day:	6 (Friday)
Start Time:	1700 (5 p.m.)
Stop Time:	0800 (8 a.m.)

This schedule is active January 11, 2099 through January 31, 2099 only on weekdays (Mondays through Fridays). For each day that this schedule is active, it is in effect for the hours 5 p.m. to midnight, and midnight to 8 a.m. For example, this schedule is active each Monday morning from midnight to 8 a.m., as well as each Monday evening from 5 p.m. to midnight.

Scheduled controls

These are the scheduled controls in a resource group:

Schedule Number
   This field indicates the number of the schedule that is being processed.

Next Schedule Number to Process
   Enter a number between 1 and 255. Enter the same number as the currently displayed schedule to terminate the create session. Otherwise, the value that you enter indicates the number of the next schedule to create.

Start and Stop Date

These values specify the start and stop dates that this schedule must be active. The dates must be of the form YYYYMMDD and are inclusive.

Start and Stop Day

These values specify the start and stop days of the week that this schedule must be active. The days must be from 1 (Sunday) to 7 (Saturday) and are inclusive.

Start and Stop Time

These values specify the start and stop times that this schedule must be active. The times must be of the form HHMM and are inclusive.

Active?

This flag controls whether or not this resource group control schedule is active. Its value must be Y (to activate or enable) or N (to deactivate or disable). If the entire resource group is disabled, all scheduled controls are disabled. If the resource group is enabled, this flag is used to determine whether or not this particular schedule is enabled.

Use Service Unit Defaults Flag

If set to N only Cost Category A Service Unit estimates are used in preemptive governing. All Category B estimates are ignored and the SQL statement is processed. If set to Y Cost Category A or B Service Unit estimates can be used.

Note: The Enable Query Analyzer option must be set to 'Y' or 'S' and Service Units must be set greater than 0 for this value to have effect.

Max CPU Seconds (Prompt Limit)

In an online QMF session, if the CPU time for a QMF command exceeds this limit, a prompt dialog occurs between the user and QMF. (The cancel limit is checked before the prompt limit is checked.) CPU time checking is only performed asynchronously; it is effectively disabled if the common control **Asynchronous Timer Interval** is set to 0.

Max CPU Seconds (Cancel Limit)

For batch or online QMF, this value, expressed in CPU seconds, represents the maximum CPU time allowable for any command. If this value is exceeded, the command is canceled. CPU time checking is only performed asynchronously; it is effectively disabled if the common control **Asynchronous Timer Interval** is set to 0.

Max Rows Fetched (Prompt Limit)

In an online QMF session, if the rows fetched for a QMF command exceeds this limit, a prompt dialog occurs between the user and QMF. (The cancel limit is checked before the prompt limit is checked.)

Max Rows Fetched (Cancel Limit)

For batch or online QMF, this value represents the maximum number of rows that may be fetched per command. If this value is exceeded, the command is canceled.

Allow GRANT, REVOKE SQL? Allow CREATE, ALTER, DROP SQL? Allow INSERT, DELETE, UPDATE SQL?

A value of Y for any of these fields enables the type of SQL statement to be processed. A value of N disables or disallows the type of SQL statement. If N is specified and the user attempts to process the type of SQL statement, the command is canceled.

Allow TSO/CICS Command? Allow EXPORT Command? Allow IMPORT Command? Allow SAVE DATA Command? Allow CONNECT Command?
A value of Y for any of these fields enables that type of QMF command to be processed. A value of N disables that type of QMF command. If N is specified and the user attempts to process that type of command, the command is canceled.

Enable QMF Access?
A value of Y for this field allows access to QMF while the schedule is active. A value of N disallows access. You can enable access to online sessions independently of batch sessions.

Enable Query Analyzer?
A value of Y for this field causes Query Analyzer to automatically analyze all queries. A value of S allows selective analysis of queries. A value of N disables all query analysis.

Creating a resource group using defaults

You can create a resource group using predefined system default values.

About this task

Follow the procedures described in "Creating a resource group" on page 120, but use an action of R instead of C. All of the panels are initialized with default values instead of blanks and zeros.

Note: These defaults may not make sense for your installation to use in a production environment. You may find them useful if you want to quickly establish resource groups with predefined controls.

The predefined system default values include common (non-scheduled) control values that are used when creating a resource group.

Table 5. Default values for common controls

Control	Value
Description	HPO DEFAULTS
Activate Resource Group?	Y
Log Resource Violations?	Q
Asynchronous Timer Interval	1 second

The predefined system default values include scheduled control values that are used when creating one or more schedules in a resource group.

Table 6. Default values for scheduled controls

Control	Value
Schedule Number	1
Schedule Start Date	20440101
Schedule Stop Date	20991231
Schedule Start Day	1
Schedule Stop Day	7
Schedule Start Time	00:00

Table 6. Default values for scheduled controls (continued)

Control	Value
Schedule Stop Time	24:00
Active?	Y
Max CPU: Online Prompt Value	1
Max CPU: Online Cancel Value	3
Max CPU: Batch Cancel Value	5
Max Rows: Online Prompt Value	250
Max Rows: Online Cancel Value	500
Max Rows: Batch Cancel Value	1500
Enable GRANT/REVOKE SQL?	N (online and batch)
Enable CREATE/ALTER/DROP SQL?	N (online and batch)
Enable INSERT/UPDATE/DELETE SQL?	Y (online and batch)
Enable TSO/CICS Command?	N (online and batch)
Enable EXPORT Command?	N (online and batch)
Enable IMPORT Command?	N (online and batch)
Enable SAVE DATA Command?	N (online and batch)
Enable CONNECT Command?	N (online and batch)
Enable QMF Access?	Y (online and batch)
Enable Query Analyzer?	N

Editing a resource group

You can edit a resource group from a selection list or from the Governor panel.

About this task

To edit a resource group entry from the Governor panel, you must enter values in the following fields:

Action
> Enter E (for edit).

Resource Group
> Enter the resource group to edit. The resource group must already exist.

To edit a resource group entry from the Resource Group Selection List panel, you must enter a value in the following field:

Action
> Enter E (for edit).

The Edit Resource Group panel is used to edit the resource group common controls. You can also edit one or more resource group schedules from this panel.

```
DB2P / DB2PLOCATION -- Edit Resource Group -------------------------- 12.1.0
Command ===>

Resource Group :

Description... :

Common Control Options:
   Activate Resource Group? (Y/N)....... :
   Log Resource Violations? (Q/R/B/N)... :
   Asynchronous Timer Interval.......... :          (in seconds)
Query Analyzer Options
   REXX Program Name.................... :
   Plan Table Owner/Current SQLID....... :
   Create Plan Table In Database........ :
   Create Plan Table In Table Space..... :

Db2 Subsystem ID for DB2PLOCATION...... :

Schedule Number To Process.......... ===>          (0=none,1-255=sched num)
```

Figure 71. Edit Resource Group common controls panel

From the Edit Resource Group panel:

- If you press **Enter**, the common control fields are modified. If the **Schedule Number To Process** field is *not* equal to zero, you proceed to the Edit Resource Group schedule panel. For more information on the Schedule fields see "Editing schedule controls." If the **Schedule Number To Process** field is equal to zero, you return to the previous panel.

- If you press **PF3**, you return to the previous panel and these controls are ignored.

The common fields that you can edit are the same as those described in "Creating a resource group" on page 120 with the exception of this field:

Schedule Number to Process
> Enter a number between 0 and 255. If you enter 0, then no schedules are edited. Otherwise, the value that you enter indicates the number of the first schedule to edit.

Editing schedule controls

You can edit resource group schedules from the Edit Resource Group schedule panel.

About this task

```
DB2P / DB2PLOCATION -- Edit Resource Group: GROUP1 -------------------- 12.1.0
Command ===>

Schedule Number. : 1         Next Schedule Number to Process....===>
Start Date...===>            Stop Date ===>         (YYYYMMDD)
Start Day....===>            Stop Day. ===>         (1=SUN,2=MON,...)
Start Time...===>            Stop Time ===>         (HHMM)
Active? (Y/N)===>            Use Service Unit Defaults (Y/N)....===>


Max CPU Seconds (Prompt Limit)........Online ===>
Max CPU Seconds (Cancel Limit)........Online ===>            Batch ===>
Max Rows Fetched (Prompt Limit).......Online ===>
Max Rows Fetched (Cancel Limit).......Online ===>            Batch ===>
Allow GRANT,REVOKE SQL? (Y/N).........Online ===>            Batch ===>
Allow CREATE,ALTER,DROP SQL? (Y/N)....Online ===>            Batch ===>
Allow INSERT,UPDATE,DELETE SQL? (Y/N).Online ===>            Batch ===>
Allow TSO/CICS Commands? (Y/N)........Online ===>            Batch ===>
Allow EXPORT Command? (Y/N)...........Online ===>            Batch ===>
Allow IMPORT Command? (Y/N)...........Online ===>            Batch ===>
Allow SAVE DATA Command? (Y/N)........Online ===>            Batch ===>
Allow CONNECT Command? (Y/N)..........Online ===>            Batch ===>
Enable QMF Access? (Y/N)..............Online ===>            Batch ===>
Service Units in 100s (Cancel limit).....Online :           Batch ===>
```

Figure 72. Edit Resource Group schedule panel

From the Edit Resource Group schedule panel:

- If you press **Enter**, the input data is validated. If any errors are detected, the panel is displayed again with an error message. If all values are valid, then this schedule is modified. If the **Next Schedule Number To Process** field is equals the current schedule number, the previous panel is displayed. If the **Next Schedule Number To Process** field is set to another schedule number, this panel is displayed again, ready for you to edit the next schedule.

- If you type DELETE on the command line and press **Enter**, this schedule is deleted. The **Next Schedule Number To Process** field determines which panel is displayed next.

- If you press **PF3**, you return to the next panel without modifying this schedule.

The schedule fields that you can edit are the same as those described in "Creating a resource group" on page 120 with the exception of these fields:

Schedule Number
> This field indicates the number of the schedule that is processing.

Next Schedule Number to Process
> Enter a number between 1 and 255. Enter the same number as the currently displayed schedule to terminate the edit session. Otherwise, the value that you enter indicates the number of the next schedule to edit.

Assigning a resource group to a user profile

A resource group has no effect unless it is assigned to at least one user profile. QMF users are mapped to a user profile, through their TSO logon ID, their Db2 primary authorization ID, or through QMF open enrollment. By assigning a resource group to a user profile, you are setting limits and options for all users who map into that profile entry.

About this task

Assignments of resource groups to user profiles are performed from a selection list. Once you choose the assignment action from the Governor panel or from the Resource Group Selection List panel, you must then set up a user profile selection list.

To choose a resource group which is assigned to one or more user profiles from the Governor panel, you must enter values in the following fields:

Action
> Enter A (for assign).

Resource Group
> Enter the resource group name.

To choose a resource group that is assigned to one or more user profiles from the Resource Group Selection List panel, you must enter a value in the following field:

Action
> Enter A (for assign).

There are two panels that you use to assign a resource group to a user profile.

- Resource Group Assignment panel 1 is used to build a selection list of user profiles. See "Building a selection list of resource groups" on page 133 for more information on the Resource Group Assignment panel 1 fields.
- Resource Group Assignment panel 2 is used to make the assignments. See "Making the resource group user profile assignments" on page 133 for more information on the Resource Group Assignment panel 2 fields.

Building the selection list of user profiles

Use the Resource Group Assignment panel 1 to build the selection list of user profiles.

About this task

```
DB2P / DB2PLOCATION -- Resource Group Assignment -------------------- 12.1.0
Command ===>

Resource Group..... :
    Description..... :

Creator......... ===>
Translation..... ===>
Environment..... ===>

Selection Filter ===>

----------------------------------------------------------------------------
Use this panel to build a selection-list of User Profiles.

Selection Filter = 1 will build a list of all User Profiles like...

Selection Filter = 2 will build a list of all User Profiles
                     already assigned to this Resource Group like...
```

Figure 73. Resource Group Assignment panel 1

From the first Resource Group Assignment panel:

- If you press **Enter**, a selection list is built using the qualifying user profiles that you entered.

- If you press **PF3**, this assignment is bypassed and you return to the previous panel.

The fields on the panel are:

Creator
>   Enter the creator field for the user profile. You can use a percent sign (%) or an underscore (_) as wildcard characters in this field to select multiple user profiles.

Translation
>   Enter the translation field for the user profile. You can use a percent sign (%) or an underscore (_) as wildcard characters in the translation to select multiple user profiles.

Environment
>   Enter the environment field for the user profile, one of TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or -. You can use a percent sign (%) or an underscore (_) as wildcard characters in the environment to select multiple user profiles.

Selection Filter
>   Enter 1 if you want the user profile selection list to include all matching user profiles or 2 if you want the list to include only those matching user profiles that are assigned to this resource group.

Making the resource group user profile assignments

Use the second Resource Group Assignment panel to make the assignments.

About this task

```
DB2P / DB2PLOCATION -- Resource Group Assignment --------------------- 12.1.0
Command ===>
                                        Scroll ===> PAGE
Valid Actions are...
A --Assign Resource Group to User Profile
U --Unassign Resource Group from User Profile

Resource Group:
    Description:


Action          Creator   Translation       Environment  Assigned To...
------          --------   ----------------  -----------  ----------------



***************************** BOTTOM OF DATA ********************************
```

Figure 74. Resource Group Assignment panel 2

From the second Resource Group Assignment panel:

- If you press **Enter**, the selected assignments are processed and the database is updated. Because a resource group can be assigned to multiple user profiles, you remain on this panel until you press **PF3**.
- If you press **PF3**, any pending assignments are bypassed and you return to the previous panel.

Building a selection list of resource groups

To build a selection list of resource groups from the Governor panel, you must enter values in the following fields:

About this task

Action

> Enter L (for list).

Resource Group

> Enter the resource group to list. You can use a percent sign (%) or an underscore (_) as wildcard characters to list multiple groups.

Drop Confirmation?

> Enter Y to request a drop confirmation panel or N to suppress one. This value is carried forward to all actions performed from the selection list that is produced.

When you enter L (for list) on the Governor panel, the Resource Group Selection List panel is displayed. This panel contains a list of all error log entries that matched the input criteria entered on the Governor panel.

```
DB2P / DB2PLOCATION -- Resource Group Selection List ----------- 12.1.0
Command ===>                                        Scroll ===> PAGE


Valid Actions Are...
A  Assign                      B  Browse
C  Create Like                 D  Drop
E  Edit                        S  Show Schedules
-------------    -------------------------------------------------------
Action           Resource Group    Description
------           ---------------    ----------------------------------

*************************** BOTTOM OF DATA ***************************
```

Figure 75. Resource Group Selection List panel

From the Resource Group Selection List panel:

- If you press **Enter**, all rows that you selected with an action code are processed. After all selected rows are processed, the panel is displayed again with an informative message on each row (such as *CREATED or *NODROP). This message appears in the space between the **Action** and **Resource Group** fields.
- If you press **PF3**, all input fields are ignored and you return to the Governor panel.
- If you press **PF8** or **PF7**, the panel scrolls forward or backward after all selected rows are processed.

Browsing a resource group

You can browse a resource group from a selection list or from the Governor panel.

About this task

To browse a resource group entry from the Governor panel, you must enter values in the following fields:

Action

> Enter B (for browse).

Resource Group

> Enter the resource group to browse. No wildcard characters are allowed.

To browse a resource group entry from the Resource Group Selection List panel, you must enter a value in the following field:

Action
> Enter B (for browse).

The Browse Resource Group panel displays the resource group common controls. You can also browse one or more resource group schedules from this panel.

```
DB2P / DB2PLOCATION -- Browse Resource Group --------------------------12.1.0
Command ===>

Resource Group :

Description... :
Common Control Options:
   Activate Resource Group? (Y/N)....... :
   Log Resource Violations? (Q/R/B/N)... :
   Asynchronous Timer Interval......... :          (in seconds)

Query Analyzer Options
   REXX Program Name................... :
   Plan Table Owner/Current SQLID....... :
   Create Plan Table In Database........ :
   Create Plan Table In Table Space..... :

Db2 Subsystem ID for DB2PLOCATION....... :

Schedule Number To Process.......... ===>        (0=none,1-255=sched num)
```

Figure 76. Browse Resource Group panel common controls

From the Browse Resource Group panel:

- If you press **Enter** and the **Schedule Number To Process** field is *not* equal to zero, you proceed to the next specified scheduled control panel.
- If you press **Enter** and the **Schedule Number To Process** field is equal to zero, or if you press **PF3**, you return to the previous panel.

The field on the panel is:

Schedule Number to Process
> Enter a number between 0 and 255. If you enter 0, then no schedules are browsed. Otherwise, the value that you enter indicates the number of the first schedule to browse.

Browsing schedule controls

If the **Schedule Number To Process** field is *not* equal to zero in the Browse Resource Group panel, and you press **Enter**, the Browse Resource Group panel opens displaying the fields for the particular schedule number that was specified.

About this task

```
DB2P / DB2PLOCATION -- Browse Resource Group: GROUP1 ---------------- 12.1.0
Command ===>
Schedule Number. :          Next Schedule Number to Process.... ===>
Start Date...... :          Stop Date... : 20991231  (YYYYMMDD)
Start Day....... :          Stop Day ... : 7          (1=SUN,2=MON,...)
Start Time...... :          Stop Time... : 2400      (HHMM)
Active? (Y/N)... :          Use Service Unit Defaults (Y/N)....... :

Max CPU Seconds (Prompt Limit)...........Online :
Max CPU Seconds (Cancel Limit)...........Online :           Batch :
Max Rows Fetched (Prompt Limit)..........Online :
Max Rows Fetched (Cancel Limit)..........Online :           Batch :
Allow GRANT,REVOKE SQL? (Y/N)............Online :           Batch :
Allow CREATE,ALTER,DROP SQL? (Y/N).......Online :           Batch :
Allow INSERT,UPDATE,DELETE SQL? (Y/N)....Online :           Batch :
Allow TSO/CICS Commands? (Y/N)...........Online :           Batch :
Allow EXPORT Command? (Y/N)..............Online :           Batch :
Allow IMPORT Command? (Y/N)..............Online :           Batch :
Allow SAVE DATA Command? (Y/N)...........Online :           Batch :
Allow CONNECT Command? (Y/N).............Online :           Batch :
Enable QMF Access? (Y/N).................Online :           Batch :
Service Units in 100s (Cancel limit).....Online :           Batch :
```

Figure 77. Browse Resource Group panel schedule fields

From the Browse Resource Group schedule panel:

- If you press **Enter** and **Next Schedule Number To Process** is not equal to the current schedule number, you browse the next specified schedule.

- If you press **Enter** and **Next Schedule Number To Process** is equal to the current schedule number, or if you press **PF3**, you return to the previous panel.

The field on the panel is:

Next Schedule Number to Process
> Enter a number between 1 and 255. Enter the same number as the currently displayed schedule to terminate the browse session. Otherwise, the value that you enter indicates the number of the next schedule to browse.

Dropping a resource group

You can drop a resource group from a selection list or from the Governor panel.

About this task

To drop a resource group from the Governor panel, you must enter values in the following fields:

Action
> Enter D (for drop).

Resource Group
> Enter the resource group to drop.

Drop Confirmation?
> Enter Y to request a drop confirmation panel or N to suppress one.

To drop a resource group entry from the Resource Group Selection List panel, you must enter a value in the following field:

Action

　　　Enter D (for drop).

The resource group to be dropped and the number of database rows that are deleted are displayed on the Resource Group Drop Confirmation panel.

```
DB2P / DB2PLOCATION -- Resource Group Drop Confirmation -------------- 12.1.0
Command ===>

Press ENTER to confirm this DROP request.
Type CAN or CANCEL or press PF3 to cancel this DROP request.

Resource Group :
Description... :

This resource group is currently assigned to        user profile(s).

Number of rows to be deleted from Q.RESOURCE_TABLE :
```

Figure 78. Resource Group Drop Confirmation panel

From the Resource Group Drop Confirmation panel:
- If you press **Enter**, the resource group identified on the panel is dropped from the database.
- If you press **PF3**, this drop command is ignored and the resource group remains in the database.

Showing schedules for a resource group

You can display all currently defined schedules for a resource group from a selection list or from the Governor panel.

About this task

To show schedules for a resource group from the Governor panel, you must enter values in the following fields:

Action

　　　Enter S (for show schedules).

Resource Group

　　　Enter the resource group that you want to show.

To show schedules for a resource group entry from the Resource Group Selection List panel, you must enter a value in the following field:

Action

　　　Enter S (for show schedules).

The resource group schedule definitions are displayed in schedule number order on the Resource Group Schedule List panel.

```
DB2P / DB2PLOCATION -- Schedule List For GROUP1 --------------------- 12.1.0
Command ===>                                              Scroll ===> PAGE

  Schedule Schedule Start    Stop     Start     Stop      Start Stop
  Number   Active?  Date     Date     Day       Day       Time  Time
  -------- -------- -------- -------- --------- --------- ----- -----



**************************** BOTTOM OF DATA *******************************
```

Figure 79. Schedule List for a resource group panel

From the Schedule List for a resource group panel:
- If you press **PF7** or **PF8**, the panel scrolls backward or forward.
- To return to the previous panel, press **PF3**.

Displaying current resource limits from QMF (RLIMITS)

About this task

While in QMF, a user can review the resource group scheduled limits and controls that are currently in effect by issuing the RLIMITS command from the QMF command line.

To operate properly, the RLIMITS command synonym must be installed as described in "Step 2b. Creating Manager command synonyms" on page 196.

When the RLIMITS command is issued, this Current Active Governor Schedule panel is displayed.

```
DB2P -- Current Active Governor Schedule --------------------------- 12.1.0
Command ===>
Resource Group :
Start Date.... :        Stop Date.... :          (YYYYMMDD)
Start Day..... :        Stop Day..... :          (1=SUN,2=MON,...)
Start Time.... :        Stop Time.... :          (HHMM)
Active?....... :        Use Service Unit Defaults (Y/N) :
Max CPU Seconds (Prompt Limit)........Online :
Max CPU Seconds (Cancel Limit)........Online :          Batch :
Max Rows Fetched (Prompt Limit).......Online :
Max Rows Fetched (Cancel Limit).......Online :          Batch :
Allow GRANT,REVOKE SQL? (Y/N).........Online :          Batch :
Allow CREATE,ALTER,DROP SQL? (Y/N)....Online :          Batch :
Allow INSERT,UPDATE,DELETE SQL? (Y/N).Online :          Batch :
Allow TSO/CICS Commands? (Y/N)........Online :          Batch :
Allow EXPORT Command? (Y/N)...........Online :          Batch :
Allow IMPORT Command? (Y/N)...........Online :          Batch :
Allow SAVE DATA Command? (Y/N)........Online :          Batch :
Allow CONNECT Command? (Y/N)..........Online :          Batch :
Enable QMF Access? (Y/N)..............Online :          Batch :
Enable Query Analyzer? (Y/S/N)........Online :          Batch :
Service Units in 100s (Cancel limit)..Online :          Batch :
```

Figure 80. Current Active Governor Schedule panel

To return to the previous QMF panel, from the Current Active Governor panel, press **Enter**.

Enabling the HPO/Governor module help panel

Whenever a QMF command is canceled, a message is displayed on the QMF panel message line. This message explains why the command was canceled, for example:

```
RAAG006E--Not authorized to process this QMF command: SAVE DATA
```

If you want to provide your QMF users with additional information regarding what to do when one of their QMF commands is canceled, you can enable the HPO/Governor module help panel. If enabled, this panel is displayed when a user enters the HELP command after their QMF command is canceled. This panel, named RAAQMFH, can be customized to contain any information. For example, it can provide end users with the telephone number to your Help desk if they have questions about the cancellation of a QMF command.

Note: For detailed instructions on enabling this feature, see "Step 3g. Setting the HPO/Governor data set names" on page 208.

Chapter 7. View QMF session activity in real time

You can view QMF session activity in real time with Monitor. You can monitor who is currently using QMF, determine what types of actions are being performed, assess CPU time utilization and number of rows fetched for any action requiring database activity, and even view the SQL text associated with a long running query.

The following actions are supported from the Monitor online facility:

- Listing QMF sessions
- Browsing detail session activity
- Browsing SQL text
- Canceling current activity
- Generating VSAM file cleanup JCL

The HPO/Governor module provides Monitor's direct interface into QMF processing.

The Monitor facility can only be activated for QMF/TSO sessions. To enable QMF monitoring, you must allocate QMFHPO.SRAALOAD to your TSO session. "Step 5a. Allocating HPO libraries" on page 197 provides more information about this allocation. In addition, you must create the Monitor VSAM file (see "Step 4. Creating Monitor VSAM file" on page 196), and specify its name to the HPO Configuration Dialog (see "Step 3g. Setting the HPO/Governor data set names" on page 208).

Related tasks:

"Starting Monitor"
Start the Monitor online facility by selecting option 3 from the Manager Selection Menu, or by issuing the following TSO command:

"Viewing the QMF session list" on page 142
The Monitor online facility allows you to generate a list of QMF sessions. Both current and previous sessions can be included in the list. The list displays the session user, and the start date and time. If the session has terminated, the stop date and time display.

"Setting default parameters" on page 146
Monitor uses a collection of default parameter settings. These default settings are saved from session to session in your ISPF profile data set (under an application ID of RAAX). You can set these default parameters by selecting option D from the Monitor Selection Menu.

"Monitor VSAM file maintenance" on page 147
Monitor obtains QMF session information from the Monitor VSAM file (which is written by the HPO/Governor module). During normal usage, more and more data is written to this file. The Monitor online facility can generate and submit JCL to clean up this file.

Starting Monitor

Start the Monitor online facility by selecting option 3 from the Manager Selection Menu, or by issuing the following TSO command:

About this task

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'MN'
```

Note: You receive an error indicating a dynamic allocation failure if you attempt to invoke the Monitor online facility while you have a QMF session active.

```
QMF HPO/Manager -- Monitor Selection Menu --------------------------- 12.1.0
Option ===>

                                             Db2 SSID   ===> DB2P

                                             User ID:
                                             Date:
                                             Time:
--------------------------------------------------------------------------------

    1  List QMF Sessions
    2  VSAM File Cleanup JCL
    D  Set Default Parameters
    X  Exit
```

Figure 81. Monitor Selection Menu panel

Viewing the QMF session list

The Monitor online facility allows you to generate a list of QMF sessions. Both current and previous sessions can be included in the list. The list displays the session user, and the start date and time. If the session has terminated, the stop date and time display.

About this task

When you select option 1 from the Monitor Selection Menu, the QMF Session List panel is displayed. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'MN 1'
```

The sessions that match the default parameter values are displayed.

```
DB2P -- QMF Session List --------------------------------------------- 12.1.0
Command ===>                                               Scroll ===> PAGE

Valid Actions Are...
B  Browse Detail Activity for a Session


                            --Session Start--   ---Session End---
Act  TSOID     Mode         Date     Time       Date     Time
---  --------  --------     -------- --------    -------- --------

**************************** BOTTOM OF DATA ********************************
```

Figure 82. QMF Session List panel

From the QMF Session List panel:

- If you press **Enter**, the screen is refreshed and the QMF sessions displayed are current to the present time.
- If you press **PF3**, you return to the Monitor Selection Menu.

The fields on the panel are:

Act (Action): Enter a B to view the detail activity for this session. This is the only input field on the panel. See "Viewing the session activity list" for more information on activity details for a session.

TSOID
For online sessions, this field displays the TSOID of the user who logged on to QMF. For batch sessions, this field displays the user ID associated with the batch job.

Mode This field displays the mode of the session, either ONLINE or BATCH.

Session Start Date and Time
This field displays the start date and time for the QMF session.

Session End Date and Time
This field displays the end date and time for the QMF session. If this field is blank, the session is still active or it abnormally terminated.

Viewing the session activity list
About this task

Within a session, you can see every QMF command that is being issued by the user. For actions that cause database activity, the number of rows fetched and the CPU time consumption are also displayed.

When you enter a B next to an entry on the QMF Session List panel and press **Enter**, the Session Activity List panel is displayed. This panel displays the detail activity being performed in the user's QMF session.

```
DB2P -- Session Activity List ---------------------------------- 12.1.0
Command ===>                                          Scroll ===> PAGE

Valid Actions Are...
B  Browse SQL Text
C  Cancel Current Action

TSOID :
Mode  :                                                          C S
                 QMF Object  Object                              A Q
A Date     Time     Act Owner   Name                 Rows   CPU  N L
- -------- -------- --- -------- ------------------ ---------- ----------- - -

***************************** BOTTOM OF DATA *****************************
```

Figure 83. Session Activity List panel

From the Session Activity List panel:
- If you are displaying an active QMF session and you press **Enter**, the displayed data is refreshed.
- If you are displaying a QMF session that has ended and you press **Enter**, the displayed data remains the same.
- If you press **PF3**, you return to the QMF Session List panel.

The fields on the panel are:

A (Action): Enter B in this column to browse SQL text associated with a query. This displays the SQL text in ISPF view. See "Viewing SQL text" on page 144 for more information on the viewing the SQL text. Enter C to

cancel an active QMF command with database activity. See "Canceling a QMF command" on page 145 for more information on canceling a QMF command.

Date and Time
The date and time that the command started displays in these columns. If this entry indicates incremental database activity (that is, QMF Act is ***), the date and time are the same as the corresponding entry for the command that initiated the database activity.

QMF Act
(QMF action): The QMF action that was performed displays in this column. Values that can appear here are:

BEG   Start QMF session

END   End QMF session

ERA   ERASE command

CNV   CONVERT command

PRI   PRINT command

DIS   DISPLAY command

EXP   EXPORT command

IMP   IMPORT command

SAV   SAVE command

RUN   RUN command

***   Incremental database activity

Object Owner
The owner of the object against which the action is being performed displays in this column.

Object Name
The name of the object against which the action is being performed displays in this column.

Rows   The accumulated number of rows retrieved displays in this column. It is valid only for entries indicating incremental database activity.

CPU   The accumulated CPU time consumed displays in this column. It is valid only for entries indicating incremental database activity.

CAN   The cancel flag displays in this column. See Appendix H, "HPO/Governor cancel codes," on page 241 for more information on the values that can appear here.

SQL   If a Y appears in this column, then SQL text is available for viewing. Otherwise, no SQL text is available.

Viewing SQL text

When you enter a B next to an entry on the Session Activity List panel and press **Enter**, the SQL Text is displayed (if SQL text is available) in ISPF view. This screen displays the actual SQL statement being executed.

About this task

```
VIEW        SYS10148.T101938.RA000.QMFUSER.R0200630         Columns 00001 00072
 Command ===>                                                 Scroll ===> PAGE
****** **************************** Top of Data *****************************
====== OBJECT: QMFUSER.QUERY1
======
====== DATE       TIME      TSOID     SQLID     MODE    ROWS       CPU
====== ---------- -------- -------- -------- ------ --------- -----------
====== 2010/05/26 14:38:03 QMFUSER   QMFUSER   ONLINE 35         00:00:00:00
======
000001 SELECT * FROM Q.STAFF
000002
****** *************************** Bottom of Data ***************************
```

Figure 84. SQL text

Note: The length of the SQL text displayed is determined during the configuration process. Refer to "Step 3h. Setting the HPO/Governor module parameters" on page 210 for more information.

From the SQL Text Browse ISPF view:

- If you enter the command ANALYZE on the command line and press **Enter**, Query Analyzer is invoked with the QMF query identified on this panel. This command is only valid for QMF queries. When you exit Query Analyzer, you return to this panel.
- If you press **PF3**, you return to the previous panel.
- If you press **PF8** or **PF7**, the screen scrolls forward or backward.
- If you press **PF10** or **PF11**, the screen moves left or right

The fields on the panel are:

Date   This field displays the date on which the command that activated database activity began.

Time   This field displays the time on which the command that activated database activity began.

TSOID
> For online sessions, this field displays the TSOID of the user who logged on to QMF. For batch sessions, it displays the user ID associated with the batch job.

SQLID
> This field displays the CURRENT SQLID at the time the command was initiated.

Mode   This field displays the mode in which the command was run, either ONLINE or BATCH.

Rows   This field displays the accumulated number of rows fetched at the time that the SQL text was captured for the query.

CPU   This field displays the accumulated CPU time consumed at the time that the SQL text was captured for the query.

Canceling a QMF command
About this task

In addition to browsing QMF session activity, you can use the Monitor online facility to cancel a command in progress. Incremental records are displayed that

show the cumulative CPU time consumption and database rows fetched for the command. You can use this information to decide whether or not to cancel a command.

You can enter a line action of C (Cancel) on the Session Activity List panel. The cancel action only takes effect if entered on the most recent incremental database activity row for an active QMF session. (Incremental database activity rows are indicated by a value of *** for QMF Act.) When you enter the cancel action, Monitor sends a message to the HPO/Governor module, requesting that the command be canceled.

Setting default parameters

Monitor uses a collection of default parameter settings. These default settings are saved from session to session in your ISPF profile data set (under an application ID of RAAX). You can set these default parameters by selecting option D from the Monitor Selection Menu.

About this task

If you press **Enter**, the default values specified are saved.

```
DB2P -- Set Default Parameters ------------------------------------- 12.1.0
Command ===>

Include QMF sessions that were started...
1. By this TSOID (use * for LIKE)....... ===>
2. On or since this date (YYYYMMDD)..... ===>          (TODAY for current date)
3a. On or since this time (HHMMSS)....... ===>          (TODAY for current time)
 b. If 3a. = TODAY, include sessions that
    were started this many hours ago (HH) ===>
```

Figure 85. Set Default Parameters panel

From the Set Default Parameters panel:
- If you press **PF3**, all input fields are ignored and you return to the Monitor Selection Menu.

The fields on the panel are:

Include QMF sessions that were started by this TSOID
> Enter the TSOID to monitor. You can use * as a wildcard character in the TSOID to select a group of TSOIDs to monitor. For example, enter ABC* to monitor all TSOIDs that start with ABC.

Include QMF sessions that were started on or since this date
> Enter a date (in the form YYYYMMDD) to select QMF sessions started on or after this date, or enter TODAY to select today's QMF sessions.

Include QMF sessions that were started on or since this time
> Enter a time of (in the form HHMMSS) to select QMF sessions started on or after this time (on the date specified), or enter TODAY to select today's QMF sessions. If you enter TODAY, you must specify a value in the **If 3a. = TODAY, include sessions that were started this many hours ago** field.

If 3a. = TODAY, include sessions that were started this many hours ago (HH)
> Enter a number from 00 to 24 to represent the number of hours back in time from the current time to include in the monitor display for session activity. If this number results in a time earlier than midnight, then

midnight is used. This field is ignored if the value for the **Include QMF sessions that were started on or since this time** field is not TODAY.

Monitor VSAM file maintenance

Monitor obtains QMF session information from the Monitor VSAM file (which is written by the HPO/Governor module). During normal usage, more and more data is written to this file. The Monitor online facility can generate and submit JCL to clean up this file.

About this task

Note: If the Monitor VSAM file fills up, Monitor will automatically stop recording QMF session information.

The required frequency of cleanup is related to the amount of QMF activity at your site and the space allocation of the VSAM file. Once the data in the file is purged, it is no longer available for display from the Monitor online facility. Therefore, if a daily purge is scheduled, data is only available for the last 24 hours.

Selecting option 2 from the Monitor Selection Menu brings you to the VSAM File Cleanup JCL panel. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'MN 2'
```

This panel allows you to specify the information needed to create the JCL and to run the cleanup batch job.

```
DB2P -- VSAM File Cleanup JCL -------------------------------------- 12.1.0
Command ===>

Press ENTER to build JCL.
Type CAN or CANCEL or press PF3 to cancel this request.

1. Monitor VSAM File.. ===>

2. Cleanup Parameter.. ===>   (1=Reinitialize entire file,
                               2=Keep records for today,
                               3=Keep records for last 7 days,
                               4=Keep records for last 30 days)

3. Job Cards...
      ===>
      ===>
      ===>
      ===>

4. Edit or Submit JCL? ===>   (E=Edit, S=Submit)
```

Figure 86. VSAM File Cleanup JCL panel

From the VSAM File Cleanup JCL panel:

- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel is displayed again with an error message. Otherwise, JCL to run the cleanup job is edited or submitted.
- If you press **PF3**, all input fields are ignored and you return to the previous panel.

The fields on the panel are:

Cleanup Parameter

You can specify four different types of cleanup:

- 1 = re-initializes the file
- 2 = purges all records except for the records from today
- 3 = purges all records except for the records from the last seven days
- 4 = purges all records except for the records from the last 30 days

Job Cards

Enter valid job cards for the job. You must enter at least one line. Any lines specified are used exactly as entered in the generated JCL.

Edit or Submit JCL?

Enter E to edit the generated JCL or S to automatically submit it after it is generated.

Chapter 8. Analyze queries

Query Analyzer provides you with preemptive governing capabilities required to automatically prohibit resource intensive or inefficient QMF queries from being processed by Db2. By providing you with a resource profile for your query that is more meaningful than the TIMERON value, you can make decisions about whether a query must run or be canceled before it runs.

Even though you can also use Query Analyzer outside of QMF to interpret a query's access path efficiency without running it, this facility is primarily designed to be a preemptive governor for QMF. The HPO/Governor module provides Query Analyzer's direct interface into QMF processing.

The primary components of Query Analyzer are:

- Access path reporting

  Query Analyzer automatically generates the PLAN_TABLE information required to explain the access path information for a query. Relevant fields of the plan table output are calculated and summarized into a concise report for display purposes. Additionally, this data can be used by the exit routine to prevent queries from running based on restrictions devised by your site.

- Historical QMF query statistics

  With the object tracking component of Object Manager in place, Query Analyzer can also provide accurate detailed historical data for queries that have previously run. The historical information (maximum, minimum, and average CPU time, and number of rows fetched) can be used in conjunction with the access path data to further identify resource intensive queries.

- Exit routine that allows conditional processing

  An exit point is taken after Query Analyzer has produced the raw analysis data. The analysis data is passed to the Query Analyzer exit routine (a REXX program named RAARXQA), where you can specify whether the query must run or be canceled.

  This exit routine specifies which ISPF panel to display to the user. A pre-defined panel is (and associated help panels are) shipped with Query Analyzer, but you can create your own and display it instead.

  Additionally, all tables found in the access path information are passed to this exit routine. This allows you to cancel queries based on the tables that are referenced and accessed.

  The exit routine can also limit the number of rows that the query must return. This "Top-10" feature tells QMF to return only the first n-rows of an answer set before the query runs.

  The exit routine provided uses the REXX language for easy programming and modification.

Related tasks:

"Starting Query Analyzer" on page 151
Start the Query Analyzer online facility by selecting option 4 from the Manager Selection Menu, or by issuing the following TSO command:

"Analyzing queries from outside of QMF" on page 151
Query Analyzer can be used to process queries outside of QMF, such as ad hoc queries, exported QMF queries, and SPUFI queries. Selecting option 1 from the Query Analyzer Selection Menu brings you to the Analyze Query panel. You can

also invoke this panel by issuing the following TSO command:

"Setting default parameters" on page 152
Query Analyzer uses a collection of default parameter settings. These default settings are saved from session to session in your ISPF profile data set (under an application ID of RAAX). You can set these default parameters by selecting option D from the Query Analyzer Selection Menu.

"Analyzing queries with the edit macro" on page 153
Queries can be analyzed outside of QMF using the Query Analyzer edit macro named RAAQA. While you are in an ISPF EDIT session, you can select a query from the edited data set and invoke Query Analyzer.

Related reference:

"Enabling QMF query analysis"
To enable query analysis, you must first allocate QMFHPO.SRAALOAD to your TSO session.

"Create an exit routine" on page 154
The Query Analyzer exit routine provides a very powerful option that allows you to specify whether a query must be run or canceled depending on the results of collected analysis data.

Enabling QMF query analysis

To enable query analysis, you must first allocate QMFHPO.SRAALOAD to your TSO session.

See "Step 5a. Allocating HPO libraries" on page 197 for more information about this allocation.

Note: Query Analyzer restrictions are:
- Only SELECT queries are currently handled. Other types of queries, such as INSERT, UPDATE, and DELETE are ignored.
- A maximum of 10 tables (creator and name) are passed to the sample exit routine.
- Queries cannot be analyzed from QMF running under CICS.
- Queries cannot be analyzed from QMF running in batch.

In addition to enabling query analysis in general, you must activate query analysis for a QMF user. To activate query analysis for a QMF user, you must create a resource group using the Governor online facility that enables Query Analyzer. For that resource group to take effect, you must assign it to the QMF user's profile. For a detailed discussion of the Governor online facility, resource groups and their Query Analyzer options, and assigning resource groups to user profiles, see "Starting the Governor" on page 120.

If you have used the Governor online facility to make query analysis **automatic** for a resource group, then as users issue RUN QUERY commands in QMF, the SQL to be executed is automatically analyzed.

If you have enabled Query Analyzer in **selective mode**, only those queries run with the RQA command synonym are analyzed. RQA is a command synonym for the QMF RUN command, which directs Query Analyzer to analyze the associated query. See "Step 2b. Creating Manager command synonyms" on page 196 for information about how to create this command synonym.

Starting Query Analyzer

Start the Query Analyzer online facility by selecting option 4 from the Manager Selection Menu, or by issuing the following TSO command:

About this task

CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'QA'

The Query Analyzer Selection Menu is displayed. This panel is not displayed from QMF. It displays only when running the Query Analyzer online facility.

```
QMF HPO/Manager — Query Analyzer Selection Menu ---------------------- 12.1.0
Option ===>

                                            Db2 SSID ===> DB2P

                                            User ID:
                                            Date:
                                            Time:
  ----------------------------------------------------------------------------


    1  Analyze Query
    D  Set Default Parameters
    X  Exit
```

Figure 87. Query Analyzer Selection Menu panel

Analyzing queries from outside of QMF

Query Analyzer can be used to process queries outside of QMF, such as ad hoc queries, exported QMF queries, and SPUFI queries. Selecting option 1 from the Query Analyzer Selection Menu brings you to the Analyze Query panel. You can also invoke this panel by issuing the following TSO command:

About this task

CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'QA 1'

```
DB2P -- Analyze Query ------------------------------------------- 12.1.0
Command ===>

Press ENTER to analyze a query from one of the following input sources.
Type CAN or CANCEL or press PF3 to end.

1. Query Data Set ===>

2. Or Enter Ad Hoc Query Text Below===>
===>
===>
===>
===>
===>
===>
===>
===>
===>
===>
===>
```

Figure 88. Analyze Query panel

From the Analyze Query panel:

- If you press **Enter**, the specified query is analyzed. If any errors are detected, the panel is displayed again with an error message. Otherwise, the analysis data is passed to the exit routine identified on the Set Default Parameters panel.
- If you press **PF3**, all input fields are ignored and you return to the Query Analyzer Selection Menu.

The fields on the panel are:

Query Data Set
Enter the name of the data set or data set and member containing the query to be analyzed. The data set must contain only query text and QMF-style comments.

Enter Ad Hoc Query Text Below
Enter an ad hoc query.

Setting default parameters

Query Analyzer uses a collection of default parameter settings. These default settings are saved from session to session in your ISPF profile data set (under an application ID of RAAX). You can set these default parameters by selecting option D from the Query Analyzer Selection Menu.

About this task

```
DB2P -- Set Default Parameters -------------------------------------- 12.1.0
Command ===>

1. REXX Program Name............. ===>
2. Plan Table Owner/Current SQLID ===>

Create Plan Table In
3a. Database..................... ===>
3b. Table Space.................. ===>
```

Figure 89. Set Default Parameters panel

From the Set Default Parameters panel:
- If you press **Enter**, all input fields are validated. If any errors are detected during input validation, the panel is displayed again with an error message. If there are no errors, then these default values are saved.
- If you press **PF3**, all input fields are ignored and you return to the Query Analyzer Selection Menu. The previous default values are restored.

The fields on the panel are:

REXX Program Name
(This field is optional.) Specify the name of your exit routine, if you have written one. If you leave this field blank, the sample exit routine, RAARXQA, is used.

Plan Table Owner/Current SQLID
(This field is optional.) If a value is entered here, it is used as the CURRENT SQLID during query analysis. This ID becomes the owner of the PLAN_TABLE used for the EXPLAIN command. It also becomes the owner of all unqualified tables in FROM clauses. Before setting this value, review the restrictions for setting CURRENT SQLID in the *Db2 Administration Guide*.

Create Plan Table In Database
(This field is optional.) Specify the database in which Query Analyzer must create a PLAN_TABLE for a user if one does not exist. If you leave this field blank and a PLAN_TABLE does not exist, query analysis is bypassed.

Create Plan Table In Table Space
(This field is optional.) Specify the table space in which Query Analyzer must create a PLAN_TABLE for a user if one does not exist. You cannot enter a value in this field unless you enter a value in the **Create Plan Table In Database** field.

Analyzing queries with the edit macro

Queries can be analyzed outside of QMF using the Query Analyzer edit macro named RAAQA. While you are in an ISPF EDIT session, you can select a query from the edited data set and invoke Query Analyzer.

About this task

You can enter the name of the Db2 subsystem in which to analyze the query after the macro name. For example, to analyze a query in Db2 subsystem DB2T, type RAAQA DB2T on the command line.

```
EDIT ---- USERAPPL.SOURCE(QUERY1) -- 01.00 ------------------ COLUMNS 007 072
Command ===> RAAQA DB2T                                       Scroll ===> CSR
013700          DEPT            SMALLINT               ,
013800          JOB             CHARACTER(5)           ,
013900          YEARS           SMALLINT               ,
014000          SALARY          DECIMAL(7,2)           ,
014100          COMM            DECIMAL(7,2)
014200       )
014300      END-EXEC.
014400 *
014500      EXEC SQL
014600      DECLARE C1 CURSOR FOR
014700
QQ          SELECT ID, NAME
014900        FROM Q.STAFF
QQ            WHERE COMM IS NOT NULL
015100
015200      END-EXEC.
015300 *
015400      EXEC SQL INCLUDE SQLCA END-EXEC.
015500 *
015600  01  SAVED-SQLCODE              PIC S9(9) COMP.
015700 *
```

Figure 90. Example panel for invoking query analysis from an ISPF EDIT session

From the example panel, if you type RAAQA or RAAQA SSID on the command line and press **Enter**, the selected query is analyzed in the specified Db2 subsystem. If you do not specify a subsystem, the last subsystem specified is used. If any errors are detected, the panel is displayed again with an error message. Otherwise, the analysis data is passed to the exit routine.

The fields on the panel are:

Command
Type RAAQA or RAAQA SSID on the command line (where SSID is a valid Db2 subsystem ID).

Line Command:
Isolate or select the query by entering a Q on the line of code (or QQ for

blocks of code) that contain the query. Only select the query; do not select
any lines that contain EXEC SQL, DECLARE CURSOR FOR, or
END-EXEC.

Create an exit routine

The Query Analyzer exit routine provides a very powerful option that allows you
to specify whether a query must be run or canceled depending on the results of
collected analysis data.

Before attempting to use or modify the sample exit routine or before you write
your own exit routine, become familiar with the information covered in the
following topics:
- "Process flow of the query to the exit routine" on page 155
- "Setting the CANFLG variable" on page 156
- "Setting the AAQARM variable" on page 157
- "Setting the analysis output variables" on page 157
- "View the sample exit routine" on page 156
- "Work with the analysis data" on page 158
- "Viewing the analysis data in the QMF Query Information panel" on page 158
- "Viewing the analysis data in the QMF Query Information Help panel" on page
  161

Related concepts:

"Process flow of the query to the exit routine" on page 155
A query follows these steps on its way to the Query Analyzer exit routine:

Related tasks:

"Setting the CANFLG variable" on page 156
To cancel a query, set the CANFLG variable to the character string `CANCEL`. Any
other value allows the query to continue running. For example, if a table is being
accessed at a time of day when it is restricted, the exit routine can set this flag to
cancel the query.

"Setting the AAQARM variable" on page 157
The exit routine can pass back the number of rows to fetch before canceling the
query. This allows each user the ability to minimize resource consumption by
limiting the number of rows fetched for each query. To pass the variable value
back to Query Analyzer, the exit routine must also VPUT the variable into the
shared variable pool.

"Setting the analysis output variables" on page 157
The exit routine must VPUT all variables that are displayed on the output panel. In
the sample exit, the variables QAP1 through QAP29 are VPUT to the shared pool.

"Viewing the analysis data in the QMF Query Information panel" on page 158
The QMF Query Information panel (RAAQMFQA) displays the data that is
available from Query Analyzer.

"Viewing the analysis data in the QMF Query Information Help panel" on page
161
The QMF Query Information Help panel (RAAQMFQB) displays the raw access
path data available from Query Analyzer. This panel is accessed from the QMF
Query Information help facility.

Related reference:

"View the sample exit routine" on page 156
The sample exit routine is named RAARXQA and it performs several operations on the raw analysis data as received from the analysis engine. Refer to the comments within these exits for details on the processes and for a list of the incoming parameters, the names of the variables, and their meanings.

"Work with the analysis data" on page 158
Before you run Query Analyzer using the sample exit routine or before you modify or create your own exit routine, become familiar with the analysis data that is provided to the exit routine. The sample output panel (and associated help panels) that are provided with Query Analyzer contain and describe all of these values, excluding the table names passed to the exit routine.

Process flow of the query to the exit routine

A query follows these steps on its way to the Query Analyzer exit routine:

1. Running the query.

   RUN QUERY represents the beginning of the process. This can mean the user issued a RUN QUERY or RQA QUERY command from QMF. It can also mean that Query Analyzer was invoked from the online ISPF facility or from the edit macro. In the latter two cases, the query is never executed.

2. Trapping the SQL.

   This step represents the isolation of the query prior to execution of the analysis phase. If the query is coming from QMF, then all substitution variables are replaced. If the query is coming from the online ISPF facility or the edit macro, host variables and substitution variables are replaced internally by parameter markers (question marks) in this step.

3. Running the EXPLAIN command.

   During this step, the query is processed using the EXPLAIN command. The result of this command is that access path information is inserted into a PLAN_TABLE. These PLAN_TABLE entries are read and stored internally in the program, then these entries are deleted from the PLAN_TABLE.

   The owner of the PLAN_TABLE into which these entries are inserted is determined by the user's CURRENT SQLID. You can override the CURRENT SQLID. That is, Query Analyzer can SET CURRENT SQLID before running the EXPLAIN to control which PLAN_TABLE is used. Once CURRENT SQLID is set, all unqualified tables within the query are qualified by CURRENT SQLID.

   From QMF, CURRENT SQLID is obtained from the user's resource group. Use the Governor online facilities to set this field. From the online ISPF facility or from the edit macro, CURRENT SQLID is obtained from the Set Default Parameters panel.

   If a PLAN_TABLE does not exist for the user (the CURRENT SQLID), then Query Analyzer attempts to create one. The database and table space in which the PLAN_TABLE are created is supplied to Query Analyzer via the resource group definitions if the user is running under QMF, or via the value set on the Set Default Parameters if the user is running from the online ISPF facility. If these variables are left blank, no analysis can be performed.

4. Gathering access path and historical data.

   During this step, access path information is gathered and summarized. In addition, historical query statistics (CPU time and rows fetched) are summarized and made available to the exit routine. All table names found in the plan table output (a maximum of 10) are passed to the exit routine.

5. Calling the exit routine.

Once the access path information is gathered and summarized, the exit routine is called. The exit routine is responsible for setting three variables:

- PANELID
- CANFLG
- AAQARM

The **PANELID** variable notifies Query Analyzer which panel, if any, must be displayed to the user after the query is analyzed. Any non-blank value is used as the name of the output panel.

The **CANFLG** variable notifies Query Analyzer if it must cancel the QMF query. To cancel the query, set CANFLG to `CANCEL`. Any other value allows the query to continue.

If the exit routine specifies a panel name and has canceled the query, a message is displayed on the output panel notifying the user that the query has been canceled. If the query was not canceled by the exit routine, then the panel contains a cancellation prompt. If the user responds with a `Y`, then the CANFLG variable is set to CANCEL by the output panel in its processing section.

If the query is canceled (if CANFLG is set to CANCEL after all exit processing finishes), then Query Analyzer cancels the QMF query and notifies the user with a message on the QMF message line.

The **AAQARM** variable is more of a resource controller than an analysis tool, but it provides more user control over query execution. This field lets the user tell QMF how many rows to fetch before canceling the query. The default value is zero, which means no row limit is set here. If any other value is specified, that value causes QMF to halt execution after reaching this row limit.

6. Setting the PANELID field.

   Query Analyzer can display a panel to the user. The exit routine is responsible for notifying Query Analyzer which panel it must display by setting the ISPF variable named PANELID. To hide the analysis from the user, set PANELID to spaces. The sample exit sets PANELID to RAAQMFQA, the sample output panel.

7. Displaying the Analysis Output panel.

   If the PANELID variable is set, then Query Analyzer displays the appropriate panel.

8. Deciding whether to cancel the query.

   Query Analyzer can cancel a QMF query. This exit routine is responsible for notifying Query Analyzer if the query must be canceled by setting the ISPF named CANFLG to `CANCEL`. (The sample output panel can also set CANFLG.)

View the sample exit routine

The sample exit routine is named RAARXQA and it performs several operations on the raw analysis data as received from the analysis engine. Refer to the comments within these exits for details on the processes and for a list of the incoming parameters, the names of the variables, and their meanings.

Setting the CANFLG variable

To cancel a query, set the CANFLG variable to the character string `CANCEL`. Any other value allows the query to continue running. For example, if a table is being accessed at a time of day when it is restricted, the exit routine can set this flag to cancel the query.

About this task

To pass the variable value back to Query Analyzer, the exit routine must VPUT the variable into the shared variable pool.

```
ISPEXEC VPUT (CANFLG) SHARED
```

You can add threshold logic, such as, logic that cancels a query if more than one table is accessed and no indexes are used.

Setting the AAQARM variable

The exit routine can pass back the number of rows to fetch before canceling the query. This allows each user the ability to minimize resource consumption by limiting the number of rows fetched for each query. To pass the variable value back to Query Analyzer, the exit routine must also VPUT the variable into the shared variable pool.

About this task

```
ISPEXEC VPUT (AAQARM) SHARED
```

Setting the analysis output variables

The exit routine must VPUT all variables that are displayed on the output panel. In the sample exit, the variables QAP1 through QAP29 are VPUT to the shared pool.

About this task

```
ISPEXEC VPUT (QAP1, QAP2, QAP3, QAP4, QAP5,
              QAP6, QAP7, QAP8, QAP9, QAP10,
              QAP11, QAP12, QAP13, QAP14, QAP15,
              QAP16, QAP17, QAP18, QAP19) SHARED
ISPEXEC VPUT (QAP20, QAP21, QAP22, QAP23, QAP24,
              QAP25, QAP26, QAP27, QAP28, QAP29) SHARED
```

Table 7. Analysis output variables and their descriptions

Variable	Description
QAP1	Number of Query blocks
QAP2	Number of Tables Referenced
QAP3	Join Methods
QAP4	Access Types
QAP5	Number of Index Only scans
QAP6	Db2 Sorting
QAP7	Parallelism Modes
QAP8	Highest Access Degree
QAP9	Number of Page Range Screens
QAP10	Join Types
QAP11	Prefetch Types
QAP12	Minimum row count
QAP13	Maximum row count
QAP14	Average row count
QAP15	Minimum CPU time
QAP16	Maximum CPU time
QAP17	Average CPU time

Table 7. Analysis output variables and their descriptions (continued)

Variable	Description
QAP18	Number of Matching Index scans
QAP19	Column Functions Evaluation Types
QAP20	Is access through an index?
QAP21	Is access through more than one index?
QAP22	How many indexes use matching columns?
QAP23	Is the query satisfied using only an index?
QAP24	Are scans limited to certain partitions?
QAP25	What kind of prefetching is done?
QAP26	Is data accessed/processed in parallel?
QAP27	Are sorts performed?
QAP28	Are joins present in query?
QAP29	When are column functions evaluated?

Work with the analysis data

Before you run Query Analyzer using the sample exit routine or before you modify or create your own exit routine, become familiar with the analysis data that is provided to the exit routine. The sample output panel (and associated help panels) that are provided with Query Analyzer contain and describe all of these values, excluding the table names passed to the exit routine.

Table creator/name
> The table creator and name for up to 10 tables found in the plan table are passed to RAARXQA. The exit routine can act upon this information by canceling the query, displaying the table name, or any other appropriate action. These table names are accessed using the ISPF VGET command in the sample exit routine for the variables named T1, T2, through T10.

The following topics describe the panels that you can use to view the analysis data:

Related tasks:

"Viewing the analysis data in the QMF Query Information panel"
The QMF Query Information panel (RAAQMFQA) displays the data that is available from Query Analyzer.

"Viewing the analysis data in the QMF Query Information Help panel" on page 161
The QMF Query Information Help panel (RAAQMFQB) displays the raw access path data available from Query Analyzer. This panel is accessed from the QMF Query Information help facility.

Viewing the analysis data in the QMF Query Information panel

The QMF Query Information panel (RAAQMFQA) displays the data that is available from Query Analyzer.

About this task

```
DB2P — QMF Query Information -------------------------------------- 12.1.0
Command ===>


Is access through an index?............................... :
Is access through more than one index?.................... :
How many indexes use matching columns?.................... :
Is the query satisfied using only the index?.............. :
Was a scan limited to certain partitions?................. :
Is prefetching performed?................................. :
Is data accessed/processed in parallel?................... :
Are sorts performed?...................................... :
Are joins present in the query?........................... :
When are column functions evaluated?...................... :
Cost category-Service Units (in 100s) to run query........ :

Historical Data For This Query
Minimum rows...... :              Minimum CPU time......... :
Maximum rows...... :              Maximum CPU time......... :
Average rows...... :              Average CPU time......... :

Enter Y or press PF3 to cancel this query ===>
Enter maximum number of rows to fetch.... ===>          (0=bypass)
```

Figure 91. QMF Query Information panel

If you press **PF1** from the QMF Query Information panel, a description of these fields and the raw access path data are available for display.

The fields on the panel are:

Is access through an index?
> If an access type of I, I1, N, or MX is found in the EXPLAIN output, then this field is set to YES. This indicates that there is at least one instance of index access, although other access types can also be present.

Is access through more than one index?
> If an access type of M, MX, MI, or MU is found in the EXPLAIN output, then this field is set to YES. This indicates at least one instance of a multiple index access.

How many indexes use matching columns?
> If index access is found in the plan and MATCHCOLS > 0, then this number is incriminated by 1. This is not the number of matching columns per index nor is it the sum of the number of matching columns, but rather it is the number of index accesses in which columns in a WHERE condition matched columns of the index. This is equal to the Matching Index scans field on the Help panel.

Is the query satisfied using only the index?
> If **any** query in the plan has an INDEXONLY column = YES, then this field is set to YES.

Was a scan limited to certain partitions?
> If PAGE_RANGE = Y for any row in the plan table, then this field is set to YES.

Is prefetching performed?
> If PREFETCH is L or S for any row of the plan table, then this field is set to YES.

Is data accessed/processed in parallel?
>If PARALLELISM_MODE is I or C for any row in the plan table, then this field is set to YES.

Are sorts performed?
>If any of the SORTN_ or SORTC_ columns of the plan table are Y, then this field is set to YES. Also, if Join Method = 3, this also indicates a sort was performed.

Are joins present in the query?
>If METHOD = 1,2, or 4 for any row in the plan table, then this field is set to YES.

When are column functions evaluated?
>This value can be S and/or R according to COLUMN_FN_EVAL in the plan table. SQL Parsing is not performed to determine specific function type.

Cost Category and Service Units to run query
>This is the estimated processor cost for this SQL statement. This value is comprised of the Cost Category and the Service Units. Both these values come from the DSN STATEMENT TABLE and are present only if the release level of Db2 is 6.1 or higher.

>**Cost Category**
>>Indicates which values Db2 used to make the estimate.
>>- **A** indicates Db2 had enough information to make the estimate without using defaults.
>>- **B** indicates Db2 had some condition that forced it to use defaults and, as a result, estimates may not be as accurate.

>**Service Units**
>>Estimated processor cost for this SQL statement in units of 100. For example, a displayed value of 21 means approximately 2100 service units (the value is truncated).

Historical data for query
>This area of the panel shows the actual historical values saved from previous runs of the named object. The object name and associated statistics are displayed only if they are available. Because object history is tracked by QMF object name, queries run with no associated object name are not able to access historical statistics. Given the case where the object has been tracked, the information shown is the minimum, maximum, and average counts for both rows fetched and CPU utilization (the CPU time shown is in HH:MM:SS:HS format).

Query will be canceled by Query Analyzer
>If the exit routine has determined that the query must be canceled, then this message appears at the bottom of the panel.

Enter Y or press PF3 to cancel this query
>If you specify Y and press **Enter** or press **PF3**, this query does not run and you return to the previous QMF panel. If you leave this field blank and press **Enter**, this query runs.

Enter maximum number of rows to fetch (0=bypass)
>This value determines the number of rows that QMF fetches before the query is canceled. A value of 0 (zero) directs Query Analyzer to bypass this row limit checking. The value entered here does not override the row limit enforced by Governor.

Viewing the analysis data in the QMF Query Information Help panel

The QMF Query Information Help panel (RAAQMFQB) displays the raw access path data available from Query Analyzer. This panel is accessed from the QMF Query Information help facility.

About this task

```
DB2P — QMF Query Information Help - Access Path Details ----------- 12.1.0
Command ===>
Press ENTER for a description of these values.

Number of Query Blocks.................................... :
Number of Tables Referenced............................... :
Access Types.............................................. :
Number of Index Only Scans/Matching Index Scans........... :
Join Methods.............................................. :
Join Types................................................ :
Prefetch Types............................................ :
Number of Page Range Screens.............................. :
Db2 Sorting............................................... :
Parallelism Modes/Highest Access Degree................... :
Column Functions Evaluation Types......................... :
```

Figure 92. QMF Query Information Help panel

The fields on the panel are:

Number of Query Blocks
> The highest number found in the QBLOCKNO column of the plan table. It represents the number of queries in the SQL statement.

Number of Tables Referenced
> The total number of table names occurrences found in the plan table. An occurrence of a table name is a non-blank value in the TNAME column of the plan table. This column can contain a name of a table, view, table expression or temporary table. Duplicates are counted as separate references. For information about creating a list of table names found in the plan table, see "Work with the analysis data" on page 158.

Access Types
> The different methods of accessing the tables found in the plan table. The values listed here are from the ACCESSTYPE column of the plan table. Duplicates are not shown.

Number of Index Only Scans/Matching Index Scans
> A total number of occurrences of the value Y (Yes) in the INDEXONLY column of the plan table. This represents the number of steps within the plan that can be satisfied with an index read only (no data access necessary). If the Number of Query Blocks equals this number, then all queries in the statement are satisfied using an index only. The **Number of Matching Index Scans** represent the number of occurrences of the MATCHCOLS column where the value is greater than zero. It is not the actual number of columns matching on the index, but rather the number of times the index keys are used in an index scan.

Join Methods
> A list of the different types of join methods found in the plan table. The values listed come from the METHOD column of the plan table. Duplicates are not included.

Join Types

A list of the different types of joins found in the plan table. The values listed come from the JOIN_TYPE column of the plan table. Only outer joins are listed (inner joins are blank) and a Left Outer join (L) is equivalent to a Right Outer join. Duplicates are not included.

Prefetch Types

A list of the different types of prefetch, if any, found in the plan table. If prefetching is possible, it is a sequential (S) prefetch or a list (L) prefetch as listed in the PREFETCH column of the plan table. Duplicates are not included.

Number of Page Range Screens

The total number of occurrences of tables that qualify for page range screening. For every value equal to Y (Yes) in the column PAGE_RANGE of the plan table, this number is incriminated by one. The total Number of Page Range Screens found and the **Number of Tables Referenced** can be used to determine percentages of page range screening per table access within the query.

Db2 Sorting

This value indicates whether any Db2 sorting was found in the plan table. A value of Y (Yes) for any of the SORTN_ or SORTC_ columns triggers a Y indicator for this field.

Parallelism Modes/Highest Access Degree

Parallelism modes list the types of parallelism available at bind time. If a value of I or C (I/O or CPU parallelism) is found for any step in the plan in column PARALLELISM_MODE, then the highest access degree field can be non-zero. The highest access degree represents the greatest number of parallel tasks available for any step in the plan table activated by the query. This is the highest value found in the ACCESS_DEGREE column of the plan table and does not include the JOIN_DEGREE value.

Column Functions Evaluation Types

A list of the different types of column function evaluations, if any, found in the plan table. The values can be an S (function evaluated while performing a sort to satisfy a GROUP BY clause) or R (column function evaluated while data is being read). If NONE is listed, then function can be evaluated after data retrieval and any sorts, or if ACCESSTYPE = I1 and MIN or MAX function is present, at index access time. Duplicates are not included.

Chapter 9. Work with user profiles

Every QMF user is required to have a user profile to start a QMF session.

A QMF user profile is uniquely identified by the combination of creator, translation, and environment.

Creator
> The Creator is usually a user's TSO logon ID, such as TSOU01.

Translation
> The Translation value corresponds to the different language environments supported by QMF are ENGLISH, UPPERCASE, FRANCAIS CANADIEN, DANSK, FRANCAIS, DEUTSCH, ITALIANO, NIHONGO, HANGEUL, PORTUGUES, ESPANOL, SVENSKA, FRANCAIS (SUISSE), and DEUTSCH (SCHWEIZ).

Environment
> The Environment can be TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or null. The User Profile Facility allows you to specify null for this field with a single dash (-).

User profiles are stored in your site's QMF user profile table, Q.PROFILES.

Every QMF user needs a user profile. There are two types of user profile enrollment. Under restricted QMF enrollment, if a user profile with a matching creator does not exist, then the user cannot start a QMF session. With open QMF enrollment, if a user profile with a matching creator does not exist, then QMF looks for a user profile with a creator equal to SYSTEM. A session can begin only if a profile is found. With open enrollment in effect, every user has access to the SYSTEM profile, giving every user potential access to QMF.

It is possible for a site to have open and restricted enrollment. The hierarchy of searches is:

- Search for a restricted user profile row (matching creator)
- Search for the open user profile row (creator = SYSTEM)

The User Profile Facility makes it easy for you to support full restricted enrollment. This ultimately helps you achieve better control over your QMF environment.

The following topics describe working with user profiles:

Related tasks:

"Displaying the User Profile panel" on page 164
You perform all user profile maintenance from the User Profile panel, which you can access by selecting option 5 from the Manager Selection Menu, or by issuing the following TSO command:

"Building a selection list of user profiles" on page 164

"Browsing a user profile" on page 165

"Creating a user profile" on page 166

"Editing a user profile" on page 168

"Dropping a user profile" on page 169

"Assigning a resource group to a user profile" on page 171

Displaying the User Profile panel

You perform all user profile maintenance from the User Profile panel, which you can access by selecting option 5 from the Manager Selection Menu, or by issuing the following TSO command:

About this task

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM U'
```

```
DB2P / DB2PLOCATION -- User Profile -------------------------------- 12.1.0
Command ===>

Action................... ===>

Creator.................. ===>
Translation.............. ===>
Environment.............. ===>

Clean Up Objects? (Y/N)... ===>
Drop Confirmation? (Y/N).. ===>


--------------------------------------------------------------------------
Valid Actions Are...
A  Assign
B  Browse
C  Create
D  Drop
E  Edit
G  Invoke Governor
L  Display Selection List
--------------------------------------------------------------------------
```

Figure 93. User Profile panel

From the User Profile panel:

- If you press **Enter**, all input fields are processed. If any errors are detected during input validation, the panel is displayed again with an error message.
- If you press **PF3**, all input fields are ignored and you will return to the previous menu.

Building a selection list of user profiles

About this task

To build a selection list of user profile entries from the User Profile panel, you must enter values in the following fields:

Action
> Enter L (for list).

Creator
> Enter the creator field for the user profile. You can use a percent sign (%) or an underscore (_) as wildcard characters in the creator to select multiple profile entries.

Translation
> Enter the translation field for the user profile. You can use a percent sign (%) or an underscore (_) as wildcard characters in the translation to select multiple profile entries. If you leave this field blank or enter *, the system default is used.

Environment

Enter the environment field for the user profile, one of TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or -. You can use a percent sign (%) or an underscore (_) as wildcard characters in the environment to select multiple profile entries.

Clean Up Objects?

Enter Y to automatically invoke Object Manager after a user profile is dropped. This allows you to clean up (drop, transfer, copy, or migrate) objects for the user that was just dropped. Enter N to disable this action.

Drop Confirmation?

Enter Y to request drop confirmations or N to suppress them. This value is carried forward to all actions performed from the selection list.

This User Profile Selection List panel contains a list of all user profile entries that match the input specifications entered on the User Profile panel.

```
DB2P / DB2PLOCATION -- User Profile Selection List ------------------ 12.1.0
Command ===>                                              Scroll ===> PAGE

Valid Actions Are...
A  Assign                    B  Browse
C  Create Like               D  Drop
E  Edit                      G  Invoke Governor
-------------------------------------------------------------------------
Action          Creator   Translation       Environment  Resource Group
------          --------  ---------------   -----------  ----------------

****************************** BOTTOM OF DATA ******************************
```

Figure 94. User Profile Selection List panel

From the User Profile Selection List panel:

- If you press **Enter**, all rows that are selected with an action code are processed. After all selected rows are processed, the panel is displayed again with an informative message on each row (such as *CREATED or *NODROP). This message appears in the space between the **Action** and **Creator** columns.
- If you press **PF3**, all input fields are ignored and you return to the User Profile panel.
- If you press **PF8** or **PF7**, the panel scrolls forward or backward after all selected rows have been processed.

Browsing a user profile

About this task

You can browse a user profile from the:

- **User Profile panel**
- **User Profile Selection List panel**

To browse a user profile entry from the User Profile panel, you must enter values in the following fields:

Action

Enter B (for browse).

Creator

Enter the creator field for the user profile. No wildcard characters are allowed.

Translation

Enter the translation field for the user profile. No wildcard characters are allowed. If you leave this field blank or enter *, the system default is used.

Environment

Enter the environment field for the user profile, one of TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or -. No wildcard characters are allowed.

To browse a user profile entry from the User Profile Selection List panel, you must enter a value in the following field:

Action

Enter B (for browse).

The Browse User Profile panel is a browse-only panel; you cannot change displayed attribute values from this panel.

```
DB2P / DB2PLOCATION -- Browse User Profile -------------------------- 12.1.0
Command ===>

Creator... :          Translation... :               Environment... :
--------------------------------------------------------------------------------
Case...... : (   ) UPPER    Decimal.... : (   ) PERIOD
             (   ) STRING                 (   ) COMMA
             (   ) MIXED                  (   ) FRENCH

Confirm... : (   ) YES       Language... : (   ) SQL
             (   ) NO                      (   ) QBE
                                          (   ) PROMPTED

Model..... : (   ) REL       Trace...... : (   ) ALL
             (   ) ER                      (   ) NONE
                                          (   ) Custom:
Number of Lines/Page.... :
Number of Chars/Line.... :
GDDM Printer Nickname... :
Table Space Name........ :
Resource Group......... :
PF Key Table............ :
Synonym Table........... :
```

Figure 95. Browse User Profile panel

From the Browse User Profile panel, if you press **Enter** or **PF3** you return to the previous panel.

Creating a user profile

About this task

You can create a user profile from the:

- **User Profile panel**
- **User Profile Selection panel**

To create a user profile entry from the User Profile panel, you must enter values in the following fields:

Action

Enter C (for create).

Creator

> Enter the creator field for the user profile. No wildcard characters are allowed.

Translation

> Enter the translation field for the user profile. No wildcard characters are allowed. If you leave this field blank or enter *, the system default is used.

Environment

> Enter the environment field for the user profile, one of TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or -. No wildcard characters are allowed.

To create a user profile entry from the User Profile Selection List panel, you must enter a value in the following field:

Action

> Enter C (for create). This action is treated as a Create Like... The attributes of the profile entry selected with the action of C are used as default attribute values on the Create User Profile panel.

If you are creating a user profile from the User Profile panel, this panel contains default attribute values when it is first displayed. If you are creating a user profile from the User Profile Selection List panel, this panel contains the attribute values from the user profile that was selected.

```
DB2P / DB2PLOCATION -- Create User Profile ------------------------- 12.1.0
Command ===>

Creator ===>          Translation ===>             Environment ===>
--------------------------------------------------------------------------
Case... ===> (   ) UPPER    Decimal. ===> (   ) PERIOD
             (   ) STRING                 (   ) COMMA
             (   ) MIXED                  (   ) FRENCH

Confirm ===> (   ) YES       Language ===> (   ) SQL
             (   ) NO                      (   ) QBE
                                          (   ) PROMPTED

Model.. ===> (   ) REL       Trace... ===> (   ) ALL
             (   ) ER                      (   ) NONE
                                          (   ) Custom:

Number of Lines/Page. ===>
Number of Chars/Line. ===>
GDDM Printer Nickname ===>
Table Space Name..... ===>
Resource Group....... ===>
PF Key Table......... ===>
Synonym Table........ ===>
```

Figure 96. Create User Profile panel

From the Create User Profile panel:

- If you press **Enter**, the attribute values are validated. If any errors are detected during input validation, the panel is displayed again with an error message. Otherwise, the user profile is created (an entry is inserted into Q.PROFILES) and you return to the previous panel.
- If you press **PF3**, the attribute values are ignored and the user profile is not created. You return to the previous panel.

The fields on the panel are:

Case This field can be: UPPER, STRING, or MIXED. Enter an X by the desired selection. Only one of these options can be selected.

Decimal

This field can be: PERIOD, COMMA, or FRENCH. Enter an X by the desired selection. Only one of these options can be selected.

Confirm

This field can be: YES or NO. Enter an X by the desired selection. Only one of these options can be selected.

Language

This field can be: SQL, QBE, or PROMPTED. Enter an X by the desired selection. Only one of these options can be selected.

Model This field can be: REL or ER. Enter an X by the desired selection. Only one of these options can be selected.

Trace This field can be: ALL, NONE, or a custom value. Enter an X by the desired selection. Only one of these options can be selected. If a custom trace value is desired, enter the trace value next to the prompt.

Length

Enter the maximum number of lines per report page. This field must be a positive number less than 1000.

Width Enter the maximum number of characters per report line. This field must be a number between 22 and 999 inclusive.

Space This field defines the table space used in SAVE DATA and IMPORT DATA commands. Enter the desired table space name here.

Printer

Enter the desired GDDM printer nickname.

Resource Group

Enter the name of the resource group to assign to this profile. If you leave this field blank, then QMF uses the user's TSO logon ID or primary authorization ID (depending on the value of the QMF startup parameter DSQSPRID).

PF-Key Table

Enter the name of the PF-key table to be used by this profile.

Synonym Table

Enter the name of the synonym table to be used by this profile.

Editing a user profile

About this task

You can edit a user profile from the:

- **User Profile panel**
- **User Profile Selection List panel**

To edit a user profile entry from the User Profile panel, you must enter values in the following fields:

Action

Enter E (for edit).

Creator

Enter the creator field for the user profile. No wildcard characters are allowed.

Translation

Enter the translation field for the user profile. No wildcard characters are allowed. If you leave this field blank or enter *, the system default is used.

Environment

Enter one of the following environment fields for the user profile: TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or -. No wildcard characters are allowed.

To edit a user profile entry from the User Profile Selection List panel, you must enter a value in the following field:

Action

Enter E (for edit).

You can change attribute values from the Edit User Profile panel. However, you cannot change the key values (creator, translation, and environment) from this panel.

```
DB2P / DB2PLOCATION -- Edit User Profile -------------------------- 12.1.0
Command ===>

Creator... :            Translation... :              Environment... :
--------------------------------------------------------------------------
Case... ===> (   ) UPPER    Decimal. ===> (   ) PERIOD
             (   ) STRING                 (   ) COMMA
             (   ) MIXED                  (   ) FRENCH

Confirm ===> (   ) YES       Language ===> (   ) SQL
             (   ) NO                      (   ) QBE
                                          (   ) PROMPTED

Model.. ===> (   ) REL       Trace... ===> (   ) ALL
             (   ) ER                      (   ) NONE
                                          (   ) Custom:
Number of Lines/Page. ===>
Number of Chars/Line. ===>
GDDM Printer Nickname ===>
Table Space Name..... ===>
Resource Group....... ===>
PF Key Table......... ===>
Synonym Table........ ===>
```

Figure 97. Edit User Profile panel

From the Edit User Profile panel:

- If you press **Enter**, the attribute values are validated. If any errors are detected during input validation, the panel is displayed again with an error message. Otherwise, the user profile is updated and you return to the previous panel.
- If you press **PF3**, the attribute values are ignored and the user profile is not updated. You return to the previous panel.

Dropping a user profile

About this task

You can drop a user profile from the:

- **User Profile panel**
- **User Profile Select List panel**

In addition, Object Manager can be automatically invoked after a User Profile is dropped. This facilitates the cleaning up of objects for users who are being removed from the system.

To drop a user profile entry from the User Profile panel, you must enter values in the following fields:

Action
> Enter D (for drop).

Creator
> Enter the creator field for the user profile. No wildcard characters are allowed.

Translation
> Enter the translation field for the user profile. No wildcard characters are allowed. If you leave this field blank or enter *, the system default is used.

Environment
> Enter the environment field for the user profile, one of TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or -. No wildcard characters are allowed.

Clean Up Objects?
> Enter Y to automatically invoke Object Manager after a user profile is dropped. This allows you to clean up (drop, transfer, copy, or migrate) objects for the user that was just dropped. Enter N to disable this action.

Drop Confirmation?
> Enter Y to request a drop confirmation panel or N to suppress one.

To drop a user profile entry from the User Profile Selection List panel, you must enter a value in the following field:

Action
> Enter D (for drop).

The user profile being dropped displays on the User Profile Drop Confirmation panel, along with the number of database rows that will be deleted.

```
DB2P / DB2PLOCATION -- User Profile Drop Confirmation ---------------- 12.1.0
Command ===>

Press ENTER to confirm this DROP request.
Type CAN or CANCEL or press PF3 to cancel this DROP request.

User....... :
Translation :
Environment :

Number of rows to be deleted from Q.PROFILES :
```

Figure 98. User Profile Drop Confirmation panel

From the User Profile Drop Confirmation panel:
- If you press **Enter**, the user profile identified on the panel is dropped from the database and you return to the previous panel.
- If you press **PF3**, the drop command is ignored (the user profile remains in the database) and you return to the previous panel.

Assigning a resource group to a user profile

About this task

You can assign a resource group to a user profile from the:

- **User Profile panel**
- **User Profile Selection List panel**

To assign a resource group to a user profile entry from the User Profile panel, you must enter values in the following fields:

Action

Enter A (for assign).

Creator

Enter the creator field for the user profile. No wildcard characters are allowed.

Translation

Enter the translation field for the user profile. No wildcard characters are allowed. If you leave this field blank or enter *, the system default is used.

Environment

Enter the environment field for the user profile, one of TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or -. No wildcard characters are allowed.

To assign a resource group to a user profile entry from the User Profile Selection List panel, you must enter a value in the following field:

Action

Enter A (for assign).

The following topics describe the multi-step process of assigning a resource group to a user profile:

Related tasks:

"Building the selection list of resource groups"
Use the User Profile Assignment panel 1 to build a selection list of resource groups.
"Making the resource group assignments" on page 172
Use the User Profile Assignment panel 2 to make the resource group assignments.

Building the selection list of resource groups

Use the User Profile Assignment panel 1 to build a selection list of resource groups.

About this task

```
DB2P / DB2PLOCATION -- User Profile Assignment ---------------------- 12.1.0
Command ===>

Creator................ :
Translation............ :
Environment............ :

Is currently assigned to :


Resource Group....... ===>

------------------------------------------------------------------------
Use this panel to build a selection-list of Resource Groups.
```

Figure 99. User Profile Assignment panel 1

From the User Profile Assignment panel 1:

- If you press **Enter**, a selection list of all qualifying resource groups is built.
- If you press **PF3**, the assignment is bypassed and you return to the previous panel.

Enter the following information on the User Profile Assignment panel 1:

Resource Group
> Enter the resource group to include in the list. You can use a percent sign (%) or an underscore (_) as wildcard characters in the resource group name to select multiple resource groups.

Making the resource group assignments

Use the User Profile Assignment panel 2 to make the resource group assignments.

About this task

```
DB2P / DB2PLOCATION -- User Profile Assignment ---------------------- 12.1.0
Command ===>                                        Scroll ===> PAGE

Valid Actions are...
A --Assign Resource Group to User Profile
U --Unassign Resource Group from User Profile

Creator.... :
Translation :
Environment :

Action          Resource Group   Description
------          ---------------   ----------------------------------------

***************************** BOTTOM OF DATA ******************************
```

Figure 100. User Profile Assignment panel 2

From the User Profile Assignment panel 2:

- If you press **Enter**, the selected assignment is processed, the database is updated, and you return to the previous panel (because a user profile can be assigned only to one resource group).
- If you press **F3**, pending assignments are bypassed and you return to the previous panel.

Chapter 10. Use the error log

When QMF detects a system or resource error, it writes an entry to the Q.ERROR_LOG table. Errors are logged by user and message number and are date and time stamped. System programmers and troubleshooters refer to error log entries to resolve outstanding QMF problems.

Error log entries are stored in Q.ERROR_LOG. For a detailed discussion of this table, see the latest documentation on managing QMF.

QMF continually inserts entries into the QMF error log table. Review this table for outstanding problems and remove resolved error log entries. If entries are not removed, this table grows and it ties up excessive DASD storage.

A well maintained error log table ensures that you are not wasting critical system resources and that you are resolving outstanding errors.

You can review and manipulate the error log using the Error Log panel.

The following topics describe the supported Error Log facilities:

Related tasks:

"Displaying the Error Log panel"
Perform all error log maintenance from the Error Log panel, which you can access by selecting option 6 from the Manager Selection Menu.

"Viewing the selection list of error log entries" on page 175
When you enter L (for list) on the Error Log panel and any other relevant fields, the Error Log Selection List panel is displayed. This panel contains a list of all error log entries that matched the input criteria entered on the Error Log panel.

"Browsing an error log entry" on page 175

"Deleting an error log entry" on page 176

"Archiving an error log entry" on page 178
You can archive an error log entry or multiple entries from a selection list or from the Error Log panel. The archive process writes the entire error log entry to the archive data set identified on the Error Log panel and then removes the error log entry from the QMF system table.

Displaying the Error Log panel

Perform all error log maintenance from the Error Log panel, which you can access by selecting option 6 from the Manager Selection Menu.

About this task

You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM E'
```

```
DB2P / DB2PLOCATION -- Error Log ----------------------------------- 12.1.0
Command ===>

Action................... ===>

From Date................. ===>              To Date...... ===>
From Time (HH:MM)......... ===>              To Time...... ===>
User..................... ===>
Message Number........... ===>

Asc/Desc Option (A/D)..... ===>
Delete Confirmation? (Y/N) ===>

Error Log Archive DSN..... ===>


------------------------------------------------------------------------------
Valid Actions Are...
A  Archive
B  Browse
D  Delete
L  Display Selection List
------------------------------------------------------------------------------
```

Figure 101. Error Log panel

From the Error Log panel:
- If you press **Enter**, all input fields are processed. If any errors are detected during input validation, the panel is displayed again with an error message.
- If you press **PF3**, all input fields are ignored and you return to the previous panel.

The Error Log panel fields are:

Action
> Enter L (for list).

From Date
> Enter a date (the date format depends on the version/release and maintenance level of QMF). Errors logged on or after this date are selected.

To Date
> Enter a date (the date format depends on the version/release and maintenance level of QMF). Errors logged on or before this date are selected. If you leave this field blank, **From Date** is used as the default.

From Time
> Enter a time in HH:MM format. Errors logged on **From Date** at or after this time are selected. If you leave this field blank, `00:00` is used as the default.

To Time
> Enter a time in HH:MM format. Errors logged on **To Date** at or before this time are selected. If you leave this field blank, `24:00` is used as the default.

User　Enter the user for whom the error was logged. You can use a percent sign (%) or an underscore (_) as wildcard characters in the user to select entries from multiple users. If you leave this field blank, a percent sign (%) is used as the default.

Message Number
> Enter the message number for the logged error. You can use a percent sign (%) or an underscore (_) as wildcard characters in the message number to

select entries with multiple error message numbers. If you leave this field blank, a percent sign (%) is used as the default.

Asc/Desc Option

This flag determines the order of entries in the selection list. Enter A to list the entries in ascending (chronological) order. Enter D to list the entries in descending (reverse chronological) order.

Delete Confirmation?

Enter Y to request delete confirmations or N to suppress them. This value is carried forward to all actions performed from the selection list.

Archive Data Set

Enter the name of a data set for archiving the error log entries. This data set must be cataloged and must have DSORG=PS and LRECL=131.

Viewing the selection list of error log entries

When you enter L (for list) on the Error Log panel and any other relevant fields, the Error Log Selection List panel is displayed. This panel contains a list of all error log entries that matched the input criteria entered on the Error Log panel.

About this task

```
DB2P / DB2PLOCATION -- Error Log Selection List -------------------- 12.1.0
Command ===>


Valid Actions Are...
A  Archive
B  Browse
D  Delete



---------------- -------------------------------
Action           Date    Time User     Msg Num
------           -------- ----- -------- --------
```

Figure 102. Error Log Selection List panel

From the Error Log Selection List:
- If you press **Enter**, all rows that are selected with an action code are processed. After all selected rows are processed, the panel is displayed again with an informative message on each row (such as *BROWSED or *NOARCH). This message appears in the space between the **Action** and **Date** columns.
- If you press **PF3**, all input fields are ignored and you return to the Error Log panel.
- If you press **PF8** or **PF7**, the panel scrolls forward or backward after all selected rows have been processed.

Browsing an error log entry

About this task

You can browse an error log entry from the:
- **Error log panel**
- **Error Log Selection List panel**

To browse an error log entry from the Error Log panel, you must enter values in the following fields:

Action
>Enter B (for browse).

From Date
>Identify the date on which the entry was logged.

To Date
>This field is ignored when **Action** is B.

From Time
>Identify the time on which the entry was logged

To Time
>This field is ignored when **Action** is B.

User Enter the user for whom the entry was logged.

Message Number
>Enter the QMF message number of the entry.

To browse an error log entry from the Error Log Selection List panel, you must enter a value in the following field:

Action
>Enter B (for browse).

The message text associated with the selected error log entry is displayed on the Browse Error Log panel.

```
DB2P / DB2PLOCATION -- Browse Error Log ----------------------------- 12.1.0
Command ===>                                           Scroll ===> PAGE

User:                    Date:
Msg :                    Time:

Message Text
-------------------------------------------------


-------------------------------------------------



***************************** BOTTOM OF DATA ******************************
```

Figure 103. Browse Error Log panel

From the Browse Error Log panel:
- If you press **PF3**, the browse session ends and you return to the previous panel.
- If you press **PF8** or **PF7**, the message text scrolls forward or backward.

Deleting an error log entry

About this task

You can delete an error log entry or multiple entries from the:
- **Error Log panel**
- **Error Log Selection List panel**

To delete an error log entry from the Error Log panel, you must enter values in the following fields:

Action
>   Enter `D` (for delete).

From Date
>   Enter a date (the date format depends on the version/release and maintenance level of QMF). Errors logged on or after this date are deleted.

To Date
>   Enter a date (the date format depends on the version/release and maintenance level of QMF). Errors logged on or before this date are deleted. If you leave this field blank, **From Date** is used as the default.

From Time
>   Enter a time in HH:MM format. Errors logged on **From Date** at or after this time are deleted. If you leave this field blank, `00:00` is used as the default.

To Time
>   Enter a time in HH:MM format. Errors logged on **To Date** at or before this time are deleted. If you leave this field blank, `24:00` is used as the default.

User   Enter the user for whom the error was logged. You can use a percent sign (%) or an underscore (_) as wildcard characters in the user to delete entries from multiple users. If you leave this field blank, a percent sign (%) is used as the default.

Message Number
>   Enter the message number for the logged error. You can use a percent sign (%) or an underscore (_) as wildcard characters in the message number to delete entries with multiple error message numbers. If you leave this field blank, a percent sign (%) is used as the default.

Delete Confirmation?
>   Enter `Y` to request a delete confirmation panel or `N` to suppress one.

To delete an error log entry from the Error Log Selection List panel, you must enter a value in the following field:

Action
>   Enter `D` (for delete).

The number of database rows that are deleted as a result of this delete command are displayed on Error Log Delete Confirmation panel.

```
DB2P / DB2PLOCATION -- Error Log Delete Confirmation ----------------- 12.1.0
Command ===>

Press ENTER to confirm this DELETE request.
Type CAN or CANCEL or press PF3 to cancel this DELETE request.


Number of error log entries to be deleted :
```

Figure 104. Error Log Delete Confirmation panel

From the Error Log Delete Confirmation panel:

• If you press **Enter**, the error log entry identified on the panel is deleted from the database and you return to the previous panel.

- If you press **PF3**, the delete command is ignored (the error log entry remains in the database) and you return to the previous panel.

Archiving an error log entry

You can archive an error log entry or multiple entries from a selection list or from the Error Log panel. The archive process writes the entire error log entry to the archive data set identified on the Error Log panel and then removes the error log entry from the QMF system table.

About this task

You can archive an error log entry from the:
- **Error Log panel**
- **Error Log Selection List panel**

To archive an error log entry from the Error Log panel, you must enter values in the following fields:

Action
> Enter A (for archive).

From Date
> Enter a date (the format depends on the version/release and maintenance level of QMF). Errors logged on or after this date are archived.

To Date
> Enter a date (the format depends on the version/release and maintenance level of QMF). Errors logged on or before this date are archived. If you leave this field blank, **From Date** is used as the default.

From Time
> Enter a time in HH:MM format. Errors logged on **From Date** at or after this time are archived. If you leave this field blank, 00:00 is used as the default.

To Time
> Enter a time in HH:MM format. Errors logged on **To Date** at or before this time are archived. If you leave this field blank, 24:00 is used as the default.

User Enter the user for whom the error was logged. You can use a percent sign (%) or an underscore (_) as wildcard characters in the user to archive entries from multiple users. If you leave this field blank, a percent sign (%) is used as the default.

Message Number
> Enter the message number for the logged error. You can use a percent sign (%) or an underscore (_) as wildcard characters in the message number to archive entries with multiple error message numbers. If you leave this field blank, a percent sign (%) is used as the default.

Delete Confirmation?
> Enter Y to request a delete confirmation panel or N to suppress one.

To archive an error log entry from the Error Log Selection List panel, you must enter a value in the following field:

Action
> Enter A (for archive).

The number of database rows that are printed (and deleted) as a result of this archive command is displayed on the Error Log Archive Confirmation panel.

```
DB2P / DB2PLOCATION -- Error Log Archive Confirmation --------------- 12.1.0
Command ===>

Press ENTER to confirm this ARCHIVE request.
Type CAN or CANCEL or press PF3 to cancel this ARCHIVE request.


Number of error log entries to be archived :
Rows will be written to this archive data set before they are deleted :
```

Figure 105. Error Log Archive Confirmation panel

From the Error Log Archive Confirmation panel:

- If you press **Enter**, the error log entry identified on the panel is written to your archive data set and then deleted from the database. You return to the previous panel.
- If you press **PF3**, the archive command is ignored and the error log entry is not written to your archive data set and remains in the database. You return to the previous panel.

Chapter 11. Specify the spill file allocation

QMF uses a spill file when there is no more room in virtual storage for the current data object. The spill file is a temporary storage area utilized by QMF when virtual storage is not large enough to hold the current data object.

The spill file allocation for each user must be large enough to hold all rows from the largest accessed table. If you do not allocate a spill file for a user or if you allocate a spill file that is too small, problems can occur. QMF can encounter an insufficient storage condition which can degrade response time.

The Spill File online facility helps to ensure the correct allocation for a user's spill file. By entering the name of a table and the type of device on which the spill file resides, the allocation is calculated automatically.

The following topic describes how to display the Spill File panel and calculate the spill file allocation:

Related tasks:

"Displaying the Spill File panel"

"Calculating spill file allocation" on page 182

Displaying the Spill File panel

About this task

When you select option 7 from the Manager Selection Menu, the Spill File panel is displayed. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM S'
```

```
DB2P / DB2PLOCATION -- Spill File --------------------------------- 12.1.0
Command ===>

To calculate the number of tracks to allocate for spill file, enter:

Name of Largest Table (Creator) ===>
                       (Name)... ===>

Device Type (3350, 3380, 3390) ===>


--------------------------------------------------------------------------
When you press ENTER, the spill file allocation will be computed.

Maximum number of tracks for spill file:
--------------------------------------------------------------------------
```

Figure 106. Spill File panel

From the Spill File panel:

- If you press **Enter**, the spill file track allocation is calculated based on the specified input table name and the storage device type.
- If you press **PF3**, you return to the previous panel without performing any more calculations.

Calculating spill file allocation

About this task

Enter the following information on the Spill File panel:

Name of Largest Table (Creator)
> Enter the creator of the largest table that is accessed in a QMF session.

Name of Largest Table (Name)
> Enter the name of the largest table that is accessed in a QMF session.

Device Type
> Enter the type of device on which the spill file is stored. Valid values are 3350, 3380, or 3390.

Chapter 12. Generate JCL for HPO Activity Log batch job

The HPO Activity Log is a repository for QMF session activity and object usage information. Periodically a batch job is run to copy the HPO Activity Log data sets to the HPO Activity Log tables. The HPO Activity Log JCL facility generates the JCL for this batch job. This JCL can be generated once and then added to your job scheduling system.

There are two types of HPO Activity Log data sets that must be processed periodically (daily, nightly, etc.) by the HPO Activity Log batch job. The two types are the current and the historical data sets. After successful completion of the batch job, the data sets are automatically reset.

The current HPO Activity Log data sets are the:
- **TSO activity log** where the current QMF activity under TSO is recorded.
- **TSO SQL text log** where the SQL text associated with current QMF activity under TSO is recorded.
- **CICS activity log** where the current QMF activity under CICS is recorded.
- **CICS SQL text log** where the SQL text associated with current QMF activity under CICS is recorded.

The historical HPO Activity Log data sets are the:
- **Sorted activity log** where the current TSO and CICS session activity is sorted and written.
- **Archive activity log** where the Sorted Activity log is appended for historical purposes.
- **Archive SQL text log** where the current TSO and CICS SQL text data sets are appended for historical purposes.

Note: The HPO Activity Log data sets must be specified to (and optionally created by) the HPO Configuration Dialog. For more information about the requirements for these data sets, see "Step 3g. Setting the HPO/Governor data set names" on page 208.

The log data sets must be processed periodically by the HPO Activity Log batch job. Because this facility needs exclusive access to the log data sets, you must schedule this job for a time when there is no QMF activity. You can use the HPO Activity Log JCL panel to generate JCL to run a batch job that performs the following functions:
- Sorts the current TSO and CICS activity log files into the sorted activity log file.
- Updates Q.OBJ_ACTIVITY_SUMM and Q.OBJ_ACTIVITY_DTL from the sorted activity log file and the current TSO and CICS SQL text log files.
- Appends the sorted activity log file to the historical archive activity log file.
- Appends the SQL text log files to the historical archive SQL text log file.
- Resets the TSO activity log file.
- Resets the CICS activity log file.
- Resets the sorted activity log file.
- Resets the TSO SQL text log file.
- Resets the CICS SQL text log file.

Related tasks:

"Accessing the HPO Activity Log JCL panel"

"Processing HPO Activity Log records at remote locations" on page 189
QMF activity at remote locations is recorded in the HPO Activity Log data sets.
For example, suppose a QMF CONNECT command is followed by a RUN QUERY
command. This RUN QUERY command is tracked with an indicator that it was
executed at the remote Db2 location (the target of the CONNECT statement). When
processing the log records through the batch job, the **Process data at remote
locations?** parameter determines whether or not the records must be processed at
that remote location. An internal connection to the remote location is attempted
and the Db2 activity log tables at that remote location is updated as appropriate.
The local Db2 activity log tables are not affected, regardless of the setting of the
parameter, for this particular record.

"Maintaining HPO Activity Log tables" on page 190
As historical data is added to the HPO Activity Log tables, you must perform
maintenance on the tables, table spaces, and indexes. (The Q.OBJ_ACTIVITY_DTL
table grows substantially faster than the Q.OBJ_ACTIVITY_SUMM table, so it
requires more frequent maintenance.)

Related reference:

"Understand the generated HPO Activity Log batch job JCL" on page 185
The generated JCL for the HPO Activity Log batch job is described in each of the
following topics. The descriptions in each of these topics assumes that all TSO and
CICS log data sets are configured. If any data sets are omitted, the corresponding
steps and DDs are automatically omitted from the generated JCL.

Accessing the HPO Activity Log JCL panel

About this task

You can access the HPO Activity Log JCL panel by selecting option 8 from the
Manager Selection Menu, or by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM L'
```

```
DB2P / DB2PLOCATION -- HPO Activity Log JCL ------------------------ 12.1.0
Command ===>

Press ENTER to build JCL.
Type CAN or CANCEL or press PF3 to cancel this request.

1. Process TSO Activity Logs? (Y/N).............................. ===> Y
2. Process CICS Activity Logs? (Y/N)............................. ===> Y

3. Delete historical data when an object is erased? (Y/N)........ ===> Y
4. Delete historical data when an object is re-saved? (Y/N)...... ===> N
5. Process data at remote locations? (Y/N)...................... ===> Y

6. Job Cards...
     ===>
     ===>
     ===>
     ===>

7. Edit or Submit JCL?... ===>      (E=Edit, S=Submit)
```

Figure 107. HPO Activity Log JCL panel

From the HPO Activity Log JCL panel:

- If you press **Enter**, JCL is generated. This JCL contains the steps to completely process the log data sets. If the **Edit or Submit JCL?** flag is set to E, an ISPF edit session is invoked, allowing you to view and optionally modify the generated JCL. You must explicitly issue the TSO SUBMIT command to submit the JCL. If the **Edit or Submit JCL?** flag is set to S, the JCL is automatically submitted without editing it.
- If you press **PF3**, you return to the previous panel, bypassing JCL generation.

The fields on the panel are:

Process TSO Activity Logs? (Y/N)
> Enter a Y here to process the TSO activity logs as defined in your configuration file.

Process CICS Activity Logs? (Y/N)
> Enter a Y here to process the CICS activity logs as defined in your configuration file.

Delete historical data when an object is erased? (Y/N)?
> This flag is used as input to the batch job. If you enter Y, ERASE commands that have been logged cause corresponding rows in the activity tables to be deleted. If you enter N, then no deletes are performed against the tables and you must remove rows for obsolete objects from the tables manually. The default value is Y.

Delete historical data when an object is re-saved? (Y/N)?
> This flag is used as input to the batch job. If you enter Y, SAVE and IMPORT commands that have been logged cause corresponding rows in the activity tables to be deleted, and the object is re-saved as if it were new. If you enter N, then no deletes are performed against the tables and the new object activity is considered an extension of the old. The default value is N.

Process data at remote locations (Y/N)?
> This flag is used as input to the batch job. If you enter Y, remote locations are processed. If you enter N, then remote locations are not processed. The default value is Y. If specific locations must be included or excluded from processing, set this flag to Y and use the optional INCLUDE or EXCLUDE DD statements.

Job Cards
> Enter valid job cards for the job. At least one line must be entered. Any lines specified are used exactly as entered in the generated JCL.

Edit or Submit JCL?
> Enter E to edit the generated JCL or S to automatically submit it after it is generated.

Understand the generated HPO Activity Log batch job JCL

The generated JCL for the HPO Activity Log batch job is described in each of the following topics. The descriptions in each of these topics assumes that all TSO and CICS log data sets are configured. If any data sets are omitted, the corresponding steps and DDs are automatically omitted from the generated JCL.

Related tasks:

"Specifying the SORT1 step JCL" on page 186
This step sorts the TSO and CICS activity log files and merges them into the sorted activity log file.

"Specifying the LOAD2 step JCL"
This step updates the HPO Activity Log table, loading the information from the
sorted activity log file and the SQL text log files into Db2.

"Specifying the ARCH3 step JCL" on page 187
This step appends the sorted activity log file to the activity archive log file.

"Specifying the ARCH4 step JCL" on page 187
This step appends the SQL text log files to the SQL text archive log file.

"Specifying the INIT5 step JCL" on page 188
This step re-initializes the TSO activity log file.

"Specifying the INIT6 step JCL" on page 188
This step re-initializes the CICS activity log file.

"Specifying the INIT7 step JCL" on page 188
This step re-initializes the sorted activity log file.

"Specifying the INIT8 step JCL" on page 189
This step re-initializes the TSO SQL text log file.

"Specifying the INIT9 step JCL" on page 189
This step re-initializes the CICS SQL text log file.

Specifying the SORT1 step JCL

This step sorts the TSO and CICS activity log files and merges them into the sorted
activity log file.

About this task

Table 8. Step SORT1 JCL specifications

JCL term	Value
Step Name	SORT1
Program	SORT
Input Data Sets (DD=SORTIN)	Current TSO and CICS activity log files
Input Data Set Disposition	OLD
Output Data Sets (DD=SORTOUT)	Sorted activity log file
Output Data Set Disposition	OLD

If the job terminates in this step, restart at job start.

Specifying the LOAD2 step JCL

This step updates the HPO Activity Log table, loading the information from the
sorted activity log file and the SQL text log files into Db2.

About this task

Table 9. Step LOAD2 JCL specifications

JCL term	Value
Step Name	LOAD2
Program	RAAOMLD
Input Data Set (DD=RAALOG)	Sorted activity log file (SORTOUT from previous step)
Input Data Set (DD=RAALOG2)	Current TSO and CICS SQL text log files

Table 9. Step LOAD2 JCL specifications (continued)

JCL term	Value
Input Data Set (DD=INCLUDE) **Note:** This DD is not generated automatically.	Optional DD; read only if remote location parm = Y. Sysin listing for all desired included locations.
Input Data Set (DD=EXCLUDE) **Note:** This DD is not generated automatically.	Optional DD; read only if remote location parm = Y. Sysin listing for all desired excluded locations.
Output Data Sets (DD=SORTOUT)	Sorted activity log file
Output Data Set Disposition	OLD

The Db2 tables that are updated in this step are:

- Q.OBJ_ACTIVITY_SUMM
- Q.OBJ_ACTIVITY_DTL

If the job terminates in this step, restart at LOAD2 job step.

Specifying the ARCH3 step JCL

This step appends the sorted activity log file to the activity archive log file.

About this task

Table 10. Step ARCH3 JCL specifications

JCL term	Value
Step Name	ARCH3
Program	IEBGENER
Input Data Set (DD=SYSUT1)	Sorted activity log file
Input Data Set Disposition	OLD
Output Data Set (DD=SYSUT2)	Archive activity log file
Output Data Set Disposition	MOD (data will be appended to the archive log file)

If the job terminates in this step, restore the archive activity log file (SYSUT2 data set) to its state prior to executing this step then restart at the ARCH3 step.

Specifying the ARCH4 step JCL

This step appends the SQL text log files to the SQL text archive log file.

About this task

Table 11. Step ARCH4 JCL specifications

JCL term	Value
Step Name	ARCH4
Program	IEBGENER
Input Data Set (DD=SYSUT1)	Current TSO and CICS SQL text log files
Input Data Set Disposition	OLD
Output Data Set (DD=SYSUT2)	Archive SQL text log file

Table 11. Step ARCH4 JCL specifications (continued)

JCL term	Value
Output Data Set Disposition	MOD (data will be appended to the archive log file)

If the job terminates in this step, restore the archive SQL text log file (SYSUT2 data set) to its state prior to executing this step then restart at ARCH4 step.

Specifying the INIT5 step JCL

This step re-initializes the TSO activity log file.

About this task

Table 12. Step INIT5 JCL specifications

JCL term	Value
Step Name	INIT5
Program	RAAMT
Input Data Set (DD=SYSUT1)	Current TSO activity log file
Input Data Set Disposition	OLD

If the job terminates in this step, restart at INIT5 step.

Specifying the INIT6 step JCL

This step re-initializes the CICS activity log file.

About this task

Table 13. Step INIT6 JCL specifications

JCL term	Value
Step Name	INIT6
Program	RAAMT
Input Data Set (DD=SYSUT1)	Current CICS activity log file
Input Data Set Disposition	OLD

If the job terminates in this step, restart at INIT6 step.

Specifying the INIT7 step JCL

This step re-initializes the sorted activity log file.

About this task

Table 14. Step INIT7 JCL specifications

JCL term	Value
Step Name	INIT7
Program	RAAMT
Input Data Set (DD=SYSUT1)	Sorted activity log file
Input Data Set Disposition	OLD

If the job terminates in this step, restart at INIT7 step.

Specifying the INIT8 step JCL

This step re-initializes the TSO SQL text log file.

About this task

Table 15. Step INIT8 JCL specifications

JCL term	Value
Step Name	INIT8
Program	RAAMT
Input Data Set (DD=SYSUT1)	TSO SQL text log file
Input Data Set Disposition	OLD

If the job terminates in this step, restart at INIT8 step.

Specifying the INIT9 step JCL

This step re-initializes the CICS SQL text log file.

About this task

Table 16. Step INIT9 JCL specifications

JCL term	Value
Step Name	INIT9
Program	RAAMT
Input Data Set (DD=SYSUT1)	CICS SQL text log file
Input Data Set Disposition	OLD

If the job terminates in this step, restart at INIT9 step.

Processing HPO Activity Log records at remote locations

QMF activity at remote locations is recorded in the HPO Activity Log data sets. For example, suppose a QMF CONNECT command is followed by a RUN QUERY command. This RUN QUERY command is tracked with an indicator that it was executed at the remote Db2 location (the target of the CONNECT statement). When processing the log records through the batch job, the **Process data at remote locations?** parameter determines whether or not the records must be processed at that remote location. An internal connection to the remote location is attempted and the Db2 activity log tables at that remote location is updated as appropriate. The local Db2 activity log tables are not affected, regardless of the setting of the parameter, for this particular record.

About this task

Additional granularity is provided with two optional input DD cards. An INCLUDE DD * or EXCLUDE DD * card can be specified on the job step LOAD2 explicitly naming the locations to include or omit from processing. The **Process data at remote locations?** parameter must be set to Y; otherwise, the location DDs is ignored. When it is set to Y, and neither DD is present, all remote locations are processed.

Note: If the parameter is set to Y, and the INCLUDE DD * card is present, the local location must be defined in the list of locations in order to process the local Db2 records.

The following sample JCL processes all records for DB2A, as well as all remote activity at DB2B and DB2C (assume LOCATION_ DB2A is location name for subsystem DB2A, etc.) Any other location records found in the file are bypassed.

```
//...
//LOAD2 EXEC PGM=RAAOMLD,PARM='DB2A,YYY'
//STEPLIB    DD DSN=QMFHPO.LOADLIB,DISP=SHR
//           DD DSN=Db2.LOADLIB,DISP=SHR
//LOADMSGS   DD SYSOUT=*
//RAALOG     DD DSN=SORTED.LOG,DISP=SHR
//RAALOG2    DD DSN=SQL.LOG,DISP=SHR
//INCLUDE    DD *
LOCATION_DB2A
LOCATION_DB2B
LOCATION_DB2C
/*
//...
```

The following JCL processes all records for DB2A, as well as all remote activity at any location except DB2B, which is bypassed.

```
//...
//LOAD2 EXEC PGM=RAAOMLD,PARM='DB2A,YYY'
//STEPLIB    DD DSN=QMFHPO.LOADLIB,DISP=SHR
//           DD DSN=Db2.LOADLIB,DISP=SHR
//LOADMSGS   DD SYSOUT=*
//RAALOG     DD DSN=SORTED.LOG,DISP=SHR
//RAALOG2    DD DSN=SQL.LOG,DISP=SHR
//EXCLUDE    DD *
LOCATION_DB2B
/*
//...
```

Note: If the **Process data at remote locations?** parameter for either example specified N for location processing (such as PARM='DB2A,YYN'), the INCLUDE and EXCLUDE DD cards would have been ignored and only DB2A location records would have been processed.

Maintaining HPO Activity Log tables

As historical data is added to the HPO Activity Log tables, you must perform maintenance on the tables, table spaces, and indexes. (The Q.OBJ_ACTIVITY_DTL table grows substantially faster than the Q.OBJ_ACTIVITY_SUMM table, so it requires more frequent maintenance.)

About this task

The following recommendations assist you in maintaining efficient performance:
- Ensure that RUNSTATS is run for the appropriate table spaces and indexes.
- As the data volume increases, REBIND the plans to ensure the use of indexes.
- Delete old detail data periodically. For example, delete detail statistics older than 30 days. You can use the sample JCL in the RAAOBCLN member in QMFHPO.SRAASAMP to delete these records. This job can delete records that are older than 7, 15, or 30 days. See the JCL comments for more specific instructions. If this batch job is too restrictive, you can write your own SQL with a more appropriate WHERE clause.

Chapter 13. Using the QMF Startup Parameters panel

You can control the characteristics of a QMF session that you start by passing parameters to it. For example, there are parameters to identify the Db2 environment, the QMF plan, and other performance-related parameters. Tuning these parameters typically requires manual changes to CLISTs and EXECs. You can tune and customize these parameters by using the QMF Start-Up Parameters panel. You can specify values for the QMF startup parameters, and you can start a QMF session using those parameters.

When you select option 9 from the Manager Selection Menu, the QMF Start-Up Parameters panel is displayed. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RMQ'
```

```
DB2P / DB2PLOCATION -- QMF Start-Up Parameters ---------------------- 12.1.0
Command ===>

Long      Short
Form      Form
--------  -----
DSQSBSTG   B   ===>           Maximum storage for reports (Version 3 parm)
DSQSDBCS   K   ===>           DBCS support at a non-DBCS terminal
DSQSDBNM   D   ===>
                              Location for initial connection (Version 3 parm)
DSQSDBUG   T   ===>           Trace options
DSQSIROW   F   ===>           Maximum number of fetched rows
DSQSMODE   M   ===>           Mode of operation
DSQSPILL   L   ===>           Use the spill file (Version 3 parm)
DSQSPLAN   P   ===>           Name of QMF application plan
DSQSPRID   U   ===>           Profile key (Version 3 parm)
DSQSRSTG   R   ===>           Amount of reserved storage
DSQSRUN    I   ===>
                               Name of called procedure


--------------------------------------------------------------------------
Start a QMF session using these parameters? (Y/N) ===>
```

Figure 108. QMF Start-Up Parameters panel

From the QMF Startup Parameters panel:
- If you press **Enter**, the current parameters are saved in your ISPF profile. If you set the **Start a QMF session using these parameters?** flag to Y, then a QMF session is started using these parameters.
- If you press **PF3**, you return to the previous panel without saving the current parameters.
- To use the default value for a parameter, leave the field for that parameter blank.

The fields on the panel are:

DSQSBSTG (B-Parm)
> Enter the amount of storage to reserve for the data object (in bytes).

DSQSDBCS (K-Parm)
> Enter a Y if you are printing DBCS data from or on a non-DBCS device.

DSQSDBNM (D-Parm)
Enter the location that must be used for the initial connection.

DSQSDBUG (T-Parm)
Enter any desired trace options.

DSQSIROW (F-Parm)
Enter the maximum number of rows to be fetched before the first screen of report data is displayed.

DSQSPILL (L-Parm)
Specify whether the spill file can be used for this QMF session.

DSQSMODE (M-Parm)
Specify batch mode or interactive mode.

DSQSPLAN (P-Parm)
Enter the name of the QMF application plan.

DSQSPRID (U-Parm)
Enter the profile key setting to be used when validating the QMF profile. The two valid values are TSOID or PRIMEID.

DSQSRSTG (R-Parm)
Enter the amount of storage to reserve for this QMF session (in bytes).

DSQSRUN (I-Parm)
Enter the procedure that must be invoked when the QMF session is started.

Start a QMF session using these parameters?
If this flag is set to Y when you press **Enter**, then a QMF session is started using these options. If this flag is set to N, then a session is not started; however, you remain on the panel until you press **PF3**.

Chapter 14. Install and upgrade QMF HPO components

These instructions describe the installation, upgrade, and configuration of the QMF HPO components.

Related reference:

Plan for installation or upgrade

The following requirements must be verified before beginning the installation or upgrade process:

- Program product requirements

  See Table 17 for the program product requirements.

  Note: Each of these products might have prerequisite hardware or software that you must install and configure. See the documentation for each specific product in the IBM Publications Center for more information.

- Required Db2 privileges

  See Table 18 for a list of the Db2 privileges that you must be authorized with to perform the installation.

- Language Environment (LE) requirement

  The IBM Language Environment (LE) library SCEERUN must be available during runtime. You must ensure that the library is allocated in the z/OS program search order.

Table 17. Program product requirements

Program product	Minimum version and release level
QMF	Version 11 Release 1
DB2®	Version 9 Release 1
z/OS	Version 1 Release 10 or Release 13 for COBOL V5.1
CICS	Version 3 Release 1

Table 18. Required Db2 privileges

Object type	Object	Privileges
System	System	CREATEDBA or CREATEDBC, BINDADD
Collection	RAACOLL	CREATE IN
Database	RAADB	CREATETS, CREATETAB
Table	Q.COMMON_SYNONYMS	DELETE, INSERT, SELECT, UPDATE

Table 18. Required Db2 privileges (continued)

Object type	Object	Privileges
Table	Q.ERROR_LOG	DELETE, INSERT, SELECT, UPDATE
Table	Q.OBJECT_DATA	DELETE, INSERT, SELECT, UPDATE
Table	Q.OBJECT_REMARKS	DELETE, INSERT, SELECT, UPDATE
Table	Q.OBJECT_DIRECTORY	DELETE, INSERT, SELECT, UPDATE
Table	Q.PROFILES	DELETE, INSERT, SELECT, UPDATE
Table	Q.RESOURCE_TABLE	DELETE, INSERT, SELECT, UPDATE
Table	Q.OBJ_ACTIVITY_SUMM	ALL
Table	Q.OBJ_ACTIVITY_DTL	ALL
Table	Q.REPORTS	ALL
Table	Q.REPORT_VARIABLES	ALL
Table	SYSIBM.SYSCOLUMNS	SELECT
Table	SYSIBM.SYSDATABASE	SELECT
Table	SYSIBM.SYSINDEXES	SELECT
Table	SYSIBM.SYSKEYS	SELECT
Table	SYSIBM.SYSTABLES	SELECT
Table	SYSIBM.SYSTABLESPACE	SELECT
Table	SYSIBM.SYSVIEWS	SELECT
Table	SYSIBM.SYSVIEWDEP	SELECT
Table	SYSIBM.SYSSYNONYMS	SELECT

Install HPO

Before you install HPO, make sure that the product requirements specified in the appropriate Db2 program directory have been met. After you verify these requirements, you can begin the installation process.

If you are installing HPO/Compiler *and* HPO/Manager, follow all of the installation steps. If you are installing HPO/Compiler *or* HPO/Manager, you can skip the steps that do not pertain to the feature you are installing.

The following topics describe the steps to install HPO for the first time.

Related tasks:

Step 1a. Creating databases, table spaces, tables, and indexes
About this task

Db2 documentation and your site's Db2 administration staff are the authoritative sources for information on how to create databases, table spaces, tables, and indexes. All supplied DDL is generic and must be reviewed and modified to meet your site's standards for Db2 object placement and creation.

Do not change any table names, including the owner.

Run the RAADDL0 member in QMFHPO.SRAASAMP. This member creates the following objects:
- **Database**

  RAADB
- **Table spaces**

  RAADB.RAATS1, RAADB.RAATS2, RAADB.RAATS3, and RAADB.RAATS4
- **Tables**

  Q.OBJ_ACTIVITY_SUMM, Q.OBJ_ACTIVIY_DTL, Q.REPORTS, and Q.REPORT_VARIABLES
- **Indexes**

  Q.RAAIX1, Q.RAAIX2, Q.RAAIX3, and Q.RAAIX4

Step 1b. Db2 global temporary tables
About this task

Skip this step if you do **not** use stored procedures.

Stored procedures utilize Db2's declared global temporary tables. Refer to Db2 documentation for global temporary table requirements.

Step 2a. Creating Compiler command synonyms
About this task

Skip this step if you are **not** using Compiler.

Skip this step if these QMF command synonyms exist.

Execute the following member in QMFHPO.SRAASAMP:

RAADML1
> This member creates two QMF command synonyms:
> - RCO, which invokes Program Generator
> - LIST REPORTS, which invokes the End User Facility
>
> Before executing this member, update the command synonym text to reflect the name of QMFHPO.SRAALOAD at your site.

Step 2b. Creating Manager command synonyms
About this task

Skip this step if you are **not** using Manager.

Skip this step if these QMF command synonyms exist.

Execute the following member in QMFHPO.SRAASAMP:

RAADML2
>This member creates two QMF command synonyms:
>- RLIMITS, which displays the governing schedule and the associated processing options and restrictions currently active in a QMF session
>- RQA, which invokes selective query analysis

Step 3. Altering the HPO End User Facility report variables table
About this task

Skip this step if you are **not** using Program Generator.

Skip this step if you are upgrading from Version 10 or Version 11 to Version 12.

Execute the following member in QMFHPO.SRAASAMP:

RAADDL2
>This member contains the SQL statements that increase the size of the **TYPE** column to 28 bytes in the Q.REPORT_VARIABLES table.

Skip this SQL, if the size of the **TYPE** column is already 28 bytes.

Step 4. Creating Monitor VSAM file
About this task

Skip this step if you are **not** using Manager.

Skip this step if this VSAM file exists and was created in Version 8 or later.

A VSAM file must be created and initialized for each Db2 subsystem before using Monitor. The member named RAAIDCMM in QMFHPO.SRAASAMP contains sample JCL to create this file. You must modify this member according to its instructions before you can run it.

The space allocation for this file must be adjusted based on the amount of QMF activity and the frequency with which the cleanup job is run. Use the following formulas to produce an initial estimate for the space allocation:
- If you are tracking SQL text along with activity, allocate (5 * the number of QMF users * the number of days between running the cleanup job) tracks for the DATA component.
- If you are not tracking SQL text along with activity, allocate (1 * the number of QMF users * the number of days between running the cleanup job) tracks for the DATA component.

Step 5. Tailor for TSO

Steps 4a through 8b describe tailoring HPO for TSO.

Related tasks:

Step 5a. Allocating HPO libraries
About this task

Anyone who is using the product's ISPF interface must have the HPO libraries allocated. On behalf of your users, you can choose to allocate these libraries outside of HPO or let HPO make the allocations.

Allocate libraries outside of HPO
About this task

The method that you use to allocate the following HPO libraries can vary depending on your site. You can allocate the HPO libraries explicitly in a user's TSO logon procedure or dynamically in a CLIST or EXEC. The most important consideration is that the allocation of the HPO libraries occurs before the allocation of the QMF and Db2 libraries.

```
DDNAME          HPO Libraries


ISPMLIB         QMFHPO.SRAAISPM
ISPPLIB         QMFHPO.SRAAISPP
STEPLIB         QMFHPO.SRAALOAD
SYSPROC         QMFHPO.SRAACLST
                QMFHPO.SRAAEXEC
```

Note: Alternative allocations such as ISPMLIB or the system linklist can be used in place of STEPLIB. You cannot allocate the HPO libraries in the LPA list.

HPO allocates libraries
About this task

To let HPO dynamically allocate the required libraries, set the **Automatically LIBDEF and ALTLIB?** configuration parameter found in the **Data set names** panel to **Y**. The allocations are handled by member RAAALLOC in QMFHPO.SRAACLST. You do not need to add explicit library allocations to the TSO logon procedure or dynamic allocations in a CLIST or EXEC. The configuration parameters in the **Data set names** panel are described in "Step 3c. Setting data set names" on page 205.

Note: You cannot use this method of allocating the HPO libraries for users who are governed, logged, monitored, or analyzed by the HPO/Governor module.

Step 5b. Special allocations for Compiler-generated programs

About this task

Skip this step if you are **not** using Compiler.

Users who are running programs generated by Compiler must have the following libraries allocated. There is no support for performing these allocations automatically:

```
//ISPMLIB    DD      DSN=QMFHPO.SRAAISPM,DISP=SHR
//ISPPLIB    DD      DSN=QMFHPO.SRAAISPP,DISP=SHR
//SYSEXEC    DD      DSN=QMFHPO.SRAAEXEC,DISP=SHR
//ISPLLIB    DD      DSN=QMFHPO.SRAALOAD,DISP=SHR
```

Step 6. Customizing the HPO/Governor module help panel

About this task

Skip this step if you are **not** using Manager.

You can enable a help panel to be displayed if the HPO/Governor module cancels a command. This panel is displayed if the end user presses **PF1** (or enters the HELP command) after a cancellation message appears.

Follow these steps to activate this panel:

Procedure

1. Edit the member named RAAQMFH found in QMFHPO.SRAAISPP. RAAQMFH, as provided, is a sample and can be modified for your site. The text in the panel body is can be customized. For example, you can add text to this panel so that the end user can contact the help desk phone number when a QMF command is canceled.
2. Set the **Enable the HPO/Governor Module Help Panel?** configuration parameter to Y. See "Step 3g. Setting the HPO/Governor data set names" on page 208 for more information.

Step 7. Verifying DSNH CLIST

About this task

Skip this step if you are **not** using Compiler.

Compiler invokes the Db2 CLIST named DSNH. Verify that DSNH is installed and working properly. See *Db2 Command and Utility Reference* for a discussion of DSNH.

If DSNH is not installed and working properly, online program preparation does not work.

Step 8. Customizing pre- and post-generation CLISTs

About this task

Skip this step if you are **not** using Compiler.

Standard processing can be performed prior to generating source code by modifying the member named RAAPREG in QMFHPO.SRAACLST. Standard post-generation modifications can be made to generated source code by modifying the member named RAAPOSTG in QMFHPO.SRAACLST. For example, this CLIST

can easily be used to apply an ISPF edit macro to the generated source code. (A sample edit macro CLIST named RAAPOSTM is also provided.)

The RAAPOSTG CLIST is invoked by Compiler after the program has been generated and before any of the post-generation action flags are processed.

You can add your own code to the supplied RAAPOSTG (and RAAPOSTM) CLIST. However, when new releases of Compiler are introduced, you must repeat these modifications.

Step 9a. Customizing Compiler JCL skeletons
About this task

Skip this step if you are not using Compiler.

These members, found in QMFHPO.SRAASKEL, contain skeleton JCL:

- **RAACC**

  The CICS library names are assumed to follow the SDFH naming convention as adopted beginning with CICS 3.2. If you are compiling programs for earlier versions of CICS, modify the following three lines in this member:

  ```
  // DSN=#AACICSPR#.SDFHLOAD
  // DSN=#AACICSPR#.SDFHLOAD
  // DSN=#AACICSPR#.SDFHCOB
  ```

- **RAACR**

  Add a JOBLIB card to this JCL to identify the library that contains your site's sort program. This is not necessary if the sort program exists in a linklist or LPA library.

- **RAAENDUJ**

  Modify the default job cards found at the beginning of this member. These default cards are used if a user does not specify the default job cards when running a program.

Step 9b. Customizing Manager JCL skeletons
About this task

Skip this step if you are not using Manager.

This member, found in QMFHPO.SRAASKEL, contains skeleton JCL:

- **RAAOMLD**

  Add an appropriate JOBLIB card to this JCL to identify the library that contains your site's sort program. This is not necessary if the sort program exists in a linklist or LPA library.

When you are finished installing HPO, continue to the "Configure HPO" on page 201 topic.

Upgrade HPO

Before you upgrade HPO, make sure that the product requirements specified in the appropriate Db2 program directory have been met. Refer to "Plan for installation or upgrade" on page 193 for more information. After you verify these requirements, you can begin the upgrade process.

The following topics describe upgrading HPO from:

- Version 9 to Version 12
- Version 10 to Version 12
- Version 11 to Version 12

Note: If you have changed the HPO installation file names, ensure that the file names match your environment during the upgrade process.

Step 1. Db2 global temporary tables
About this task

Skip this step if you do **not** use stored procedures.

Stored procedures utilize Db2's declared global temporary tables. Refer to Db2 documentation for global temporary table requirements.

Step 2. Migrating the HPO Activity Log table
About this task

Skip this step if you are **not** using Manager.

Skip this step if you upgrading from Version 10 or Version 11 to Version 12.

Run the following DDL member in QMFHPO.SRAASAMP:

RAADDL1
This member contains SQL that changes multiple objects:

- It creates a copy of the RAATS2 table space.
- It drops the RAATS2 table space.
- It defines a new table space RAATS2 with a bufferpool size of 8K.
- It defines a new table Q.OBJ_ACTIVITY_DTL with additional columns SEQ and BYTECT.
- It populates the new table from the copied table.
- It re-creates the index to include the SEQ column.

Skip this SQL if the SEQ and BYTECT columns exist.

Step 3. Copying the configuration files

About this task

Before configuring HPO, copy the configuration files from the previous version's load library to the new load library. The configuration files have the format RAAX*ssid*, where *ssid* is the Db2 subsystem ID.

When the configuration files are copied to the new load library, many of the fields in the configuration process will be populated automatically.

Step 4. Finishing the upgrade
About this task

After the upgrade steps have been completed, you must follow the steps in
"Configure HPO" and "Complete the installation" on page 220 to complete the
upgrade procedure.

Upgrade Db2

There are no additional configuration steps in HPO to upgrade Db2 from:
- Version 9 to 10
- Version 10 to 11
- Version 11 to 12

If you are installing HPO for the first time, refer to "Install HPO" on page 194.

If you are upgrading HPO, refer to "Upgrade HPO" on page 199.

If you are upgrading Db2 only, refer to "Configure HPO."

Configure HPO

Using the HPO Configuration dialog, you must specify configuration values for
each Db2 subsystem that is accessed by HPO.

The following topics describe the steps for configuring HPO for each Db2
subsystem. Follow these steps for new installations and upgrades.

Related tasks:

Step 1. Allocating libraries
About this task

The first time that you run the HPO Configuration dialog, you are asked if the HPO libraries have been allocated to the current session. The HPO libraries are as follows:

- QMFHPO.SRAAISPM
- QMFHPO.SRAAISPP
- QMFHPO.SRAACLST
- QMFHPO.SRAAEXEC
- QMFHPO.SRAALOAD

If the HPO libraries have been allocated, respond to the prompt with a Y. The first time that you run the HPO Configuration dialog, the only way the HPO libraries would have been allocated is if they were allocated outside of HPO.

If the HPO libraries have not been allocated, then respond to the prompt with an N. Subsequent prompts ask for each of the library names. The only way the HPO libraries would not have been allocated is if you are choosing to let HPO make all the allocations, and this is the first time that the HPO Configuration dialog has run.

- QMFHPO.SRAAISPM, QMFHPO.SRAAISPP, and QMFHPO.SRAALOAD are dynamically allocated using the ISPF LIBDEF service.
- QMFHPO.SRAACLST and QMFHPO.SRAAEXEC are allocated using the TSO ALTLIB command.

Asking whether the HPO libraries have been allocated only occurs the first time that you run the Configuration dialog. You are not prompted for this information on subsequent runs of the dialog.

Step 2. Invoking the HPO Configuration dialog
About this task

Invoke the HPO Configuration Dialog by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CONFIG'
```

```
HPO Configuration Dialog Selection Menu ---------------------------- 12.1.0
Option ===>

                                            Db2 SSID ===> DB2P

                                            User ID:
                                            Date:
                                            Time:
--------------------------------------------------------------------------

    1 Configure One Db2 Subsystem
    2 Bind Application Plans For One Db2 Subsystem
    3 Bind Packages At One Location
    X Exit

--------------------------------------------------------------------------
```

Figure 109. HPO Configuration Dialog Selection Menu panel

Step 3. Configuring one Db2 subsystem
About this task

When you select option 1, the configuration process begins for the specified Db2 subsystem:

- If this subsystem has been configured, the current configuration parameters are displayed.
- If this subsystem has not been configured, but another subsystem has, then the most recent configuration parameters specified are displayed.
- If no subsystems have been configured, configuration defaults are displayed.

If at any point the dialog is terminated prematurely (by pressing **PF3** or typing `CAN` or `CANCEL`), none of the parameters for this Db2 subsystem are saved and you return to the HPO Configuration Dialog Selection Menu.

```
DB2P -- General Configuration Parameters --------------------------- 12.1.0
Command ===>

Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

1. Db2 Version And Release.. ===>

2. QMF Version And Release.. ===>
3. Default Translation...... ===>

4. Default Job Parameters...
      CLASS.................. ===>
      MSGCLASS............... ===>
      SYSOUT CLASS........... ===>
      DEST................... ===>
      Temporary Data Set Unit ===>
```

Figure 110. General Configuration Parameters panel

Step 3a. Setting general configuration parameters
About this task

If you press **Enter**, the next panel is displayed. If you press **PF3**, you return to the HPO Configuration Dialog Selection Menu and the configuration parameters are not saved.

The fields on the panel are:

Db2 Version And Release
> Enter the version and release of this Db2 subsystem. Valid values are `9.1`, `10.1`, or `11.1`.

QMF Version And Release
> Enter the version and release of the QMF installation running under this subsystem. Valid values are `9.1`, `10.1`, `11.1`, `11.2`. or `12.1`.

Default Translation
> Enter the default value to use for Translation for this QMF installation. Valid values are: ENGLISH, UPPERCASE, FRANCAIS CANADIEN, DANSK, FRANCAIS, DEUTSCH, ITALIANO, NIHONGO, HANGEUL, PORTUGUES, ESPANOL, SVENSKA, FRANCAIS (SUISSE), and DEUTSCH (SCHWEIZ).

Default CLASS

Enter the default value to be used by Program Generator and the End User Facility for the CLASS parameter when tailoring JCL to run report programs.

Default MSGCLASS

Enter the default value to be used by Program Generator and the End User Facility for the MSGCLASS parameter when tailoring JCL to run report programs.

Default SYSOUT CLASS

Enter the default value to be used by Program Generator and the End User Facility for the SYSOUT parameter on the REPORTnn DDs when tailoring JCL to run report programs.

Default DEST

Enter the default value to be used by Program Generator and the End User Facility for the DEST parameter on the REPORTnn DDs when tailoring JCL to run report programs. If you leave this field blank, no DEST is specified.

Temporary Data Set Unit

Enter a work unit (such as SYSDA) to be used when creating temporary data sets.

Note: Do not enter a VIO unit.

Step 3b. Setting plan names
About this task

```
DB2P -- Plan Names ------------------------------------------------- 12.1.0
Command ===>

Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

1. QMF (Optional)................... ===>

Compiler...
2. Program Generator................ ===>
3. End User Facility for TSO........ ===>
4. End User Facility for CICS....... ===>

Manager...
5. Object Manager for Administrators ===>
6. Object Manager for Users......... ===>
7. Governor......................... ===>
8. HPO/Governor Module.............. ===>
```

Figure 111. Plan Names panel

From the Plan Names panel:

- If you press **Enter**, the next panel is displayed.
- If you press **PF3**, you return to the HPO Configuration Dialog Selection Menu and the configuration parameters are not saved.

The fields on the panel are:

QMF Enter the name of the QMF application plan. If you leave this field blank, the system default is used.

Program Generator

Enter the name of the Program Generator application plan.

End User Facility For TSO
Enter the name of the End User Facility for TSO application plan.

End User Facility For CICS
Enter the name of the End User Facility for CICS application plan.

Object Manager For Administrators
Enter the name of the Object Manager for Administrators application plan.

Object Manager For Users
Enter the name of the Object Manager for Users application plan.

Governor
Enter the name of the Governor application plan.

HPO/Governor Module
Enter the name of the HPO/Governor module application plan.

Step 3c. Setting data set names
About this task

```
DB2P -- Data Set Names ---------------------------------------------- 12.1.0
Command ===>

Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

1. Automatically LIBDEF and ALTLIB? (Y/N) ===>

2. Data Set Names...
      QMFHPO.SRAADBRM ==>
      QMFHPO.SRAASKEL ==>
      QMFHPO.SRAALOAD ==>
      QMFHPO.SRAAISPM ==>
      QMFHPO.SRAAISPP ==>
      QMFHPO.SRAACLST ==>
      QMFHPO.SRAAEXEC ==>
      QMFHPO.SRAASAMP ==>
```

Figure 112. Data Set Names panel

From the Data Set Names panel:

- If you press **Enter**, the next panel is displayed.
- If you press **PF3**, you return to the HPO Configuration Dialog Selection Menu and the configuration parameters are not saved.

The fields on the panel are:

Automatically LIBDEF and ALTLIB?
Enter Y to automatically LIBDEF to the specified message, panel, and load libraries and ALTLIB to the specified CLIST and EXEC libraries on entry. Enter N if you are allocating the libraries outside of HPO. See "Step 5a. Allocating HPO libraries" on page 197 for more information.

Data Set Names
Enter the name of each of the listed libraries regardless of your response to the Automatically LIBDEF and ALTLIB? parameter.

Step 3d. Setting QMF and Db2 data set names
About this task

```
DB2P -- QMF and Db2 Data Set Names -------------------------------- 12.1.0
Command ===>

Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

1. QMF Data Set Names...
     Load Library.....===>
     Exit Library.....===>
     CLIST Library....===>
     EXEC Library.....===>
     Message Library..===>
     Panel Library....===>

2. Db2 Data Set Names...
     Load Library.....===>
     Exit Library.....===>
     CLIST Library....===>
     EXEC Library.....===>
     Message Library..===>
     Panel Library....===>
```

Figure 113. QMF and Db2 Data Set Names panel

From the QMF and Db2 Data Set Names panel:

- If you press **Enter**, the next panel is displayed.
- If you press **PF3**, you return to the HPO Configuration Dialog Selection Menu and the configuration parameters are not saved.

The fields on the panel are:

QMF Data Set Names
> Enter the name of the QMF data set for each of the listed libraries.

Db2 Data Set Names
> Enter the name of the Db2 data set for each of the listed libraries.

Step 3e. Setting optional Program Generator data set names
About this task

```
DB2P -- Program Generator Data Set Names ----------------------------- 12.1.0
Command ===>

Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

Default User Libraries (Optional)...
1. Query Library.... ===>
2. Form Library..... ===>
3. Procedure Library ===>
4. Source Library... ===>
5. DBRM Library..... ===>
6. Load Library..... ===>
```

Figure 114. Program Generator Data Set Names panel

From the Program Generator Data Set Names panel:

- If you press **Enter**, the next panel is displayed.
- If you press **PF3**, you return to the HPO Configuration Dialog Selection Menu and the configuration parameters are not saved.

The fields on the panel are:

Default User Libraries (Optional)
Enter the default value to use for the listed Program Generator data sets. These values are used only when a user enters Program Generator for the first time. Do not enter the names of restricted system data sets because users must be able to write to these data sets. If any of these data sets do not exist, a subsequent panel is displayed, allowing you to allocate them. If you leave any of these fields blank, the corresponding fields in Program Generator are blank when a user enters Program Generator for the first time.

Step 3f. Setting Program Generator parameters
About this task

These parameters are used by Program Generator when preparing generated programs. Any of the fields except for **Use Custom Compile?** can be left blank. However, if they are left blank, Program Generator uses the default names found in DSNH (the Db2 program preparation CLIST) when performing online compiles, and does not specify them when performing batch compiles.

```
DB2P -- Program Generator Parameters -------------------------------- 12.1.0
Command ===>

Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

1. Use Custom Compile? (Y/N) ===>
2. COBOL Data Sets (Optional)...
      Compiler.... ===>
      Load Library ===>
      CICS Library ===>
3. CICS Data Sets (Optional)...
      DSN Prefix.. ===>
4. GDDM Data Sets (Optional)...
      Load Library ===>
```

Figure 115. Program Generator Parameters panel

From the Program Generator Parameters panel:

- If you press **Enter**, the next panel is displayed.
- If you press **PF3**, you return to the HPO Configuration Dialog Selection Menu and the configuration parameters are not saved.

The fields on the panel are:

Use Custom Compile?
Enter Y to have Program Generator bypass all panel displays associated with preparing a program, and invoke the RAADSNH CLIST to prepare a program.

Note: RAADSNH must be customized to invoke a local prepare/compile facility.

Otherwise, enter N to use Program Generator's native facilities.

COBOL Compiler
Identify the COBOL compiler (both data set and member). For example, 'IGY.SIGYCOMP(IGYCRCTL)'.

COBOL Load Library

Identify the COBOL load library (data set only). For example, `'CEE.SCEELKED'`.

CICS Library

Identify the CICS load library (data set only). For example, `'QMFDEV.QMFHPO.BUILD.COB2CICS'`.

CICS DSN Prefix

Identify the prefix for the names of the CICS libraries. For example, `CICS`. This field is validated by checking for the existence of a CICS.LOADLIB library or .SDFHLOAD library.

GDDM Load Library

Identify the GDDM load library (data set only). For example: `'GDDM.SADMMOD'`.

Step 3g. Setting the HPO/Governor data set names
About this task

These data set names are used in QMF by the HPO/Governor module for object tracking, and monitoring.

```
DB2P -- HPO/Governor Module Data Set Names --------------------------- 12.1.0
Command ===>

Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

1. HPO Activity Log Data Set Names...
      TSO Activity......... ===>
      TSO SQL Text......... ===>
      CICS Activity........ ===>
      CICS SQL Text........ ===>
      Sort/Merge........... ===>
      Activity Archive..... ===>
      SQL Text Archive..... ===>
2. Number of Additional TSO Activity and SQL Text Log Data Sets ===>
3. CICS Transient Data Queue Names...
      CICS Activity Log.... ===>
      CICS SQL Text Log.... ===>
4. VSAM File Names...
      Monitor.............. ===>
```

Figure 116. HPO/Governor Module Data Set Names panel

From the HPO/Governor Data Set Names panel:

- If you press **Enter**, the next panel is displayed.
- If you press **PF3**, you return to the HPO Configuration Dialog Selection Menu and the configuration parameters are not saved.

The fields on the panel are:

TSO Activity

Enter the name of the data set to which Object Manager must log all activity against QMF objects under TSO. If you leave this field blank, no logging is performed. If the data set exists, it must have DSORG=PS, RECFM=FB, LRECL=550. If it does not exist, a subsequent panel is displayed, allowing you to allocate it.

TSO SQL Text

Enter the name of the data set to which Object Manager must log SQL text

associated with the run of a QMF query under TSO. This logging is conditional, depending on the value of **CPU Time Threshold for SQL Text Monitoring** specified on this panel. If you leave this field blank, no logging is performed. If the data set exists, it must have DSORG=PS, RECFM=VB, LRECL=4070, and BLKSIZE=4074. If it does not exist, a subsequent panel is displayed, allowing you to allocate it.

CICS Activity
Enter the name of the data set to which Object Manager must log all activity against QMF objects under CICS. If you leave this field blank, no logging is performed. If the data set exists, it must have DSORG=PS, RECFM=FB, LRECL=550. If it does not exist, a subsequent panel is displayed, allowing you to allocate it.

Note: CICS object tracking is activated by the specification of the CICS data set names in conjunction with:
- the QMF HPO resource group assigned to the CICS user
- the specification of a Db2 subsystem ID for the Db2 location within the assigned resource group (see "Specifying common controls" on page 122 for more information on common controls for resource groups.)

CICS SQL Text
Enter the name of the data set to which Object Manager must log SQL text associated with the run of a QMF query under CICS. This logging is unconditional. If you leave this field blank, no logging is performed. If the data set exists, it must have DSORG=PS, RECFM=VB, LRECL=4070, and BLKSIZE=4074. If it does not exist, a subsequent panel is displayed, allowing you to allocate it.

Sort/Merge
Enter the name of the data set to be used during the processing of the TSO and CICS activity log data sets. If a data set was specified for the TSO or CICS activity log, this field must be specified. Otherwise, it is not used. If the data set exists, it must have DSORG=PS, RECFM=FB, LRECL=550. If it does not exist, a subsequent panel is displayed, allowing you to allocate it.

Activity Archive
Enter the name of the data set in which to archive object activity information from the TSO and CICS activity log data sets after processing them. If a data set was specified for either of the TSO or CICS activity logs, this field must be specified. Otherwise, it is not used. If the data set exists, it must have DSORG=PS, RECFM=FB, LRECL=550. If it does not exist, a subsequent panel is displayed, allowing you to allocate it.

SQL Text Archive
Enter the name of the data set in which to archive SQL text information from the TSO and CICS SQL text log data sets after processing them. If a data set was specified for either of the TSO or CICS SQL text logs, this field must be specified. Otherwise, it is not used. If the data set exists, it must have DSORG=PS, RECFM=VB, LRECL=4070, and BLKSIZE=4074. If it does not exist, a subsequent panel is displayed, allowing you to allocate it.

Number of Additional TSO Activity and SQL Text Log Data Sets
Enter the number of additional log data sets to be allocated. In environments that support large numbers of simultaneous QMF users, adding additional log data sets can eliminate file contention by spreading the activity logging I/O across multiple files. Entering 0 results in no additional log data sets. A value of 5, for example, would allocate an

additional 5 TSO activity and SQL log data sets. These data sets are created from the base file names you explicitly provide for the TSO activity and SQL text log data sets, and are processed automatically by HPO. A value greater than 0 must be considered on heavily utilized QMF systems.

CICS Activity Log
Enter the DCT name that defines this Db2 subsystem's HPO Activity Log for CICS activity.

CICS SQL Text Log
Enter the DCT name that defines this Db2 subsystem's HPO Activity Log for CICS SQL text.

Monitor
If Monitor is used, enter the name of the CLUSTER component of the VSAM data set that it uses. This data set must have been created using the procedures described in "Step 4. Creating Monitor VSAM file" on page 196. If Monitor will not be used, this field should be left blank.

Step 3h. Setting the HPO/Governor module parameters
About this task

These parameters are used in QMF by the HPO/Governor module for object tracking, monitoring, and customized help processing.

```
DB2P -- HPO/Governor Module Parameters ------------------------------- 12.1.0
Command ===>

Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

1. CPU Time Threshold for SQL Text Monitoring (in seconds) ===>
2. Maximum text length for SQL Text Monitoring............ ===>
3. Maximum text length for SQL Text Logging.............. ===>
4. Enable the HPO/Governor Module Help Panel? (Y/N)....... ===>
```

Figure 117. HPO/Governor Module Parameters panel

From the HPO/Governor Module Parameters panel:
- If you press **Enter**, the next panel is displayed.
- If you press **PF3**, you return to the HPO/Governor Module Data Set Names panel and the configuration parameters are not saved.

The fields on the panel are:

CPU Time Threshold For SQL Text Monitoring
This field is ignored if the HPO Activity Log Data Set Name For TSO SQL Text is left blank. Enter a CPU time threshold value which determines whether or not SQL text associated with the run of a query is logged to the TSO SQL text activity log. If the amount of CPU time consumed by a query exceeds this value, its SQL text is logged. Otherwise, it is not logged. If you enter 0, all SQL text is logged. Under TSO only, SQL text is always logged.

Maximum text length for SQL Text Monitoring
Enter length of SQL Text that is logged by Object Manager. Enter any number from 0 to 2097151. The value can also be entered as an integer followed by M (million) or K (thousand). An asterisk (*) indicates the HPO default value of 3492. A zero (0) indicates the maximum value of 2M.

Maximum text length for SQL Text Logging
> Enter the maximum length for SQL text that is logged by Object Manager. Enter any number from 0 to 2097151. The value can also be an integer followed by M (million) or K (thousand). An asterisk (*) indicates the default value of 3492. A zero (0) indicates the maximum value of 2M.

Enable the HPO/Governor Module Help Panel?
> Enter Y to activate the HPO/Governor module help panel whenever the HPO/Governor module cancels a QMF command.

Step 3i. Building the HPO configuration modules
About this task

After the configuration parameters have been specified, the dialog is ready to build the HPO configuration modules. The Select Action Mode panel is used to select the mode (foreground or batch) in which this action must be performed. If foreground is selected, the HPO configuration modules are assembled and link-edited online while you wait. If batch is selected, JCL to perform the assemble and link-edit is generated and submitted.

```
DB2P -- Select Action Mode ------------------------------------- 12.1.0
Command ===>

Press ENTER to perform this action.
Type CAN or CANCEL or press PF3 to cancel this action.

Mode................. ===>    (F=Foreground, B=Batch)


If selecting batch, specify the following parameters:

1. Job Cards...
     ===>
     ===>
     ===>
     ===>

2. Write JCL To...
     Data Set........... ===>
     Member............. ===>

3. Edit or Submit JCL? ===>   (E=Edit, S=Submit)
```

Figure 118. Select Action Mode panel

From the Select Action Mode panel:

- If you press **Enter** and Mode is set to F, the HPO configuration modules are assembled and link-edited online while you wait. After this action has completed, you return to the HPO Configuration Dialog Selection Menu.
- If you press **Enter** and Mode is set to B, the JCL to perform this action is generated and edited or submitted. After this action has completed, you return to the HPO Configuration Dialog Selection Menu.
- If you press **PF3**, you return to the HPO Configuration Dialog Selection Menu and the configuration parameters are not saved.

The fields on the panel are:

Mode   Enter F to build the configuration modules online. Enter B to generate JCL to build the configuration modules in batch.

Job Cards

Enter valid job cards for the job. At least one line must be entered. Any lines specified are used exactly as entered in the generated JCL.

Data Set

Enter the data set to which the generated JCL must be written. The data set must exist. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field. You can also enter the name *TEMP to specify that a temporary data set must be created for the JCL.

Member

If the specified **Data Set** is a PDS, enter the name of the member to which the generated JCL must be written. If the **Data Set** is not a PDS or is *TEMP, this field must be left blank.

Edit or Submit JCL?

Enter E to edit the generated JCL or S to automatically submit it after it is generated.

Step 4. Selecting application plans to bind
About this task

After the Db2 subsystem is configured, you must bind the application plans. When you select option 2 from the HPO Configuration Dialog Selection Menu, the following panel is displayed:

```
DB2P -- Bind Application Plans -------------------------------------- 12.1.0
 Command ===>

 Select the plans to bind by entering Y or N next to each plan name.
 Press ENTER to bind the selected plans.
 Type CAN or CANCEL or press PF3 to cancel.

 Owner........ ===>
 Collection ID ===>
 Additional Collection ID(s) for CICS programs in End User Facility
 ===>


    Component                                 Plan Name  Bind Plan? (Y/N)
    ----------------------------------------- ---------  ----------------
 1. Compiler: Program Generator..............
 2. Compiler: End User Facility for TSO.......
 3. Compiler: End User Facility for CICS......
 4. Manager: Object Manager for Administrators
 5. Manager: Object Manager for Users.........
 6. Manager: Governor.........................
 7. Manager: HPO/Governor Module.............
```

Figure 119. Bind Application Plans panel

From the Bind Application Plans panel:

- If you press **Enter**, the next panel is displayed.
- If you press **PF3**, you return to the Configuration Dialog Selection Menu and the plans are not bound.

The fields on the panel are:

Owner
> Enter the desired OWNER parameter for the BIND PLAN command. If you leave this field blank, the OWNER parameter is not specified on the BIND.

Collection ID
> Enter the collection ID to use in the PKLIST parameter of the BIND PLAN command. The packages must be bound into this collection ID at all locations.

Additional Collection ID(s) for CICS programs in End User Facility
> Enter additional user defined collection IDs to be included in the PKLIST parameter of the BIND PLAN command. Collection IDs must be separated by a comma.

Step 4a. Binding the plans
About this task

After the bind parameters have been specified, the dialog is ready to bind the application plans. The Select Action Mode panel is used to select the mode (foreground or batch) in which this action must be performed. If foreground is selected, the plans are bound while you wait. If batch is selected, JCL to perform the bind is generated and submitted.

```
DB2P -- Select Action Mode ------------------------------------ 12.1.0
Command ===>

Press ENTER to perform this action.
Type CAN or CANCEL or press PF3 to cancel this action.

Mode................. ===>   (F=Foreground, B=Batch)


If selecting batch, specify the following parameters:

1. Job Cards...
    ===>
    ===>
    ===>
    ===>

2. Write JCL To...
    Data Set........... ===>
    Member............. ===>

3. Edit or Submit JCL? ===>   (E=Edit, S=Submit)
```

Figure 120. Select Action Mode panel

From the Select Action Mode panel:

- If you press **Enter** and Mode is set to F, the plans are bound online. The HPO Configuration Dialog invokes the CLIST named RAABIND (found in QMFHPO.SRAACLST) to perform the online bind. You can review RAABIND to ensure that the BIND parameters are consistent with your site's standards. After this action has completed, you return to the HPO Configuration Dialog Selection Menu.

- If you press **Enter** and Mode is set to B, JCL to perform the bind in batch is generated and edited or submitted. This JCL also invokes the CLIST named RAABIND. After this action has completed, you return to the HPO Configuration Dialog Selection Menu.

- If you press **PF3**, you return to the HPO Configuration Dialog Selection Menu and the plans are not bound.

The fields on the panel are:

Mode   Enter F to perform the bind online. Enter B to generate JCL to perform the bind in batch.

Job Cards

> Enter valid job cards for the job. At least one line must be entered. Any lines specified are used exactly as entered in the generated JCL.

Data Set

> Enter the data set to which the generated JCL must be written. The data set must exist. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field. You can enter the name *TEMP to specify that a temporary data set must be created for the JCL.

Member

> If the specified **Data Set** is a PDS, enter the name of the member to which the generated JCL must be written. If the **Data Set** is not a PDS or is *TEMP, this field must be left blank.

Edit or Submit JCL?

> Enter E to edit the generated JCL or S to automatically submit it after it is generated.

Step 5. Selecting packages to bind
About this task

After the Db2 subsystem is configured, you can bind the packages. Only the packages for the components you are using must be bound. The packages must be bound at each location. When you select option 3 from the HPO Configuration Dialog Selection Menu, the following panel is displayed:

```
DB2P -- Bind Packages ---------------------------------------------- 12.1.0
Command ===>

Select the packages to bind by entering Y or N next to each component name.
Press ENTER to bind the packages for the selected components.
Type CAN or CANCEL or press PF3 to cancel.

Owner........ ===>
Location..... ===>
Collection ID ===>

     Component                                   Bind Packages? (Y/N)
     ------------------------------------------ --------------------
1. Compiler: Program Generator................ ===>
2. Compiler: End User Facility for TSO........ ===>
3. Compiler: End User Facility for CICS....... ===>
4. Manager:  Object Manager for Administrators ===>
5. Manager:  Object Manager for Users......... ===>
6. Manager:  Governor......................... ===>
7. Manager:  HPO/Governor Module.............. ===>

 NOTE: Your current authorization ID (or the specified BIND owner) must have
       authority to bind the selected packages, and to execute the SQL
       contained in those packages.
```

Figure 121. Bind Packages panel

From the Bind Packages panel:

- If you press **Enter**, the next panel is displayed.
- If you press **PF3**, you return to the HPO Configuration Dialog Selection Menu and the packages are not bound.

The fields on the panel are:

Owner

>Enter the desired OWNER parameter for the BIND PACKAGE command. If you leave this field blank, the OWNER parameter is not specified on the BIND.

Location

>Enter the location at which to bind the packages. If you leave this field blank, the packages are bound at the local Db2 location.

Collection ID

>Enter the desired collection ID for the packages. Your current authorization ID (or the specified BIND OWNER) must have the authority to create a package in the specified collection. You must specify the same collection ID at all locations.

Step 5a. Binding the packages
About this task

After the bind parameters have been specified, the dialog is ready to bind the packages. The Select Action Mode panel is used to select the mode (foreground or batch) in which this action must be performed. If foreground is selected, the packages are bound while you wait. If batch is selected, JCL to perform the bind is generated and submitted.

```
DB2P -- Select Action Mode ------------------------------------------ 12.1.0
Command ===>

Press ENTER to perform this action.
Type CAN or CANCEL or press PF3 to cancel this action.

Mode................. ===>   (F=Foreground, B=Batch)


If selecting batch, specify the following parameters:

1. Job Cards...
    ===>
    ===>
    ===>
    ===>

2. Write JCL To...
   Data Set........... ===>
   Member............. ===>

3. Edit or Submit JCL? ===>   (E=Edit, S=Submit)
```

Figure 122. Select Action Mode panel

From the Select Action Mode panel:

- If you press **Enter** and **Mode** is set to F, the packages are bound online. The HPO Configuration Dialog invokes the CLIST named RAABINDP (found in QMFHPO.SRAACLST) to perform the online bind. You can review RAABINDP

to ensure that the BIND parameters are consistent with your site's standards. After this action has completed, you return to the HPO Configuration Dialog Selection Menu.

- If you press **Enter** and **Mode** is set to B, JCL to perform the bind in batch is generated and edited or submitted. This JCL also invokes the CLIST named RAABINDP. After this action has completed, you return to the HPO Configuration Dialog Selection Menu.

- If you press **PF3**, you return to the HPO Configuration Dialog Selection Menu and the packages are not bound.

The fields on the panel are:

Mode Enter F to perform the bind online. Enter B to generate JCL to perform the bind in batch.

Job Cards
Enter valid job cards for the job. At least one line must be entered. Any lines specified are used exactly as entered in the generated JCL.

Data Set
Enter the data set to which the generated JCL must be written. The data set must exist. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field. You can also enter the name *TEMP to specify that a temporary data set must be created for the JCL.

Member
If the specified **Data Set** is a PDS, enter the name of the member to which the generated JCL must be written. If the **Data Set** is not a PDS or is *TEMP, this field must be left blank.

Edit or Submit JCL?
Enter E to edit the generated JCL or S to automatically submit it after it is generated.

Setup for CICS

If QMF is being used under CICS or if you intend to use Compiler to generate CICS programs, then you must setup for CICS. Otherwise, you can skip the setup steps relating to CICS and continue to "Complete the installation" on page 220.

Note: CICS documentation and your site's CICS administration staff are the authoritative sources for information on how to set up CICS tables and startup JCL.

The following topics describe the tailoring for CICS tasks.

Related tasks:

Step 1. Installing CICS definitions
About this task

Skip this step if these definitions exist.

Definitions required by HPO must be included in your CICS configuration. A batch job named RAADEF1 has been included in the QMFHPO.SRAASAMP data set to automatically install the required definitions in CICS.

Note: Although it is recommended that you use the RAADEF1 batch job, you can also install these CICS definitions manually with CEDA.

The CICS definitions that must be installed include:

RAAX This is the HPO main configuration module.

RAAX*ssid*

This is the HPO configuration module for the Db2 subsystem being used with this CICS region. The suffix *ssid* is replaced with a Db2 subsystem ID. One entry is created for each desired subsystem.

RAAXPR

This is the HPO product registration module.

To install the CICS definitions using the RAADEF1 batch job you must:

Procedure

1. Edit the RAADEF1 and RAACICS1 members found in the QMFHPO.SRAASAMP data set as follows:
   - Within the RAACICS1 member, update RAAXssid replacing *ssid* with the Db2 subsystem ID being used with this CICS region. If you are using more than one Db2 subsystem, you must create a RAAXssid entry for each desired subsystem.
   - Within the RAADEF1 member you must add job card information, update QMFHPO to the HLQ you are using, and update the CICS and COBOL libraries accordingly.
2. Submit the RAADEF1 job. All return codes must be zero.

Results

Note: If you are planning on using the HPO Governor module for CICS, make sure that DSQUEGV3 and DXEUEGM are defined to CICS according to the instructions in the *QMF Installation Guide*.

Step 2. Installing CICS definitions for HPO/Compiler
About this task

Skip this step if you are **not** using Compiler or if these definitions exist.

Definitions required by HPO/Compiler must be included in your CICS configuration. A batch job named RAADEF2 has been included in the QMFHPO.SRAASAMP data set to automatically install the required definitions in CICS.

Note: Although it is recommended that you use the RAADEF2 batch job, you can also install these CICS definitions manually with CEDA.

The CICS definitions for HPO/Compiler that must be created include:

RAAEUC
> This is the End User Facility main program.

RAAEUCH
> This is the End User Facility variable prompt program.

RAAEUM
> This is the mapset used by End User Facility for CICS.

RAAM330
> This is the mapset used by CICS programs generated by Program Generator.

RAAE This is the CICS transaction for the End User Facility. (Transaction ID can be changed to meet site specific requirements.)

RAADBIO3
> This is the Db2 plan name for the End User Facility. If you changed this default plan name during the HPO configuration process (see "Step 4. Selecting application plans to bind" on page 212), then you must modify RAADBIO3 and specify the new name.

To install the HPO/Compiler CICS definitions using the RAADEF2 batch job you must:

Procedure

1. Edit the RAADEF2 and RAACICS2 members found in the QMFHPO.SRAASAMP data set as follows:
   a. Within the RAACICS2 member, update (if required) the RAAX definition with the CICS transaction ID for the End User Facility. Also, update the RAADBIO3 definition with End User Facility default plan name if this name was changed during the HPO configuration process.
   b. Within the RAADEF2 member you must add job card information, update QMFHPO to the HLQ you are using, and update the CICS and COBOL libraries accordingly.
2. Submit the RAADEF2 job. All return codes must be zero.

Step 3. Installing CICS definitions for the HPO CICS activity log data sets
About this task

Skip this step if you are **not** using Manager or if these definitions exist.

The two HPO activity log data sets for CICS are the CICS Activity Log data set and the CICS SQL Text Log data set. Definitions required by these data sets must be included in your CICS configuration. A batch job named RAADEF3 has been included in the QMFHPO.SRAASAMP data set to automatically install the required definitions in CICS.

Note: Although it is recommended that you use the RAADEF3 batch job, you can also install these CICS definitions manually with CEDA.

The CICS definitions for the HPO CICS activity log data sets include:

DB2PCIC1

> This is the definition for the CICS Activity Log data set. This definition associates the DD name that you specify for the data set in the CICS startup JCL to the transient data queue name for the data set.

DB2PCIC2

> This is the definition for the CICS SQL Text Log data set. This definition associates the DD name that you specify for the data set in the CICS startup JCL to the transient data queue name for the data set.

To install the CICS definitions for the HPO CICS activity log data sets using the RAADEF3 batch job:

Procedure

1. You must first add DD statements to the CICS startup JCL for the CICS Activity Log data set and the CICS SQL Text Log data set. The names of these data sets were specified in the HPO/Governor Module Configuration panel in the **CICS Activity** and **CICS SQL Text** fields. See "Step 3g. Setting the HPO/Governor data set names" on page 208 for more information on specifying these fields. You can use any DD names. You must allocate these data sets with a disposition of MOD.

2. Edit the RAADEF3 and RAACICS3 members found in the QMFHPO.SRAASAMP data set as follows:

   a. Within the RAACICS3 member, modify the definitions by specifying the transient data queue and DD names.

   b. Within the RAADEF3 member you must add job card information, update QMFHPO to the HLQ you are using, and update the CICS and COBOL libraries accordingly.

3. Submit the RAADEF3 job. All return codes must be zero.

Results

Note: You must repeat these steps for each Db2 subsystem that you are accessing from QMF.

Step 4. Modifying DFHRPL in the CICS startup JCL

About this task

Add QMFHPO.SRAALOAD to the CICS module load library concatenation (DFHRPL):

```
//DFHRPL     DD     ...
//           DD     DSN=QMFHPO.SRAALOAD,DISP=SHR
//           DD     DSN=QMF.SDSQEXIT,DISP=SHR
//           DD     DSN=QMF.SDSQLOAD,DISP=SHR
```

Note: QMFHPO.SRAALOAD must be allocated before the QMF exit and load libraries.

Complete the installation

The following steps complete the installation process.

Related tasks:

"Step 1a. Granting EXECUTE authority on the plans"

"Step 1b. Granting EXECUTE authority on the packages"

"Step 2. Initializing HPO Activity Log table" on page 221

Step 1a. Granting EXECUTE authority on the plans

About this task

Different types of users require EXECUTE authority on different plans. This table lists the plans to which each type of user must be given access. (The plan names for the listed components are set during the HPO Configuration Dialog.)

Table 19. Grant EXECUTE authority based on QMF user type

Component plan names	Administrator	Programmer	End user
Compiler: Program Generator	X	X	
Compiler: End User Facility for TSO	X	X	X
Compiler: End User Facility for CICS	X	X	X
Manager: Object Manager for Administrators	X		
Manager: Object Manager for Users	X	X	
Manager: Governor	X	X	
Manager: HPO/Governor module	X	X	X

Step 1b. Granting EXECUTE authority on the packages

About this task

Skip this step if DDF is **not** running in this subsystem.

Certain QMF HPO functions can use the remote unit of work capability of Db2 to perform remote processing. These components are:

- Program Generator
- Object Manager
- Governor
- HPO/Governor module

For these functions to work correctly, users must be granted EXECUTE authority on the packages associated with those components at each desired remote location.

Follow this procedure to grant EXECUTE authority on the appropriate packages to a particular type of user:

Procedure

1. Determine on which plans the type of user must be granted EXECUTE authority, as described in "Step 1a. Granting EXECUTE authority on the plans" on page 220.
2. Use Table 20 to determine which packages correspond to each component.
3. Grant EXECUTE authority on those packages to users of that type (at the remote location).

Example

Table 20. Components and corresponding packages

Component	Packages for QMF 3.2 or higher
Compiler: Program Generator	RAAFORM2, RAALOC, RAAMENDU, RAAPQSP, RAAPQX, RAAPROF3, RAAMSTMT
Compiler: End User Facility for TSO	n/a
Compiler: End User Facility for CICS	n/a
Manager: Object Manager for Administrators	RAADBIO, RAADB32, RAARMOM3, RAAOLMD, RAALOC, RAAMR01B, RAAMR01T, RAAMR02B, RAAMR02T, RAAMR03B, RAAMR03T, RAAMR04B, RAAMR04T, RAAMR05B, RAAMR05T, RAAMR06B, RAAMR06T, RAAMR07B, RAAMR07T, RAAMR08B, RAAMR08T, RAAMR09B, RAAMR09T, RAAMR10B, RAAMR10T
Manager: Object Manager for Users	RAADBIO, RAADB32, RAARMOM3, RAALOC
Manager: Governor	RAADBIO, RAADB32, RAALOC
Manager: HPO/Governor module	RAAOBJT, RAALOC

Note: Package names, unlike plan names, cannot be customized.

Step 2. Initializing HPO Activity Log table
About this task

Skip this step if you are **not** using Manager.

Use the following instructions to determine which one of the listed DML members in QMFHPO.SRAASAMP must be run.

RAADML3I
> Run this SQL if you executed "Step 1a. Creating databases, table spaces, tables, and indexes" on page 195. You must make the following changes to this member before you run it:
>
> 1. Change 'SSID' to the ID of the Db2 subsystem in which you are installing.
> 2. Include the single quotes. The value within the quotes must be four characters long. For example, 'Db2 '.
>
> This SQL initializes Q.OBJ_ACTIVITY_SUMM with CREATED, LAST_USED, and MODIFIED values from Q.OBJECT_DIRECTORY.

Note: No initialization takes place for objects where any of these columns contain a null value. Because of this, you may want to replace null values in these columns with an initial timestamp value before running RAADML3I.

Appendix A. Exporting QMF query objects automatically

One of the powerful features of HPO Program Generator is that it can **automatically** export QMF queries, forms, and procedures when it is invoked from within a QMF session or from outside a QMF session. Program Generator uses the SAA callable interface to establish an instance of QMF and to communicate with it.

QMF requires the following DCB attributes to be specified for export data sets that contain the exported query object:

Table 21. DCB attributes for export data sets

Data set type	LRECL	RECFM
QUERY	79	F
PROC	79	F
FORM	161 to 7290	V

The following topics describe the ways to export QMF query objects:

Related tasks:

"Exporting from within a QMF session"
A unique feature of Program Generator is that you can invoke it from within a QMF session. This allows you to easily navigate between QMF and Program Generator without having to repeatedly exit and restart each. The primary functional benefit of using Program Generator under QMF is that the current query, form or procedure object can be used.

Exporting from within a QMF session

A unique feature of Program Generator is that you can invoke it from within a QMF session. This allows you to easily navigate between QMF and Program Generator without having to repeatedly exit and restart each. The primary functional benefit of using Program Generator under QMF is that the current query, form or procedure object can be used.

About this task

To invoke Program Generator from a TSO/ISPF session, you can issue the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO'
```

To invoke Program Generator from under QMF, a shared procedure must be set up that executes this TSO command. The following is a QMF procedure (QMFADM.RCO), which contains a single command:

```
TSO CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO'
```

To run Program Generator from QMF, run this QMFADM.RCO procedure from the QMF command line:

```
RUN PROC QMFADM.RCO
```

QMFHPO.SRAALOAD must be allocated to the TSO session when this procedure is run.

You can build a QMF command synonym to run this TSO command. RCO, which is a QMF command synonym, is created during installation. All you need to type on the QMF command line is **RCO**.

Exporting from outside a QMF session

About this task

The SAA callable interface of QMF (explained in detail in *Developing QMF Applications* and *Installing and Managing Db2 QMF for TSO/CICS*) has the ability to start an instance of QMF and execute QMF commands. Program Generator makes use of this SAA callable interface each time that you direct it to automatically export QMF objects.

QMF invokes a REXX program that initializes startup parameters. A default REXX initialization program is shipped with QMF. This sample initialization program, named DSQSCMDE, resides in the QMF.SDSQEXCE library. To run QMF, the SDSQEXCE library must be allocated to the SYSEXEC DD in your TSO logon procedure (as directed in *Installing and Managing Db2 QMF for TSO/CICS*).

On the Set Default Parameters panel for Program Generator, there is a field named **QMF/REXX Initialization Program**. If you leave this field blank, DSQSCMDE is used as the initialization program. If you want Program Generator to use a different REXX program, specify the name on this default panel.

The Db2 subsystem ID that is specified on the Program Generator Menu overrides the DSQSSUBS parameter that is set in the REXX program.

Appendix B. Migrating from the QMF sample governor

If you are currently using the QMF sample governor (TSO or CICS), keep your existing resource groups separate from any new groups that you create using the HPO/Governor online facility.

If the HPO/Governor module detects a resource group with only sample resource options (SCOPE, ROWLIMIT, ROWPROMPT, and so on), it governs the QMF session appropriately using those thresholds and limits. Otherwise, if it detects a resource group with sample and HPO resource options (AACOM, AASCHD), the sample thresholds and limits are ignored.

Because there is not a one-to-one relationship between sample and HPO resource options, there is no fail-safe, automated method of migration. However, you can quickly establish comprehensive and effective QMF resource controls using the HPO/Governor online facility.

Appendix C. Using the HPO call attachment module

About this task

You use the HPO call attachment module (AACAF) to attach to Db2, open a plan and then disconnect from Db2. In order to use the HPO call attachment module you must:

- specify parameters
- specify input values
- specify output values
- specify the call to the attachment module

The pseudocode for the HPO call attachment module is as follows:

```
move appropriate values into CAF-AREA.
CALL 'AACAF' USING CAF-AREA.
IF CAF-RETURN NOT = ZERO
   THEN Process Error
```

The parameter area CAF-AREA is structured as follows:

```
01  CAF-AREA.
    03  CAF-ACTION      PIC S9(9) COMP.
    03  CAF-SSID        PIC X(4).
    03  CAF-PLAN        PIC X(8).
    03  CAF-RETURN      PIC S9(9) COMP.
    03  CAF-REASON      PIC X(8).
```

The input and output values for the call are as follows:

Table 22. Input values for AACAF call statement

Parameter	Description
CAF-ACTION	Valid input values are +0 (connect to Db2), +1 (open plan), and +2 (disconnect from Db2).
CAF-SSID	The Db2 subsystem ID to which to connect. This is required when the action code is +0 or +1.
CAF-PLAN	The name of the plan to open. This is required when the action code is +1.

Table 23. Output values for AACAF call statement

Parameter	Description
CAF-RETURN	This is set to +0 if the function is completed successfully. Otherwise, it contains the CAF return code.
CAF-REASON	This is set to spaces if the function is completed successfully. Otherwise, it contains the CAF reason code.

Appendix D. QMF commands, codes, fields and options that are supported in HPO/Program Generator

The following topics describe the QMF commands, codes, fields and options that are supported in HPO/Program Generator.

Related reference:

"QMF commands supported in procedures"

"QMF edit codes supported in forms"

"QMF usage codes supported in forms"

"Supported fields in the QMF form panels" on page 230

"Miscellaneous support restrictions" on page 230

QMF commands supported in procedures

The following QMF commands are supported when parsing a QMF linear procedure:

- DISPLAY REPORT
- ERASE TABLE
- IMPORT FORM
- IMPORT QUERY
- PRINT REPORT
- RUN QUERY
- SAVE DATA
- SET GLOBAL
- SET PROFILE

QMF edit codes supported in forms

All QMF edit codes are supported, with the following restrictions:

- User-defined edit codes are not supported when generating CICS programs.
- Vxxxx edit codes with floating point values as input are not supported when generating standalone programs.
- The TDL and TTL date and time edit codes are not supported.

QMF usage codes supported in forms

All QMF usage codes are supported, with the following restrictions:

- The ACROSS and CALC usage codes are supported only when generating HPO/Runtime programs (which implies that they are not supported when generating CICS programs).
- The CSUM, PCT, CPCT, TPCT, and TCPCT usage codes are not supported when generating programs that also use the ACROSS usage code.
- The PCT, CPCT, TPCT, and TCPCT usage codes are not supported when generating CICS programs.

Aggregation variables in form text (such as &AVG1) are supported in the same way as the corresponding usage code.

Supported fields in the QMF form panels

All QMF form panels and fields on those panels are supported, with the following restrictions:

- The **Select Panel Variation?** field on the FORM.DETAIL panel and the entire FORM.CONDITIONS panel are not supported. An error occurs at generation time if they are specified.

- Specification of column definitions on the FORM.COLUMNS panel is not supported. An error occurs at generation time if they are specified.

- Specifying BOTTOM for the **Blank Lines Before Text** field on the FORM.FINAL panel is silently treated as if 0 was specified.

- The **Line wrapping width?** field on the FORM.OPTIONS panel is not supported and is silently ignored if it is specified.

- The **Column wrapped lines kept on a page?** field on the FORM.OPTIONS panel is not supported in HPO/Runtime programs and is silently ignored if it is specified. This field is supported in standalone programs.

Miscellaneous support restrictions

- The maximum number of reports per procedure is 100.
- The maximum number of substitution variables per report is 50.
- &DATE and &TIME variables in form text are always formatted according to the ISO date and time formats, regardless of the installation default.
- Global substitution variables used in form text can only be replaced with host variables when generating standalone programs.

Other restrictions on and dependencies between the different program generation options are described in the topics "Setting generation options" on page 17 and "Setting procedure program generation options" on page 35.

Appendix E. Record types written to HPO Activity Log data sets

There are several record types written to the HPO Activity Log data sets. The first byte in each record identifies the type of record:

Table 24. HPO Activity Log record types

Record Type	Description
X'00'	Start QMF session
X'01'	ERASE command
X'02'	PRINT command
X'03'	DISPLAY command
X'04'	RUN command
X'05'	EXPORT command
X'06'	IMPORT command
X'07'	SAVE command
X'08'	Incremental database activity
X'09'	CONVERT command
X'1F'	End QMF session

The following topics describe the format of each record type and the values that can appear in each field of each record.

Related reference:

"Layout for X'00' and X'1F' record types"

Layout for X'00' and X'1F' record types

Table 25. Layout for record types X'00' and X'1F'

Offset	Length	Description
0	1	Record type
1	400	Reserved for future use
401	4	Date in packed signed Julian format (1/31/1996 is stored as X'0096031F')
405	4	Time in packed unsigned format (12:10:46:50 is stored as X'12104650')
409	1	Reserved for future use
410	128	TSO ID
538	1	'2' or '3' TSO session; '5' CICS session, 'O' Object Manager
539	4	Db2 SSID
543	1	'1' online session; '2' batch session

Table 25. Layout for record types X'00' and X'1F' (continued)

Offset	Length	Description
544	2	Reserved for use by the HPO Activity Log batch job
546	4	Reserved for future use

Layout for X'01' through X'07' and X'09' record types

Table 26. Layout for record types X'01' through X'07" and type X'09'

Offset	Length	Description
0	1	Record type
1	16	Object location
17	128	Object owner
145	128	Object name
273	128	Current SQL ID
401	4	Date in packed signed Julian format (1/31/1996 is stored as X'0096031F')
405	4	Time in packed unsigned format (12:10:46:50 is stored as X'12104650')
409	1	Success indicator, one of the HPO/Governor module cancel codes
410	128	TSO ID
538	1	'2' or '3' TSO session; '5' CICS session, 'O' Object Manager
539	4	Db2 SSID
543	1	'1' online session; '2' batch session
544	2	Reserved for use by the HPO Activity Log batch job
546	4	Reserved for future use

Layout for X'08' record type

Table 27. Layout for record type X'08'

Offset	Byte Numbers	Description
0	1	Record type
1	2	Reserved for future use
3	4	Number of rows fetched in binary integer format (256 rows is stored as X'00000100')
7	4	CPU time consumed (in hundredths of seconds) in binary integer format (1 second is stored as X'00000064')
11	4	Current time in packed unsigned format (12:10:46:50 is stored as X'12104650')
15	2	Reserved for future use
17	533	Same as record types X'01' through X'07' and X'09'

Layout for SQL text record

Table 28. Layout for SQL text record

Offset	Byte Numbers	Description
0	550	Same as record type X'08'
550	16	Location
566	2	SQL length
568	3492	SQL text

Appendix F. HPO Db2 tables

HPO uses the following Db2 tables:

- the Object Activity Summary table
- the Object Activity Detail table
- the Report Registration table
- the Report Variables table

The following topics describe the layouts of each table and the values that can appear in each column of each table.

Related reference:

"Object Activity Summary table layout (Q.OBJ_ACTIVITY_SUMM)"

Object Activity Summary table layout (Q.OBJ_ACTIVITY_SUMM)

Table 29. Q.OBJ_Activity_SUMM table

Column Name	Data Type	Description
OBJOWNER	VARCHAR(128)	Object owner
OBJNAME	VARCHAR(128)	Object name
SSID	CHAR(4)	Db2 subsystem ID
FDATE	DATE	First-used date
FTIME	TIME	First-used time
FTSOID	VARCHAR(128)	First-used TSOID
FSQLID	VARCHAR(128)	First-used SQLID
FACTN	CHAR(1)	First-used action: X'01' ERASE; X'02' PRINT; X'03' DISPLAY; X'04' RUN; X'05' EXPORT; X'06' IMPORT; X'07' SAVE; X'09' CONVERT
FENVIRO	CHAR(1)	First-used environment: '2' or '3' TSO, '5' CICS, 'O' Object Manager, 'W' Windows
FMODE	CHAR(1)	First-used mode: '1' online session, '2' batch session
LDATE	DATE	Last-used date
LTIME	TIME	Last-used time
LTSOID	VARCHAR(128)	Last-used TSOID
LSQLID	VARCHAR(128)	Last-used SQLID
LACTN	CHAR(1)	Last-used action (see FACTN for values)
LENVIRO	CHAR(1)	Last-used environment (see FENVIRO for values)
LMODE	CHAR(1)	Last-used mode (see FMODE for values)
USE_CT	INTEGER	Number of times object has been used

Table 29. Q.OBJ_Activity_SUMM table (continued)

Column Name	Data Type	Description
CAN_CT	INTEGER	Number of times object has been canceled by the HPO/Governor module
RUN_CT	INTEGER	Number of times object has been run
LMDATE	DATE	Last-modified date
LMTIME	TIME	Last-modified time
LMTSOID	VARCHAR(128)	Last-modified TSOID
LMSQLID	VARCHAR(128)	Last-modified SQLID
LMACTN	CHAR(1)	Last-modified action (see FACTN for values)
LMENVIRO	CHAR(1)	Last-modified environment (see FENVIRO for values)
LMMODE	CHAR(1)	Last-modified mode (see FMODE for values)

Note: For data retrieval purposes, a unique index should be created on columns OBJOWNER and OBJNAME.

Object Activity Detail table layout (Q.OBJ_ACTIVITY_DTL)

Table 30. Q.OBJ_Activity_DTL table

Column name	Data type	Description
OBJOWNER	VARCHAR(128)	Object owner
OBJNAME	VARCHAR(128)	Object name
SSID	CHAR(4)	Db2 subsystem ID
DATE	DATE	Date query was run
TIME	TIME	Time query was run
TSOID	VARCHAR(128)	TSOID running query
SQLID	VARCHAR(128)	CURRENT SQLID running query
ENVIRO	CHAR(1)	Environment in which query was run: '2' or '3' TSO, '5' CICS
MODE	CHAR(1)	Mode in which query was run: '1' online session, '2' batch session
ROWCT	INTEGER	Number of rows fetched
CPUCT	INTEGER	CPU time consumed (in hundredths of seconds)
SUCCESS	CHAR(1)	One of the HPO/Governor module cancel codes
SQLTEXT	VARCHAR(3492)	SQL Text
ETIME	TIME	Time query ended
IXTIME	INTEGER	HPO internal use
BYTECT	INTEGER	Byte count
SEQ	SMALLINT	SQL text sequence number

Note: For data retrieval purposes, a unique index should be created on columns OBJOWNER, OBJNAME, DATE, TIME, IXTIME, and SEQ.

Report registration table layout (Q.REPORTS)

Table 31. Q.REPORTS table

Column Name	Data Type	Description
REPORT_OWNER	CHAR(8)	Report owner
REPORT_NAME	VARCHAR(18)	Report name
RESTRICTED	CHAR(1)	'Y' restricts access to this report; 'N' allows shared access to this report
ENVIRONMENT	CHAR(1)	'B' for batch; 'T' for TSO; 'C' for CICS
LANGUAGE	CHAR(1)	'1' or 'B' for OS/VS COBOL; '2' for Enterprise COBOL; 'C' for C
DB2_CONNECTION	CHAR(1)	'C' for call attachment facility; 'T' for TSO attachment facility
PLAN_NAME	CHAR(8)	Plan name (optional)
PROGRAM_NAME	CHAR(8)	Program name
LOAD_LIBRARY	VARCHAR(44)	Load library name (optional)
VARIABLES	CHAR(1)	'Y' if this report uses variables; 'N' otherwise
QUERY_OWNER	VARCHAR(128)	Owner of query that was converted into program
QUERY_NAME	VARCHAR(128)	Name of query that was converted into program
FORM_OWNER	VARCHAR(128)	Owner of form that was converted into program
FORM_NAME	VARCHAR(128)	Name of form that was converted into program
PROC_OWNER	VARCHAR(128)	Owner of procedure that was converted into program
PROC_NAME	VARCHAR(128)	Name of procedure that was converted into program
VARIABLE_LRECL	SMALLINT	LRECL of HOSTVARS DD for batch programs
DESCRIPTION	VARCHAR(55)	Description of this report
RDATE	DATE	Date of program registration
RTIME	TIME	Time of program registration
DATAOUT_LRECL	SMALLINT	LRECL of DATAOUT DD, or -1 if n/a
DATAIN_LRECL	SMALLINT	LRECL of DATAIN DD, or -1 if n/a
REPORT_LRECL	SMALLINT	LRECL of REPORTnn DDs, or -1 if n/a
NUM_REPORT_FILES	SMALLINT	Number of REPORTnn DDs used by program, or -1 if unknown or n/a
PROGRAM_TYPE	CHAR(1)	Type of program: 'P' print, 'D' display, 'N' no report, 'L' data layer, 'R' proc

Note: For data retrieval purposes, a unique index should be created on columns REPORT_OWNER and REPORT_NAME.

Report variables table layout (Q.REPORT_VARIABLES)

Table 32. Q.REPORT_VARIABLES table

Column Name	Data Type	Description
REPORT_OWNER	CHAR(8)	Report owner
REPORT_NAME	VARCHAR(18)	Report name
NAME	VARCHAR(31)	Variable name
TYPE	VARCHAR(28)	Variable data type
SEQUENCE	SMALLINT	Sequence number used to order variables

Note: For data retrieval purposes, a unique index should be created on columns REPORT_OWNER, REPORT_NAME, and SEQUENCE.

Appendix G. HPO Activity Log reason codes

The following reason codes are recorded in the system log with message prefix
RAAG998I whenever an error occurs while processing any of the HPO Activity
Log data sets.

Table 33. HPO Activity Log reason codes

Reason Code	Description
2	Load of RAAX configuration module failed
3	Load of RAAXssid configuration module failed
5	Reserved
7	Severe internal error
8	Enqueue failure on HPO Activity Log data set
9	Dynamic allocation failure on HPO Activity Log data set
A	ESTAE routine captured abend while attempting to write to HPO Activity Log data set; data set may be full
B	HPO Activity Log data set DCB verification failed; data set not created or not created with proper attributes
C	Enqueue failure on HPO SQL text data set
D	HPO SQL text data set DCB verification failed; data set not created or not created with proper attributes
E	HPO SQL Text data set open failure
F	Dynamic allocation failure on HPO SQL text data set
G	ESTAE routine captured abend while attempting to write to HPO SQL text data set; data set may be full
O	HPO Activity Log data set open failure
S	SQL error attempting to read Q.OBJECT_DIRECTORY
T	Db2 call attachment failure; user does not have authority to execute the HPO/Governor module plan or plan has not been bound

Appendix H. HPO/Governor cancel codes

The following cancel codes issued by the HPO/Governor module are recorded in the HPO Activity Log and the Q.OBJ_ACTIVITY_DTL table.

Table 34. HPO/Governor cancel codes

Cancel code	Description
0	Not canceled
1	Canceled by QMF
2	Canceled by Governor
3	Canceled by the Governor site-defined exit routine
4	Canceled by Governor; QMF access not allowed
5	Canceled by Governor; Row limit exceeded
6	Canceled by Governor; CPU time limit exceeded
7	Canceled by Governor; QMF command not allowed
8	Canceled by Governor; SQL verb not allowed
9	Canceled by Governor; User canceled from prompt dialog
A	Canceled by Query Analyzer
B	Canceled by Monitor
C	Canceled by Governor; Idle query timeout exceeded
D	Canceled by Governor; Byte limit exceeded
E	Canceled by QMF; Error occurred
N	Fatal error running query

Appendix I. Record layout for the RAADEBUG data set

The RAADEBUG data set must be allocated with:

- DSORG=PS
- RECFM=F
- LRECL=121

This is the record layout for this file:

Table 35. Record layout for the RAADEBUG data set

Offset	Byte numbers	Description
0	1	Reserved
1	2-9	TSOID
9	10	Reserved
10	11-18	Current SQLID
18	19	Reserved
19	20-29	Date in YYYY/MM/DD format
29	30	Reserved
30	31-38	Time in HH:MM:SS format
38	39	Reserved
39	40-117	Message
117	118-121	Reserved

Appendix J. Messages

Messages are organized by a set of prefix letters which indicate what component issued the message. HPO messages are organized as follows:

- RAAC messages are issued by Program Generator.
- RAAG messages are issued by Monitor.
- RAAM messages are issued by the Manager online facility.
- RAAP messages are issued by the Query Analyzer online facility.
- RAAQ messages are issued by the End User Facility.
- RAAR messages are issued by HPOC Configuration dialog and common functions.
- RAAU messages are issued from the End User Facility.
- RAAX messages are issued from the HPO Configuration dialog and common functions.

RAAC messages

Messages that begin with RAAC are issued from Program Generator and appear on the message line on ISPF panels.

RAAC002E   Please select one of the options listed below

Explanation: Choose one of the selection options listed on this panel.

RAAC003E   DB2 subsystem ID cannot be left blank

Explanation: You must enter a valid Db2 subsystem ID. This is the subsystem used to execute SQL, to start QMF, to obtain QMF profile information, and to compile and run programs.

RAAC004E   DB2 subsystem * not configured

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the specified Db2 subsystem.

RAAC005E   Unrecognized command

Explanation: The command that you entered on the command line is not valid.

RAAC006E   Specify one of query, query and form, or procedure

RAAC007E   Specify only one of query, query and form, or procedure

Explanation: The input to the generation process must be either a query, a query and form combination, or a

linear procedure. Specify only one of these input sources.

RAAC008E   Cannot specify form without query

Explanation: A program cannot be generated from a form only. You must also specify a query.

RAAC009E   * flag must be "Y" (yes) or "N" (no)

Explanation: The only acceptable values for the specified flag are yes or no.

RAAC010E   * data set name cannot be left blank

Explanation: You must enter a data set name for the specified type of object (query, form, procedure, source code, or load module). It may or may not already contain the specified data.

RAAC011E   QMF requires RECFM = F and LRECL = 79

Explanation: QMF requires that data sets into which queries and procedures are exported have RECFM = F and LRECL = 79.

RAAC012E   Member name not allowed for sequential data sets

Explanation: You cannot specify a member name for the data set because it is a sequential data set.

RAAC013E   Member name has invalid syntax

Explanation: The member name that you entered does not conform to PDS member naming rules.

RAAC014E   QMF requires RECFM = V and LRECL between * and 7290

Explanation: QMF requires that data sets into which forms are exported have RECFM = V and LRECL between 161 and 7290.

RAAC015E   Data set must have DSORG = PS or PO

Explanation: You must specify the name of a sequential data set or a partitioned data set.

RAAC016E   Profile key must be "T" (TSOID) or "P" (PRIMEID)

Explanation: Your QMF profile can be keyed by either your TSO logon ID or by your primary Db2 authorization ID. Enter the desired value.

RAAC017E   Translation must be a valid QMF translation value or "*"

Explanation: Enter a valid QMF translation value. ENGLISH, UPPERCASE, FRANCAIS CANADIEN, DANSK, FRANCAIS, DEUTSCH, ITALIANO, NIHONGO, HANGEUL, PORTUGUES, ESPANOL, SVENSKA, FRANCAIS (SUISSE), and DEUTSCH (SCHWEIZ). If you enter *, the configuration default translation will be used.

RAAC018I   Default values not saved; Cancel request honored

Explanation: Any changes that you made to the default parameter settings have been discarded.

RAAC019I   Default values will be saved

Explanation: Any changes that you made to the default parameter settings will be saved in your ISPF profile.

RAAC020I   Previous QMF command not issued; Cancel request honored

Explanation: The previous export command was bypassed due to your cancel command. The object that was to be exported is assumed to **not** exist in the specified data set.

RAAC021E   Post-generation CLIST RAAPOSTG RC = *

Explanation: The post-generation CLIST named RAAPOSTG did not run successfully.

RAAC022I   Starting QMF; Please wait...

Explanation: Program Generator is starting a QMF session to export objects.

RAAC023I   Exporting object from QMF; Please wait...

Explanation: QMF is exporting the query, form, or procedure. After the export finishes, the specified data set and member will contain the object.

RAAC024E   Previous export command failed; QMF error *

Explanation: The previous export command failed due to an error condition. Common reasons for this are that the QMF object does not exist or that there is a problem with the specified data set and member. See *Db2 QMF Messages and Codes* for more information on the specified error number. In addition, the DSQDEBUG file may contain more information.

RAAC025I   Previous QMF export command was successful

Explanation: The previous export command was successful. The specified data set and member now contain the QMF object.

RAAC026E   * does not exist due to export failure

Explanation: A previous export of the specified object failed (or was canceled). Consequently, you cannot process the report for that object.

RAAC027E   * data set does not exist, has been migrated, or is empty

Explanation: The data set specified for the object cannot be found or is empty. Consequently, you cannot process the report for that object.

RAAC028E   * member * does not exist in PDS

Explanation: The PDS member specified for the object cannot be found. Consequently, you cannot process the report for that object.

RAAC029I   Parsing procedure; Please wait...

Explanation: Program Generator is parsing the procedure to build a list of the reports that it runs.

RAAC030E   Member name cannot be left blank for PDS

Explanation: If you specify a partitioned data set, you must also specify a member name.

RAAC031E   Missing argument

Explanation: You must specify a report list row number or the word "PROC" as an argument to this command. For example, specify COMPILE 1 or COMPILE PROC.

RAAC032E   Invalid argument

Explanation: You specified an invalid argument with this command. You must specify a report list row number or the word "PROC" as an argument to this command. For example, specify COMPILE 1 or COMPILE PROC.

RAAC033E   Too many arguments

Explanation: Too many arguments were specified with this command. You must specify exactly one report list row number or the word "PROC" as an argument to this command. For example, specify COMPILE 1 or COMPILE PROC.

RAAC034E   Argument out of range

Explanation: The row number that you specified as an argument to this command is either less than 1 or greater than the number of rows in the report list.

RAAC035E   Plan name cannot be left blank

Explanation: You must enter an 8 character (or less) name to be used as the plan name for the program.

RAAC036E   Plan name has invalid syntax

Explanation: The plan name that you entered does not conform to plan naming rules.

RAAC037E   Review flag must be "B" (browse), "E" (edit), or "N" (none)

Explanation: To browse the specified object, set this flag to B. To edit the object, set this flag to E. To do neither, set this flag to N.

RAAC038E   Browse failed; Data set or member is empty

Explanation: The data set or member to be browsed contains no data.

RAAC039E   Browse failed; Member * not found

Explanation: The member to be browsed does not exist.

RAAC040E   Browse failed; Severe error

Explanation: The browse session failed due to a severe ISPF error.

RAAC041E   Edit failed; Member or data set in use

Explanation: The data set or member is in use and therefore cannot be edited.

RAAC042E   Edit failed; Member * not found

Explanation: The member to be edited does not exist.

RAAC043E   Edit failed; Severe error

Explanation: The edit session failed due to a severe ISPF error.

RAAC044I   No variables found in query or form

Explanation: Program Generator did not find any substitution variables in the query or the form, so there are none to edit. Normal processing will continue.

RAAC045I   Variable values not saved; Cancel request honored

Explanation: Any variable value changes that you made were discarded.

RAAC047E   Environment must be "B" (batch), "T" (TSO), "C" (CICS), or "S" (stored procedure)

Explanation: You can generate programs to run either in MVS batch, TSO, CICS, or as a stored procedure under Db2. Choose the one desired for this generation.

RAAC048E   Attachment Facility must be "T" (TSO attachment facility), "C" (call attachment facility), or "R" (Recoverable Resource Manager Services attachment facility)

Explanation: If you set this flag to T, the generated program will connect to Db2 via the TSO attachment facility. If you set it to C, the generated program will connect to Db2 via the call attachment facility (CAF). If you set it to C, the generated program will connect to

Db2 via the Recoverable Resource Manager Services attachment facility (RRSAF). This flag is ignored for CICS programs, which always connect to Db2 via the CICS attachment facility.

RAAC049E   Table name cannot be left blank

Explanation: You must specify a table name when generating a program that will SAVE DATA to a Db2 table or ERASE a Db2 table.

RAAC050E   * must be "N" (no) with data layer program

Explanation: The specified option is not allowed with data layer programs.

RAAC051E   Print program can only be specified with display program

Explanation: You can only specify a print program when you are generating a display program. The program that you enter will be invoked when a user enters the PRINT command from the display program.

RAAC052E   Program must be generated before it can be edited

Explanation: You cannot edit a program until it is generated.

RAAC053E   * flag must be "N" (no) with CICS program

Explanation: The specified option is not allowed with CICS programs.

RAAC054E   Pre-generation CLIST RAAPREG RC = *

Explanation: The pre-generation CLIST named RAAPREG did not run successfully.

RAAC055E   * flag must be "N" (no) with TSO or CICS print program

Explanation: The specified option is not allowed with TSO or CICS print programs.

RAAC056I   Generation was bypassed; Cancel request honored

Explanation: Program Generator bypassed the generation process due to your cancel command.

RAAC057I   Generating program; Please wait...

Explanation: Program Generator is generating the program. When it is finished, the specified output data set and member will contain the source code.

RAAC058I   Program * has been generated

Explanation: The program has been generated in the specified data set and member.

RAAC059E   Compile type must be P (prompted), N (non-prompted), or B (batch)

Explanation: If you enter P, the program will be compiled by invoking DB2I, which will lead you through a series of panels to invoke the compilation process. If you enter N, the program will be compiled immediately by invoking the DSNH command online. If you enter B, JCL will be tailored to perform the compile in batch.

RAAC061E   * flag must be "N" (no) with TSO print program

Explanation: The specified option is not allowed with TSO print programs.

RAAC062E   Validate parameter must be "BIND" or "RUN"

Explanation: Enter the value to use for the VALIDATE parameter to the BIND PLAN command. See *Db2 Application Programming and SQL Guide* for more information on this parameter. If the SQL in the program you are compiling refers to any Db2 tables that do not exist at compile time, you must specify RUN for the BIND to succeed.

RAAC063E   Target data set must be a PDS

Explanation: Load modules can only be created as members of partitioned data sets or of PDSE. You cannot specify a sequential data set as the target for the program.

RAAC064E   Error issuing LMINIT on data set

Explanation: A severe ISPF error occurred when issuing the LMINIT service.

RAAC065E   Error issuing LMOPEN on data set

Explanation: A severe ISPF error occurred when issuing the LMOPEN service.

RAAC066I   Program not compiled; Cancel request honored

Explanation: The program was not compiled due to your cancel command.

RAAC067I   **Invoking online compile; Please wait...**

Explanation: Program Generator is preparing the program online. If the process completes successfully, the program will be ready to run.

RAAC068E   **Online compile error; RC = ***

Explanation: An error occurred during the online compile. The return code is included in this message. More information should be written to your terminal during the compile. In addition, see the discussion of the DSNH command in *Db2 Command and Utility Reference* for more information about the compile, including how to locate the output from each step.

RAAC069E   **Load library must be a PDS**

Explanation: You can only run programs from a partitioned data set or PDSE.

RAAC070E   **Load library and program ID cannot both be left blank**

Explanation: If you leave the load library blank, Program Generator assumes that the program to be run exists within one of the load libraries allocated to your TSO session. If you leave the program ID blank, Program Generator displays a member list (from the specified load library). You can select the program to run from this list. If you specify both the load library and the program ID, the program is run from the specified load library (the program must exist in the specified library). You cannot leave both of these fields blank.

RAAC071E   **Not all job cards may be left blank**

Explanation: You must fill in at least one of these fields for the job card. If only one line is required for the job card, use the first line.

RAAC072E   **Flag must be "E" (edit) or "S" (submit)**

Explanation: To edit the JCL after it is generated, set this flag to E. To submit the JCL automatically after it is generated, set this flag to S. To bypass JCL generation and job submission, enter the END or CANCEL commands.

RAAC073I   **Program not run; Cancel request honored**

Explanation: The program was not run due to your cancel command.

RAAC074I   **Running program; Please wait...**

Explanation: The program is running. Please wait for the first page of the report to be displayed.

RAAC075E   **Run error; RC = ***

Explanation: An error occurred while running the program. The return code is included in this message.

RAAC076E   **Member cannot be specified with temporary data set**

Explanation: When using temporary data sets to export queries, forms, or procedures, you cannot specify a member name. The temporary data set that Program Generator creates will be a sequential data set.

RAAC077E   **Program name has invalid syntax**

Explanation: The program name that you entered does not conform to program naming rules.

RAAC078E   **Environment must be "B" (batch) or "T" (TSO)**

Explanation: You can only run batch or TSO programs using this facility.

RAAC079E   *** flag must be "Y" (yes) with TSO print program**

Explanation: The specified option is required with TSO print programs.

RAAC080E   **Print program can only be specified if Write flag is "Y"**

Explanation: TSO print programs always read their input from a file written by the display program, rather than reading from Db2. Because of this, a print program can only be specified for a display program if the display program writes data to a file.

RAAC081I   **JCL submitted**

Explanation: Program Generator has submitted JCL to either compile or run a program.

RAAC082E   **Error submitting JCL**

Explanation: An error occurred while submitting JCL to either compile or run a program. Additional information may be written to the terminal by TSO.

RAAC083E   Print program can only be specified if HPO/Runtime flag is "N"

Explanation: TSO display programs that have a corresponding print program cannot use the HPO/Runtime feature.

RAAC085E   Environment must be "B" (batch) or "T" (TSO) with non-SELECT SQL

Explanation: Program Generator does not support non-SELECT SQL in CICS programs.

RAAC086E   SQL type must be "S" (static) with data layer program

Explanation: Data layer programs are required to use static SQL.

RAAC087E   Illegal character (') in options

Explanation: The single quote character (') is not allowed in compile or link edit options. Remove the character.

RAAC088E   Program * not generated yet

Explanation: You must generate the program in the specified row of the report list before you can generate a procedure program that runs it.

RAAC089E   Program * has different dialect than proc program

Explanation: The program in the specified row of the report list was generated in a different language than the procedure program. All programs run by a procedure program must be written in the same language as the procedure program.

RAAC090E   Program * has different environment than proc program

Explanation: The program in the specified row of the report list was generated for a different environment than the procedure program. All programs run by a procedure program must be written for the same environment as the procedure program.

RAAC091E   Program * uses different attachment facility than proc program

Explanation: The program in the specified row of the report list was generated to use a different attachment facility than the procedure program. All programs run by a procedure program must be written to use the same attachment facility as the procedure program.

RAAC092E   Temporary data set only allowed when exporting

Explanation: You cannot specify a temporary data set (*TEMP) for a query, form, or procedure data set unless the object is to be exported.

RAAC093E   Temporary data set not allowed in this field

Explanation: You cannot specify a temporary data set (*TEMP) for the data set entered in this field.

RAAC094E   Error creating temporary data set

Explanation: An error occurred while creating a temporary data set. Additional error messages may be written to the terminal.

RAAC095E   No matching objects found

Explanation: No objects matching the specified owner and name were found in the database.

RAAC096E   Select one and only one object

Explanation: You must select one and only one object from each displayed column.

RAAC097E   Use "S" to select an object

Explanation: The character entered in the selection field was not recognized.

RAAC098E   JCL not generated; Cancel request honored

Explanation: The JCL was not generated due to your cancel command.

RAAC099E   DBRM library must be a PDS

Explanation: You must specify a partitioned data set name for the DBRM library. Sequential data sets are not allowed.

RAAC100E   Unexpected internal error *

Explanation: An unexpected error was encountered.

RAAC101E   Memory exhausted

Explanation: Expand your region size.

RAAC102E   Data set does not exist or has been archived/migrated

Explanation: The specified data set could not be found. You must specify the name of a data set that exists and is cataloged.

RAAC103E   **Cannot specify member name in this field**

Explanation: You cannot specify the member name as part of the data set name. For example, PDS.LIBRARY(MEM) is invalid. On the Set Default Parameters panel, you can leave the member field blank, and Program Generator will automatically build a member name from the object name. On all other panels, you must specify a member.

RAAC104E   **Error connecting to DB2 * (RC=* REASON=*)**

Explanation: This message may appear while Program Generator is connecting to the specified Db2 subsystem. Check the return code (RC) and reason code (REASON) in *Db2 Messages and Codes*. Also check that the Db2 subsystem ID that you entered is correct.

RAAC105E   **Could not open data set ***

Explanation: Program Generator could not open the specified data set. Verify that the data set exists, that you have permission to read it, etc.

RAAC106E   **Error reading data set ***

Explanation: An error occurred while reading the specified data set. Verify that the data set exists, that you have permission to read it, etc.

RAAC107E   **Error writing data set ***

Explanation: An error occurred while writing the specified data set. Verify that the data set is not full, that you have permission to write it, etc.

RAAC108E   **Procedures with logic are not supported**

Explanation: You may only specify a linear procedure as input. Procedures with logic are not supported.

RAAC109E   **Qualified object name too long**

Explanation: Object names must follow QMF object name syntax. The owner can be 8 characters or less and name can be 18 characters or less. A period should be used to delimit the owner and name.

RAAC110I   **Too many reports in procedure**

Explanation: The specified procedure referred to more reports than allowed. The maximum number of reports allowed per procedure is 100.

RAAC111E   **Too many variables in query**

Explanation: The specified query referred to too many substitution variables.

RAAC112E   **No reports in procedure**

Explanation: Program Generator did not find any reports when parsing the specified procedure. Each PRINT REPORT command in a procedure corresponds to a report. Also, each RUN QUERY command without a succeeding PRINT REPORT command corresponds to a report.

RAAC113E   **SQL error reading Q.OBJECT_DIRECTORY**

Explanation: An SQL error occurred while reading the Q.OBJECT_DIRECTORY table to build an object selection list. Enter the HELP command to obtain more information about the error.

RAAC114E   **SQL error accessing registration tables**

Explanation: An SQL error occurred while accessing the report registration tables (Q.REPORTS and Q.REPORT_VARIABLES). Enter the HELP command to obtain more information about the error.

RAAC115E   **SQL error retrieving current SQLID**

Explanation: An SQL error occurred while retrieving the current SQLID. This is generally indicative of an unrecoverable error (for example, the application plan has been bound incorrectly). Enter the HELP command to obtain more information about the error.

RAAC116E   **Error opening plan * (RC=* REASON=*)**

Explanation: This message may appear while Program Generator is connecting to Db2. Check the return code (RC) and reason code (REASON) in *Db2 Messages and Codes*. Enter the HELP command to obtain more information about the error.

RAAC117E   **Error connecting to location; SQLCODE = ***

Explanation: You cannot connect to the specified location from this Db2 subsystem. Enter the HELP command to obtain more information about the error and check with your system or database administrator.

RAAC118E   **Error allocating RAAOUT DD to ***

Explanation: An error occurred while trying to allocate the RAAOUT DD to the specified output data set. This allocation uses the disposition specified on the Set Default Parameters panel.

RAAC119E   Disposition must be "OLD", "SHR", or "MOD"

Explanation: You must specify the disposition to use for the output data set when generating source code.

RAAC120E   Error disconnecting from DB2 * (RC=* REASON=*)

Explanation: This message may appear while Program Generator is disconnecting from the specified Db2 subsystem. Check the return code (RC) and reason code (REASON) in *Db2 Messages and Codes*.

RAAC121E   Bind type must be 1, 2 or 3

Explanation: You must select one of the specified bind types. If compiling a report program, enter 1 to bind a package, 2 to bind a plan or 3 to bind neither. If compiling a proc program, enter 2 to bind a plan specifying all report program packages or 3 to not bind a plan. If compiling a report program as part of a proc program, enter 1 to bind a package, 2 to bind a plan or 3 to bind neither.

RAAC122E   Collection ID must be specified when binding a package

Explanation: In order to bind a package, a collection ID in which to bind it must be specified. Your user ID (or the bind OWNER) must have the Db2 privilege to bind packages in the collection ID that you specify.

RAAC123E   Collection ID contains invalid characters

Explanation: The specified collection ID has invalid syntax.

RAAC124E   All reports must have packages bound to specify this bind type

Explanation: In order to bind a plan for a procedure program that includes only a PKLIST that references the report programs' packages, all of the report programs must have packages bound.

RAAC125E   Save data action must be "R" (replace), "A" (append), or "P" (prompt)

Explanation: When saving data, if it is determined that the target table already exists, a decision must be made regarding what to do with any data that might already exist in the table. If you specify to replace the existing data, it is deleted before saving the new data. If you specify to append to the existing data, it is not deleted. If you specify to prompt for the action, different behavior occurs depending on whether the program is a batch program or a TSO program. For batch programs, a positional parameter can be passed in the PARM field at runtime to indicate the desired disposition (R for replace or A for append). For TSO

programs, a prompt panel is displayed, prompting the user for the desired disposition. Prompting is not supported for CICS programs; the save data action for CICS programs must be replace or append.

RAAC126E   Save data SQL type must be "S" (static) or "D" (dynamic)

Explanation: Enter S to specify that all SQL used in saving data should be static SQL, or D to specify that it should be dynamic SQL. If the program uses dynamic SQL in all other contexts, the save data SQL must also be dynamic.

Using dynamic SQL for saving data allows the save data table name, when unqualified, to be qualified with the user ID of the user at runtime, rather than the plan or package OWNER or QUALIFIER parameter.

RAAC127E   Host variable format must be "T" (tabular) or "C" (columnar)

Explanation: Enter T to specify that all of the host variables used by the program will be specified on a single input record, separated by a specific delimiter character. Enter C to specify that each host variable will be specified on a separate input record (in which case no delimiter character is used).

RAAC128I   * options do not apply to non-SELECT queries

Explanation: The specified type of options do not apply when generating programs from queries that do not use the SQL verb SELECT. As a result, the display of the options pop-up window has been suppressed.

RAAC129I   * options do not apply to data layer programs

Explanation: The specified type of options do not apply when generating data layer programs. As a result, the display of the options pop-up window has been suppressed.

RAAC130E   Host variable DD must be "H" (HOSTVARS) or "P" (PROCVARS)

Explanation: If you are running a report program, which expects to read host variable input from the DD named HOSTVARS, enter H. If you are running a procedure program, which expects to read host variable input from the DD named PROCVARS, enter P.

RAAC131I   * options apply only to batch programs which use host variables

Explanation: The specified type of options do not apply unless generating programs for the batch environment which also use host variables (excluding data layer programs). As a result, the display of the

options pop-up window has been suppressed.

RAAC132E   Host variable values not accepted; Cancel request honored

Explanation: Your request to cancel entry of host variable values has been accepted.

RAAC133I   Options set; Press Enter to generate program

Explanation: All of the selected options pop-up windows have been displayed. Press Enter to generate the program.

RAAC134E   Save data SQL type must be "D" (dynamic) when table space is *USERPROF

Explanation: In order to use the special value *USERPROF to specify that the target table space for the save data table should be retrieved from the QMF profile of the user at runtime, the SQL used to save data must be dynamic. If dynamic SQL is not desired, the table space value must be changed from *USERPROF.

RAAC135E   Attachment facility must be "T" (TSO attachment facility) or "C" (call attachment facility) for TSO program

Explanation: TSO programs can use the TSO attachment facility or the call attachment facility (CAF) to connect to Db2. You must select one of these two values.

RAAC136E   Attachment facility must be "T", "TSO", "C", or "CAF" for TSO program

Explanation: TSO programs can use the TSO attachment facility or the call attachment facility (CAF) to connect to Db2. You must select one of these two values.

RAAC137I   * options apply only to data layer programs

Explanation: The specified type of options do not apply unless generating data layer programs. As a result, the display of the options pop-up window has been suppressed.

RAAC138E   Data layer programs can only be generated from queries which can be parsed

Explanation: Part of the generation process for data layer programs requires Program Generator to parse the input SQL statement. Program Generator was unable to parse the current statement, and therefore cannot generate a data layer program from it. This

error indicates an unexpected internal parsing error in Program Generator.

RAAC200E   Token too long at line * of *

Explanation: A token was found while parsing the procedure data set that exceeded the maximum length. The maximum length for a token in a procedure is 256.

RAAC201E   Invalid quoted value at line * of *

Explanation: An invalid token was found while parsing the procedure data set. Verify that the data set contains a valid linear procedure.

RAAC202E   Unbound variable at line * of *

Explanation: An unbound variable was found while parsing the procedure data set. Verify the procedure in the data set, possibly replacing variables with constants.

RAAC203E   Invalid DSN in IMPORT at line * of *

Explanation: The data set specified in the IMPORT command in the procedure data set is invalid.

RAAC204E   Syntax error at line * of *

Explanation: A syntax error was found while parsing the procedure data set.

RAAC205E   Variable value too long at line * of *

Explanation: Variable values must be 55 characters or less.

RAAC206E   Missing variable value at line * of *

Explanation: Verify the specified procedure data set. Make sure that variable assignments are complete. Do not leave any assignments incomplete, such as RUN QUERY (FORM=.

RAAC207E   Integer value out of range at line * of *

RAAC208E   Bad integer value at line * of *

Explanation: A positive integer value was expected. A non-integer or an integer that is too large was found.

RAAC209E   No query name for RUN at line * of *

Explanation: A RUN command was found that did not reference a query name or QUERY.

RAAC210E   Bad value for DATETIME at line * of *

Explanation: An invalid value for the DATETIME parameter of the PRINT command was found. See *Db2 QMF Reference* for legal values.

RAAC211E   Bad value for PAGENO at line * of *

Explanation: An invalid value for the PAGENO parameter of the PRINT command was found. See *Db2 QMF Reference* for legal values.

RAAC212E   Unexpected continuation at line * of *

Explanation: An illegal continuation line was found while parsing the procedure data set.

RAAC213E   Command too long at line * of *

Explanation: A command was found while parsing the procedure data set that exceeds the maximum procedure command length.

RAAC214E   Variable name is too long

Explanation: The host variable name that you entered is too long. The length of COBOL identifiers is limited to 30 characters. You must specify a shorter variable name.

RAAC215E   Invalid length for variable * with * type

Explanation: When specifying data type CHAR, you must specify a length within parentheses directly after the data type, for example: VAR1 CHAR(3). When specifying data type DECIMAL, you may optionally specify a precision or precision and scale after the data type, for example: VAR1 DECIMAL(5) or VAR1 DECIMAL(7,2). The precision must be less than or equal to 15 and the scale must be less than or equal to the precision.

RAAC216E   Unrecognized type * for variable *

Explanation: Valid data types are INTEGER, SMALLINT, DECIMAL(p,s), DECIMAL(p), DECIMAL, FLOAT, CHAR(n), VARCHAR(n), DATE, TIME, and TIMESTAMP.

RAAC217E   Empty variable name

Explanation: When specifying a host variable name, enter a colon (:) followed by the variable name. For example,:VAR1.

RAAC218E   Variable naming conflict

Explanation: One or more host variables have the same name. Note that the following suffixes may be added to the names entered on the Edit Variables panel: -I, -L, -C. You must change one or more of the names to eliminate the conflict.

RAAC219E   Missing variable type

Explanation: You must supply a data type for each host variable specified.

RAAC220E   Error opening RAAVARS DD

Explanation: When you are generating a program in batch from a query or form that uses variables, Program Generator reads values for those variables from the RAAVARS DD. Make sure that the RAAVARS DD is defined and has the correct format.

RAAC221E   Invalid record in RAAVARS DD

Explanation: A record read from the RAAVARS DD had an invalid format. Each record must be of the form &VARNAME=VARVALUE

RAAC222E   Column does not exist in table

Explanation: A host variable name was specified in the format `:=tbcreator.tbname.colname`, but there is no column with the given name in the specified table. You must specify a valid column name.

RAAC223E   Unable to resolve host variable name conflicts

Explanation: An unexpected internal error occurred while trying to resolve conflicts in the names of host variables by appending numeric suffixes to the host variable names.

RAAC224E   Host variable name too long

Explanation: The indicated host variable name is too long. The maximum length that may be specified is 25 characters. This limit allows for the addition of standard name prefixes and suffixes generated by Program Generator.

RAAC225E   Query cannot be parsed; host variables matched to columns are not allowed

Explanation: The use of the host variable name syntax `:=tbcreator.tbname.colname` to automatically create a host variable suitable for use with the named database column is only supported when Program Generator is able to parse the input SQL statement. This error indicates an unexpected internal parsing error in Program Generator.

RAAC226E   Data set allocation error

Explanation: An error occurred while allocating the specified data set. Additional TSO messages written to the terminal should contain more information about the cause of the error.

RAAC227I   Data set allocated

Explanation: The specified data set has been allocated.

RAAC228E   Space units must be "C" (cylinders), "T" (tracks), or "B" (blocks)

Explanation: You must select the units in which the primary and secondary space allocation for the data set will be expressed.

RAAC229E   Primary space quantity must be a positive integer

Explanation: You must enter a valid number greater than zero for the primary space quantity.

RAAC230E   Directory blocks must be a positive integer, zero, or LIB

Explanation: You must enter a valid number greater than or equal to zero for the number of directory blocks or LIB. Entering a zero will result in the allocation of a sequential data set. Entering a value greater than zero will result in the allocation of a partitioned data set (PDS). Entering LIB will result in the allocation of a partitioned data set extended (PDSE).

RAAC231E   Block size must be a positive integer

Explanation: You must enter a valid number greater than zero for the block size.

RAAC232I   Data set not allocated; Cancel request honored

Explanation: The data set has not been allocated.

RAAC233E   Secondary space quantity must be a positive integer or zero

Explanation: You must enter a valid number greater than or equal to zero for the secondary space quantity.

RAAC234E   Directory blocks must be a positive integer or LIB

Explanation: You must enter a valid number greater than zero for the number of directory blocks. Enter LIB to allocate a partitioned data set extended (PDSE).

RAAC235I   Host variable values accepted; Press Enter to continue

Explanation: The values that you entered on the Enter Host Variable Values pop-up window have been saved. Press Enter to continue generating the JCL.

RAAC236E   Data set must have DSORG = PO

Explanation: You must specify the name of a partitioned data set.

RAAC237E   Member name cannot be specified without data set name

Explanation: In order to specify a member name in this field, you must also specify a data set name in the preceding field.

RAAC238E   * flag must be "N" with stored procedure program

Explanation: The specified option is not allowed with stored procedure programs.

RAAC239I   CREATE PROCEDURE statement executed successfully

Explanation: The generated CREATE PROCEDURE statement was executed successfully, creating the stored procedure definition in the database. Note that the stored procedure cannot be called until the program is compiled and the resulting load module placed in the appropriate load library for the desired WLM address space.

RAAC300E   Invalid header record in exported form

Explanation: The exported QMF form object is corrupted.

RAAC301E   Exported form has warnings or errors

Explanation: The specified form data set contains a form that has QMF warnings or errors. To determine what the warnings or errors are, display the form in QMF, and enter the CHECK command.

RAAC302E   Exported form is incomplete

RAAC303E   Invalid record type * at record * of *

RAAC304E   Unexpected T record at record * of *

RAAC305E   Invalid T record at record * of *

RAAC306E   Unexpected V record at record * of *

RAAC307E   Invalid V record at record * of *

RAAC308E   Unexpected R record at record * of *

RAAC309E   Error reading column info at record * of *

RAAC310E   Invalid form value at record * of *

RAAC311E   Invalid BREAK usage code at record * of *

Explanation: The specified form data set does not contain a valid QMF form.

RAAC312E   Environment must be "B" (batch) or "T" (TSO) for user edit codes

Explanation: Program Generator does not support user edit routines (Uxxxx and Vxxxx) with CICS programs.

RAAC313E   HPO/Runtime must be "Y" (yes) for * usage code

Explanation: Program Generator does not support the ACROSS and CALC usage codes with standalone programs.

RAAC314E   Invalid form variable at record * of *

Explanation: The specified form data set does not contain a valid QMF form.

RAAC315E   Host variables not supported in form text

Explanation: You attempted to replace a substitution variable with a host variable. However, that variable is used in the form. All substitution variables in form text must be replaced with literals when generating a program that uses the HPO/Runtime feature.

RAAC316E   Unsupported use of form detail variation

Explanation: The exported form contains form detail variation, which Program Generator does not support.

RAAC317E   Environment must be "B" (batch) or "T" (TSO) for * usage code

Explanation: Program Generator does not support the xPCT usage codes with CICS programs.

RAAC318E   Diag Parameters must be "1" (none), "2" (error message), or "3" (error and SQL messages)

Explanation: You must specify what additional output parameters (if any) should be generated in the stored procedure program. If you enter 1, no such parameters are generated. If you enter 2, one additional output parameter (named ERROR_MESSAGE) is added to the generated program to receive a single line of error message text if any error occurs. If you enter 3, an additional output parameter (named SQL_ERROR_MESSAGE) is added to the generated program to receive detailed SQL error message text if any SQL error occurs.

RAAC400E   Unexpected SQL parsing error

Explanation: An error occurred while parsing the query. One possible cause (of many) for this is that substitution variables in the query have not been replaced with values. Make sure that all variables have been replaced by constants, literals, or host variables (with data types).

RAAC403E   SQL parsing error: token too long

Explanation: A token which exceeds the maximum token length was found while parsing the query.

RAAC405E   SQL parsing error: invalid SQL object name

RAAC406E   SQL parsing error: SQL object name too long

RAAC407E   SQL parsing error: "*" invalid as SQL object name

Explanation: An invalid name was found while parsing the query.

RAAC408E   SQL parsing error: invalid hexadecimal string constant

Explanation: An invalid hexadecimal string constant (e.g., x'40F') was found while parsing the query.

RAAC410E   Security must be "D" (DB2), "U" (User), or "F" (Definer)

Explanation: You must specify how the stored procedure will interact with any security resources

---

outside of Db2. If you enter D, such interaction is performed in the context of the authorization ID associated with the address space in which the stored procedure is running. If you enter U, such interaction is performed in the context of the authorization ID invoking the stored procedure. If you enter D, such interaction is performed in the context of the authorization ID that executed the CREATE PROCEDURE statement for the stored procedure.

RAAC411E   Special Registers must be "I" (Inherit) or "D" (Default)

Explanation: You must specify how special register values are initialized when the stored procedure executes. If you enter I, the values of special registers are inherited from the environment in which the stored procedure executes. If you enter D, the values of special registers are initialized to default values.

RAAC412E   SQL parsing error: invalid lexical token

Explanation: Invalid characters were found while parsing the query.

RAAC413E   Program in row * with * must be generated first

Explanation: The query refers to a table that does not exist. Either there is a preceding query in the procedure that performs a CREATE TABLE for the nonexistent table, or there is a preceding SAVE DATA command that creates the nonexistent table. In either case, you must generate the program that performs the CREATE TABLE or SAVE DATA before you can generate this program.

RAAC414E   ASU Time Limit must be numeric

Explanation: The ASU time limit that you specify for the stored procedure must be numeric. If you enter 0, no limit is applied.

RAAC415E   Bind type must be "1" (package) or "3" (no bind) with stored procedure program

Explanation: Stored procedure programs use only packages, not plans. Consequently, you must enter 1 to bind a package for the program, or 3 to skip the bind at this time.

RAAC417E   SQL parsing error: expected *

Explanation: An error occurred while parsing a query that contains a UNION clause. An invalid token was found when expecting the type of token specified in the message.

RAAC420E   SQL parsing error: the number of columns specified in the correlation clause does not match the number of columns in the table

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC421E   SQL parsing error: the column * was found in more than one table

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC422E   SQL parsing error: the FETCH FIRST n ROWS clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC423E   SQL parsing error: the FOR FETCH ONLY clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC424E   SQL parsing error: the FOR UPDATE clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC425E   SQL parsing error: the QUERYNO clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this

is indicative of an unexpected internal parsing error in Program Generator.

RAAC426E   SQL parsing error: the WITH clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC427E   SQL parsing error: the WITH HOLD clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC428E   SQL parsing error: the WITH RETURN clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC429E   SQL parsing error: the OPTIMIZE FOR clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC430E   SQL parsing error: no function by the name * having compatible arguments was found in the function path

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC431E   SQL parsing error: the FOR UPDATE and ORDER BY clauses were both specified

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF)

---

or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC432E   SQL parsing error: an internal error occurred at line *

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC433E   SQL parsing error: invalid parameters to arithmetic operator

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC434E   SQL parsing error: * is an unrecognized data type

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC435E   SQL parsing error: invalid parameters to CONCAT operator

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC436E   SQL parsing error: incompatible types in expression list

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC437E   SQL parsing error: invalid identifier *

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this

is indicative of an unexpected internal parsing error in Program Generator.

RAAC438E   SQL parsing error: invalid scalar function parameter

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC439E   SQL parsing error: invalid use of parameter markers

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC440E   SQL parsing error: invalid use of "*"

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC441E   SQL parsing error: an invalid lexical token was found beginning at "*"

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC442E   SQL parsing error: labeled duration missing value

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC443E   SQL parsing error: no SELECT clause was found

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC444E   SQL parsing error: no subselect was found in a full select

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC445E   SQL parsing error: parameter markers used on both sides of operator

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC446E   SQL parsing error: column * was not found in any table

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC447E   SQL parsing error: the token * is unexpected; expected tokens may include: *

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC448E   SQL parsing error: the token is unexpected; expected tokens may include: *

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC449E   SQL parsing error: a column in the ORDER BY clause was not found in any table

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this

is indicative of an unexpected internal parsing error in Program Generator.

RAAC450E   SQL parsing error: table locators are not supported

Explanation: An error has occurred while parsing the input query. The use of table locators was encountered, which is not supported by Program Generator.

RAAC451E   SQL parsing error: three-part table names are not supported

Explanation: An error has occurred while parsing the input query. The use of three-part table names was encountered, which is not supported by Program Generator.

RAAC452E   SQL parsing error: row value expression invalid in the current context

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC453E   SQL parsing error: the FOR UPDATE and FOR FETCH ONLY clauses were both specified

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC454E   SQL parsing error: transition tables are unsupported

Explanation: An error has occurred while parsing the input query. The use of transition tables was encountered, which is not supported by Program Generator.

RAAC455E   SQL parsing error: unrecognized statement type

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC457E   Host variable exit * return code = *

Explanation: The user-specified host variable exit specified on the Set Default Parameters panel returned a non-zero return code. Investigate this exit CLIST to determine the cause of the error.

RAAC458E   Unable to map host variables due to previous query parsing error

Explanation: A host variable exit was specified on the Set Default Parameters panel to customize the declaration and use of host variables in the generated program. However, Program Generator encountered an error while parsing the input query, and as a result, cannot apply the exit.

RAAC459E   Column exit * return code *

Explanation: The user-specified column exit specified on the Set Default Parameters panel returned a non-zero return code. Investigate this exit CLIST to determine the cause of the error.

RAAC460E   Unable to map column names due to previous query parsing error

Explanation: A column exit was specified on the Set Default Parameters panel to customize the appearance of column names in the generated program. However, Program Generator encountered an error while parsing the input query, and as a result, cannot apply the exit.

RAAC461E   Table exit * return code *

Explanation: The user-specified table exit specified on the Set Default Parameters panel returned a non-zero return code. Investigate this exit CLIST to determine the cause of the error.

RAAC462E   Exit module * could not be loaded

Explanation: The executable exit module with the specified name could not be loaded. Program Generator searches for this member in the following locations:

- RAALLIB DD (if allocated)
- ISPLUSR DD (if allocated and LIBDEF for ISPLLIB activated)
- LIBDEF for ISPLLIB (if active)
- ISPLLIB DD (if allocated)
- system libraries (LINKLIST and LPA)

Verify that the correct module name was entered on the Set Default Parameters panel and that a module with that name exists in one of the locations.

RAAC463E   SQL parsing error: SQL code *

Explanation: An SQL error identified by the specified SQL code has occurred while parsing the input query and retrieving information about one of the tables referenced by the query. Verify that the correct table is referenced by the query, that the table exists, and that you have authority to read from it, and try the operation again.

RAAC464E   SQL parsing error: the ON ROLLBACK RETAIN CURSORS clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC465E   SQL parsing error: the ON ROLLBACK RETAIN LOCKS clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC466E   SQL parsing error: an integer in the ORDER BY clause * does not identify a column of the result

Explanation: You exported a wrong QMF query or made a misprint when you edited the exported SQL query.

RAAC500E   Error preparing SQL statement; SQLCODE = *

Explanation: The query contains an SQL error, indicated by SQLCODE. Enter the HELP command to obtain more information about the error.

RAAC501E   Error describing SQL statement; SQLCODE = *

Explanation: The query contains an SQL error, indicated by SQLCODE. Enter the HELP command to obtain more information about the error.

RAAC502E   SQL statement not SELECT; Form not allowed

Explanation: You may not specify a form for this query because it is not a SELECT query.

RAAC503E   SQL statement too long

Explanation: The query exceeds the maximum length for SQL statements.

RAAC504E   Invalid column count after DESCRIBE

Explanation: An unexpected Db2 error occurred. This is usually indicative of an unrecoverable error.

RAAC505E   Number of columns in form inconsistent with query

Explanation: The number of columns in the SELECT clause of the query must exactly match the number of columns referred to in the form. This message is also produced if you specify a form that makes use of column definitions.

RAAC506E   Unrecognized column type * from DESCRIBE

Explanation: An unexpected column type was received from Db2.

RAAC507E   Error executing SQL statement; SQLCODE = *

Explanation: An error occurred while executed the specified SQL statement(s). Press F1 to see more detailed SQL error message text.

RAAC600E   Invalid control statement at line * of *

Explanation: The skeleton code data set contains an invalid control code. Verify that the installation process was successful and complete.

RAAC601E   Too many)IF's at line * of *

Explanation: The nesting of)IF's in the skeleton code data set is too great. The maximum nesting level is 10.

RAAC602E   Unexpected)ELSEIF at line * of *

Explanation: An)ELSEIF was found in the skeleton code data set without a preceding)IF.

RAAC603E   Unexpected)ELSE at line * of *

Explanation: An)ELSE was found in the skeleton code data set without a preceding)IF.

RAAC604E   Unexpected)ENDIF at line * of *

Explanation: An)ENDIF was found in the skeleton code data set without a preceding)IF.

RAAC605E   Unexpected EOF in *

Explanation: The end of the skeleton code data set was reached while processing was still within an)IF or)LOOP.

RAAC606E   Specified LRECL is too small; Must be at least *

Explanation: When reading data from or writing data to a sequential file, the LRECL of the DATAIN or DATAOUT DD must be at least as large as the total length of the columns in the SELECT clause and their associated null indicators.

RAAC607E   Illegal nested)COPY at line * of *

Explanation: The skeleton code data set contains an invalid construct. Verify that the installation process was successful and complete.

RAAC608E   Loop too long at line * of *

RAAC609E   Illegal nested loop at line * of *

Explanation: The skeleton code data set contains an invalid construct. Verify that the installation process was successful and complete.

RAAC610E   Unexpected)ENDLOOP at line * of *

Explanation: An)ENDLOOP was found in the skeleton code data set without a preceding)LOOP.

RAAC611E   Unterminated)IF in loop at line * of *

Explanation: An)ENDLOOP was found in the skeleton code data set without an)ENDIF to terminate an)IF within the loop.

RAAC612E   Unrecognized)COPY target at line * of *

Explanation: The skeleton code data set contains an invalid construct. Verify that the installation process was successful and complete.

RAAC613E   * flag must be "N" (no) with parameter style "G" (GENERAL) or "N" (GENERAL WITH NULLS)

Explanation: The specified option is not supported with the GENERAL or GENERAL WITH NULLS parameter style.

RAAC614E   ASU time limit must be a positive integer, or 0 to specify no limit

Explanation: Enter the limit on processor time, in CPU service units, that a single invocation of the stored procedure can run. If you enter 0, no limit is applied.

RAAC616E   * cannot be left blank

Explanation: You must enter a value for the specified field.

RAAC618E   Parameter Style must be "D" (DB2SQL), "G" (GENERAL), or "N" (GENERAL WITH NULLS)

Explanation: You must specify how the stored procedure will receive input parameters. If you enter D, the DB2SQL parameter style will be used. If you enter G, the GENERAL parameter style will be used. If you enter N, the GENERAL WITH NULLS parameter style will be used. See the documentation for the Db2 product you are using for more information about stored procedure parameter styles.

RAAC619E   Program Type must be "M" (main) or "S" (subroutine)

Explanation: You must specify how the stored procedure will execute. Enter M to have the stored procedure execute as a main program or S to have it execute as a subroutine. See the documentation for the Db2 product you are using for more information about stored procedure program types.

RAAC700E   Program not registered; Cancel request honored

Explanation: The program was not registered due to your cancel command.

RAAC701E   Report owner cannot be left blank

Explanation: You must specify a report owner when creating a report.

RAAC702E   Report owner must be valid SQLID

Explanation: You must specify a valid primary or secondary SQLID for the owner of the report. You may also specify an owner of the form T=**tranid** where **tranid** is a valid CICS transaction identifier.

RAAC703E   Report name cannot be left blank

Explanation: You must specify a report name when creating a report.

RAAC704E   Program must be generated before it can be registered

Explanation: You cannot register a program until you generate it.

RAAC705I   Program has been registered

Explanation: T he program has been registered by creating a row in the Q.REPORTS table and (optionally) rows in the Q.REPORT_VARIABLES table. You can now run the program from the End User Facility.

RAAC706E   Invalid SQLID

Explanation: You must enter a valid primary or secondary SQLID.

RAAC707E   Please select one of the actions listed below

Explanation: Choose one of the selection options listed on this panel.

RAAC709E   No matching report(s)

Explanation: No reports matching the specified owner and name were found in the database.

RAAC710E   Report already exists

Explanation: A report with the specified owner and name already exists in the database. Specify a different owner or name.

RAAC711I   Report not created; Cancel request honored

Explanation: The report was not created due to your cancel command.

RAAC712I   Report not updated; Cancel request honored

Explanation: The report was not updated due to your cancel command.

RAAC713E   Field must be "YES" or "NO"

Explanation: The only acceptable values for this field are yes or no.

RAAC714E   Program name cannot be left blank

Explanation: You must specify a program name for the report.

RAAC716E   Environment must be "B", "BATCH", "T", "TSO", "C", or "CICS"

Explanation: You can specify either batch, TSO or CICS as the environment for the report. Choose the one desired for this registration.

RAAC717E   Attachment facility must be "T", "TSO", "C", "CAF", "R", or "RRSAF"

Explanation: You can specify TSO (the TSO attachment facility), CAF (the call attachment facility), or RRSAF (the Recoverable Resource Manager Services attachment facility) as the attachment facility for this report. Choose the one desired for this registration. This field is ignored for CICS programs, which always connect to Db2 via the CICS attachment facility.

RAAC718E   Invalid LRECL value

Explanation: You must enter an integer greater than or equal to -1 (greater than or equal to zero when specifying the LRECL of the report's host variable file).

RAAC719E   Invalid character in report name

Explanation: Report names may not contain spaces.

RAAC720I   Report not dropped; Cancel request honored

Explanation: The report was not dropped due to your cancel command.

RAAC721E   Unrecognized line command

Explanation: Legal line commands when editing host variables are D (delete), I (insert), and R (repeat). Each may be followed by a number specifying a repetition factor.

RAAC722E   Variable name cannot be left blank

Explanation: You must specify a name for each of the report's variables.

RAAC723E   Variable type cannot be left blank

Explanation: You must specify a data type for each of the report's variables.

RAAC724I   Report created

Explanation: The specified report was created in the database.

RAAC725I   Report dropped

Explanation: The specified report was dropped from the database.

RAAC726I   Report updated

Explanation: The specified report was updated in the database.

RAAC727E   Program type must be "P" (print), "N" (no report), or "L" (data layer) with batch program

Explanation: Batch programs must either print a report or present no report, or must be a data layer program.

RAAC728E   Program type must be "P" (print), "D" (display), or "N" (no report) with TSO program

Explanation: TSO programs must either print a report, display a report, or do neither.

RAAC729E   Program type must be "P" (print), "D" (display), or "N" (no report) with CICS program

Explanation: CICS programs must either print a report or display a report.

RAAC730E   Program * is online print program

Explanation: The program specified is an online print program and therefore cannot be invoked directly from a procedure program.

RAAC731E   SQL type must be "S" (static) or "D" (dynamic)

Explanation: You can generate programs that use either static or dynamic SQL. Select the type desired for this generation.

RAAC732E   Invalid transaction identifier

Explanation: A CICS transaction identifier must be no more than four characters long.

RAAC733E   Field must be left blank when dialect is "QMF"

Explanation: You cannot enter a value in this field when registering a QMF report.

RAAC734E   Environment must be "TSO" when dialect is "QMF"

Explanation: You must set environment to TSO when registering a QMF report. The End User Facility does not support QMF reports in CICS or in batch.

RAAC735E   Invalid variable name

Explanation: The variable name that you entered for the report is invalid. Variable names cannot contain the colon (:) or ampersand (&) characters.

RAAC736E   EXEC library must be a PDS

Explanation: You must enter the name of a partitioned data set for the EXEC library.

RAAC737E   Program/plan name cannot be left blank

Explanation: You must specify a name for this program/plan.

RAAC738E   Program/plan name has invalid syntax

Explanation: The name you specified cannot be used as a program/plan name.

RAAC739I   Processing report list row *

Explanation: Program Generator is now processing the report list row identified in the message text.

RAAC740I   Specify batch job information for *

Explanation: You must specify job cards and other JCL information to generate JCL to either compile or run a program.

RAAC741I   Options not saved; Cancel request honored

Explanation: Any changes that you made to the options in the current pop-up window have been discarded.

RAAC743E   CAF module usage must be "H" (HPO CAF) or "D" (DB2 CAF)

Explanation: Enter H to generate a program which uses the HPO call attachment module (AACAF), or D to generate a program which uses the Db2 call attachment module (DSNALI).

RAAC744E   Report width must be between 22 and 999, inclusive

Explanation: Enter the page width (from 22 to 999) to use when generating the report.

RAAC745E   Report length must be "CONT" or between 1 and 999, inclusive

Explanation: Enter the page length (from 1 to 999, or CONT) to use when generating the report. Entering CONT specifies that the report should be generated without any page breaks.

RAAC746E   LRECL must be a positive integer

Explanation: You must enter a positive integer.

RAAC747E   Registration of QMF reports only supported with QMF 3.1 and higher

Explanation: You can only register a report that runs a QMF query or procedure if you are running QMF Version 3 Release 1 or higher.

RAAC748E   Program type must be "N" (no report) or "L" (data layer) for batch program with non-SELECT query

Explanation: When generating a batch program from a query that does not use the SQL verb SELECT, you must specify that the program produces no report or is a data layer program.

RAAC749E   Program type must be "N" (no report) for TSO or CICS program with non-SELECT query

Explanation: When generating a TSO or CICS program from a query that does not use the SQL verb SELECT, you must specify that the program produces no report.

RAAC750E   Program * is a data layer program

Explanation: The specified program is a data layer program, and as such, cannot be called by a procedure program.

RAAC751E   Number of report files must be an integer greater than or equal to -1

Explanation: Enter the number of REPORTnn DDs written by the report, or -1 if unknown or not applicable.

RAAC752E   Program type must be "P" (print), "D" (display), "N" (no report), "L" (data layer), or "R" (proc)

Explanation: Enter the type of program.

RAAC753E   Program type must be "P" (print) or "D" (display) when dialect is "QMF"

Explanation: QMF reports must be either print or display programs.

RAAC754I   * options apply only to stored procedure programs

Explanation: The specified type of options do not apply unless generating stored procedure programs. As

a result, the display of the options pop-up window has been suppressed.

RAAC755E   Program Type must be "P" (print) or "N" (no report) with stored procedure programs

Explanation: When generating a stored procedure program, you must specify that the program produces print or no report.

RAAC756E   * flag must be "N" (no) with stored procedure program

Explanation: The specified option is not allowed with stored procedure programs.

RAAC757I   * options apply only to stored procedure programs

Explanation: The specified type of options do not apply unless generating stored procedure programs. As a result, the display of the options pop-up window has been suppressed.

RAAC758E   Attachment Facility must be "R" (RRSAF) with stored procedure program

Explanation: Program Generator only supports stored procedures that run in a WLM-managed address space. Db2 requires that WLM stored procedures use the RRS attachment facility. You must enter R to select RRSAF.

RAAC759E   Action must be "R" (replace) or "A" (append) with stored procedure program

Explanation: Stored procedure programs do not have the capability to prompt the user for the action to take when saving data. As a result, you must enter R to replace any existing data or A to append to any existing data.

RAAC760I   TDL edit code is not supported, replaced with TDY. Press ENTER to continue ...

Explanation: The exported QMF form contains unsupported TDL edit code.

RAAC761I   TTL edit code is not supported, replaced with TTS. Press ENTER to continue ...

Explanation: The exported QMF form contains unsupported TDL edit code.

RAAC762E Number of Rows is a numeric value between 1 and 32760

Explanation: You entered a wrong value for the field Number of Rows on Db2 Generation Options panel.

RAAC764E Number of Rows is restricted with the RAM size 4M. This is enough for implementation of the multi-row advantages

Explanation: The value for the field Number of Rows on Db2 Generation Options panel that you entered is too big.

RAAC765E Calculations with data type DECFLOAT are not supported

Explanation: The exported QMF query contains DECFLOAT type columns or values that are not supported in the current version.

RAAC766E Report options are not allowed for Program Type "No Report"

Explanation: You tried to select "Report Options" on the General Options panel for Program Type "No report". Report Options selection was ignored.

RAAC767E DD name should not be empty

Explanation: You specified an empty value for the field Report DD Prefix on Report Generation Options panel.

RAAC768E Return Report Result Set and Print Report options have admissible combinations: NY, YN, YY. NN is disallowed

Explanation: You tried to set the Return Report Result Set and Print Report fields to "No" on Stored Procedure Generation Options panel for Stored Procedure Environment and Program Type "Print". Select a proper combination.

RAAC772E Only one SELECT statement allowed for multi-statement query

Explanation: You cannot specify two or more SELECT statements for multi-statement query.

RAAC773E Stored Procedure Environment is not allowed for a QMF procedure

Explanation: Stored Procedure Program can be generated only for a QMF query, but not for a QMF procedure.

RAAC774E Incorrect value for ACTION at line * of *

Explanation: Verify the specified procedure data set.

Make sure that variable value for ACTION option is either 'APPEND' or 'REPLACE' for procedure commands such as RUN QUERY and SAVE DATA.

RAAC775E Cannot use FORM with TABLE at line * of *

Explanation: Verify the specified procedure data set.

Make sure that keyword parameters FORM and TABLE cannot be specified at the same time. They are mutually exclusive when used in procedure command RUN QUERY.

RAAC776E Cannot use FORM with ACTION at line * of *

Explanation: Verify the specified procedure data set.

Make sure that keyword parameters FORM and ACTION cannot be specified at the same time. They are mutually exclusive when used in procedure command RUN QUERY. ACTION option goes with TABLE option.

RAAC777E Cannot use FORM with COMMENT at line * of *

Explanation: Verify the specified procedure data set.

Make sure that keyword parameters FORM and COMMENT cannot be specified at the same time. They are mutually exclusive when used in procedure command RUN QUERY. COMMENT option goes with TABLE option.

RAAC778E Cannot use FORM with SPACE at line * of *

Explanation: Verify the specified procedure data set.

Make sure that keyword parameters FORM and SPACE cannot be specified at the same time. They are mutually exclusive when used in procedure command RUN QUERY. SPACE option goes with TABLE option.

RAAC779E ACTION can only be used with TABLE at line * of *

Explanation: Verify the specified procedure data set.

Make sure that keyword parameter ACTION can only be specified if keyword parameter TABLE is also specified. They go along with each other when used in procedure command RUN QUERY. ACTION option goes with TABLE option.

RAAC780E COMMENT can only be used with TABLE at line * of *

Explanation: Verify the specified procedure data set.

Make sure that keyword parameter COMMENT can only be specified if keyword parameter TABLE is also specified. They go along with each other when used in procedure command RUN QUERY. COMMENT option goes with TABLE option.

RAAC781E SPACE can only be used with TABLE at line * of *

Explanation: Verify the specified procedure data set.

Make sure that keyword parameter SPACE can only be specified if keyword parameter TABLE is also specified. They go along with each other when used in procedure command RUN QUERY. SPACE option goes with TABLE option.

RAAG messages

Messages that begin with RAAG are issued from the HPO/Governor module. These messages appear on the message line on QMF panels and may also appear in the user's DSQDEBUG data set or RAADEBUG data set.

RAAG000I HPO prompt dialog begin (ID=*)

Explanation: This message marks the beginning of a dialog with the HPO/Governor module.

RAAG001E Error issuing asynchronous timer

Explanation: A system error occurred while issuing the asynchronous timer. This is usually an unrecoverable error.

RAAG002E * rows have been fetched; Authorized limit exceeded

Explanation: This message will appear if a resource violation is related to excess row fetches. Your current QMF command will be canceled and this message will appear on the message line. This message may optionally be logged to your DSQDEBUG data set and your RAADEBUG data set. If your site has enabled the HPO/Governor module help panel, you can get more information by entering the HELP command.

RAAG003E CPU time exceeds authorized limit

Explanation: This message will appear if a resource violation is related to excess CPU time consumption. Your current QMF command will be canceled and this message will appear on the message line. This message may optionally be logged to your DSQDEBUG data set and your RAADEBUG data set. If your site has enabled the HPO/Governor module help panel, you can get more information by entering the HELP command.

RAAG004E Not authorized to begin QMF session at this time

Explanation: Your ID is not authorized to invoke QMF at this time. This message will not appear on any QMF panel but will be logged to your DSQDEBUG data set and your RAADEBUG data set.

RAAG005E Not authorized to process this SQL verb: *

Explanation: Your ID is not authorized to process SQL statements containing the specified verb. Your QMF administrator can selectively enable or disable certain SQL verbs for your session. This message may optionally be logged to your DSQDEBUG data set and your RAADEBUG data set. If your site has enabled the HPO/Governor module help panel, you can get more information by entering the HELP command.

RAAG006E Not authorized to process this QMF command:

Explanation: Your ID is not authorized to process QMF commands containing the specified verb. Your QMF administrator can selectively enable or disable certain QMF commands for your session. This message may optionally be logged to your DSQDEBUG data set and your RAADEBUG data set. If your site has enabled the HPO/Governor module help panel, you can get more information by entering the HELP command.

RAAG007I This QMF command has already run for * CPU seconds

Explanation: This message will appear during a prompt dialog if the resource violation is related to excess CPU time consumption. It tells you the amount of CPU time that has already been consumed by your current QMF command.

RAAG008I This QMF command has already fetched * rows

Explanation: This message will appear during the prompt dialog if the resource violation is related to excess row fetches. It tells you the number of rows that have already been fetched by your current QMF command.

RAAG009I Valid prompt dialog responses are:

Explanation:

1. Press ENTER to continue processing

2. Type CANCEL and press ENTER to cancel command

3. Type NOPROMPT and press ENTER to continue without prompts

RAAG010I   Enter your response now ===>

Explanation: You must select one of the listed responses during the prompt dialog. If you determine that the current command should not be allowed to run to completion and should now be canceled, enter CANCEL. If you determine that the command should be allowed to continue processing, simply press Enter. If you want the command to run to completion without any more prompts, enter NOPROMPT. Any other response will cause this message to be redisplayed.

RAAG011I   Response accepted; Processing will continue

Explanation: QMF will continue to process the command.

RAAG012I   Response accepted; Will try to cancel command

Explanation: QMF will attempt to cancel your command. QMF cannot always successfully cancel a command.

RAAG013E   Your response * is not valid

Explanation: This message indicates that the response you entered previously is invalid. Refer to the description of message RAAG009I for more information.

RAAG014I   Response accepted; Continuing without prompts

Explanation: QMF will continue processing your command without further interruptions from the prompt dialog.

RAAG015E   Query canceled by Query Analyzer

Explanation: Query Analyzer has canceled your query. This can happen at your request or as determined by your administrator. This message may optionally be logged to your DSQDEBUG data set and your RAADEBUG data set. If your site has enabled the HPO/Governor module help panel, you can get more information by entering the HELP command.

RAAG017E   QMF command canceled

Explanation: Your QMF command canceled due to an unknown resource violation. This message may optionally be logged to your DSQDEBUG data set and your RAADEBUG data set. If your site has enabled the

HPO/Governor module help panel, you can get more information by entering the HELP command.

RAAG018E   Not authorized to use QMF at this time; Please end session

Explanation: Your ID is not authorized to continue using QMF at this time. You should end your session immediately. No further commands will be processed successfully.

RAAG019E   Query canceled by Monitor

Explanation: Your query has been canceled by a command from the Monitor online facility.

RAAG020E   Error issuing asynchronous timer

Explanation: A system error occurred while issuing the asynchronous timer.

RAAG021E   Error issuing prompt dialog

Explanation: A system error occurred while issuing the prompt dialog.

RAAG025I   * rows fetched; No more fetches allowed without confirmation

Explanation: The HPO/Governor module has detected that your command has fetched more rows than your authorized limit. You are able to view all of the rows that have already been fetched, but no more fetches will be allowed for this query. If the message text includes "without confirmation", then additional fetches will be allowed, but only after prompting you for confirmation.

RAAG025I   * rows fetched; No more fetches allowed without confirmation

Explanation: The HPO/Governor module has detected that your command has fetched more rows than your authorized limit. You are able to view all of the rows that have already been fetched, but no more fetches will be allowed for this query. If the message text includes "without confirmation", then additional fetches will be allowed, but only after prompting you for confirmation.

RAAG026I   No limits found for resource group *

Explanation: The RLIMITS command was issued, however there is no current resource group schedule defined for the current date, day, and time in the specified resource group.

RAAG027I   **The maximum allowable CPU limit is ***

Explanation: As part of the governor prompt, this message indicates the current CPU limit in effect for the QMF session.

RAAG028I   **The maximum allowable row limit is ***

Explanation: As part of the governor prompt, this message indicates the current row limit in effect for the QMF session.

RAAG029I   **Current resource limits shown**

Explanation: The RLIMITS command has been successfully executed.

RAAG030I   ***** **rows fetched; Query Analyzer row limit exceeded**

Explanation: The row limit that you specified on the query analysis panel for this query has been exceeded. No more rows will be fetched.

RAAG998I   **QMF HPO activity log disabled for user *, reason *, subsystem ***

Explanation: This message will appear in the system log and indicates that a severe error was encountered while attempting to allocate, open, or write to one of the HPO Activity Log data sets. Check the reason code and Db2 subsystem ID.

RAAG999I   **HPO prompt dialog end**

Explanation: This message signals the end of a dialog with the HPO/Governor module. Press Enter to return to your QMF session.

RAAM messages

Messages that begin with RAAM are issued from the Monitor online facility and appear on the message line on ISPF panels.

RAAM001E   **Please select one of the options listed below**

Explanation: Choose one of the selection options listed on this panel.

RAAM002E   **DB2 subsystem ID cannot be left blank**

Explanation: You must enter a valid Db2 subsystem ID. Monitor will display activity from QMF sessions running under this subsystem.

RAAM003E   **DB2 subsystem * not configured**

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the specified Db2 subsystem.

RAAM004I   **Default values not saved; Cancel request honored**

Explanation: Any changes that you made to the default parameter settings have been discarded.

RAAM005I   **Default values will be saved**

Explanation: Any changes that you made to the default parameter settings will be saved in your ISPF profile.

RAAM007E   **Value must be between 00 and 24, inclusive**

Explanation: This value indicates the number of preceding hours for which to display QMF activity. It is

only used if you have specified (via the values of the preceding fields) that activity is to be shown relative to the current date and time.

RAAM008E   **Specified command not defined**

Explanation: The command that you entered on the command line is not valid.

RAAM009E   **Specified command requires an argument**

Explanation: The command that you entered on the command line requires an argument. Retry the command with proper arguments.

RAAM010E   **Specified entry not found**

Explanation: The entry specified in the command could not be found in the selection list. Verify that the argument is valid and try again.

RAAM011I   **No entries were selected**

Explanation: No entries were selected when you pressed Enter without specifying a command on the command line. The QMF session activity data you are viewing cannot be updated.

RAAM012E   **Invalid selection code; Use "B"**

Explanation: You entered an invalid selection code; use only B for browse.

RAAM013E   **Invalid date specified; Use**

YYYYMMDD format

Explanation: The format of the date that you entered is incorrect. Specify a date in the format required (for example, 19940101), or enter TODAY (for the current date).

RAAM014I   Cancel request accepted for this QMF action

Explanation: Your cancel request was accepted and passed on to the HPO/Governor module. The command may or may not be canceled, depending on the current activity within QMF. Only QMF activity involving Db2 fetches may be successfully canceled from here.

RAAM015I   No SQL text available for this entry

Explanation: You requested to browse SQL text, but no SQL text is available for this entry. The SQL column must contain a value of Y for this entry to be eligible for SQL text browsing.

RAAM016E   Cannot cancel action; Session already terminated

Explanation: You cannot cancel QMF activity if the QMF session has already terminated.

RAAM017E   Invalid selection code; Use "B" or "C"

Explanation: You entered an invalid selection code. Use only B for browse or C for cancel.

RAAM018I   Monitor data refreshed

Explanation: You pressed Enter without specifying a command on the command line. The QMF session activity data that you are viewing has been updated.

RAAM019E   Invalid time specified; Use HHMMSS format

Explanation: The format of the time that you entered is incorrect. Specify a time in the format required (for example, 123000), or enter TODAY (for the current time).

RAAM020E   VSAM OPEN error; Return code=*, reason code=*

RAAM021E   VSAM GET error; Return code=*, reason code=*

RAAM022E   VSAM PUT error; Return code=*, reason code=*

Explanation: An error occurred while attempting to open, read from, or write to the Monitor VSAM file.

RAAM023E   Dynamic allocation error; Return code=*, reason code=*

Explanation: An error occurred while attempting to allocate the Monitor VSAM file. A common cause of this error is attempting to invoke the Monitor online facility while you have a QMF session active. In this case, the HPO/Governor module already has the Monitor VSAM file allocated. This may be the case if the return code is 4 and the reason code is 410.

RAAM024E   VSAM file name for Monitor not configured

Explanation: No name was specified for the Monitor VSAM file in the HPO configuration module for this Db2 subsystem. As a result, the Monitor online facility is inactive. To enable these facilities, you (or your administrator) must reconfigure this subsystem and specify a name for this VSAM file.

RAAM025E   No QMF activity found for user ID(s) specified

Explanation: There are no records available for display based on your selection criteria from the Set Default Parameters panel.

RAAM026E   No SQL text available for this entry

Explanation: You requested to browse SQL text, but no SQL text is available for this entry.

RAAM027E   Unable to cancel session; May have previously terminated

Explanation: The current QMF activity could not be canceled. The session may have already ended. Refresh the activity panel (by pressing Enter) to determine the current state of the session.

RAAM028E   Severe error; No user detail found

Explanation: A severe error was detected when attempting to display QMF user session detail activity.

RAAM029E   Unable to lock the Monitor VSAM file; Try again

Explanation: The Monitor VSAM file could not be locked for exclusive access, most likely because another user was writing to it. Repeat your action.

RAAM031E Parameter value must be "1" or "2" or "3" or "4"

Explanation: To reinitialize the entire Monitor VSAM File, set this parameter to 1. To delete all records except for today's, set this parameter to 2. To delete all records except for the last 7 days', set this parameter to 3. To delete all records except for the last 30 days', set this parameter to 4.

RAAM032E Not all job cards can be left blank

Explanation: You must fill in at least one of these fields for the job card. If only one line is required for the job card, use the first line.

RAAM033E Flag must be "E" (edit) or "S" (submit)

Explanation: To edit the JCL after it is generated, set this flag to E. To submit the JCL automatically after it is generated, set this flag to S. To bypass JCL generation and job submission, enter the END or CANCEL commands.

RAAM034E Error allocating skeleton data set

Explanation: An error occurred while trying to allocate QMFHPO.SRAASKEL to your session.

RAAM035E Error allocating temporary JCL file

Explanation: The generated JCL will reside in a temporary data set that is created automatically. An error occurred while creating the data set. Associated error messages may be written to the terminal.

RAAM036E Error invoking ISPF edit session

Explanation: An error occurred while editing the generated JCL. Check with your system administrator and make sure that you are authorized to create and allocate temporary data sets.

RAAM037E Not authorized to select this option

Explanation: Only system administrators are allowed to select this option

RAAM038E Error opening plan * (RC=*, REASON=*)

Explanation: Either of these messages may appear while connecting to the specified Db2 subsystem. Check the return code (RC) and reason code (REASON) in *Db2 Messages and Codes*. Also check that the Db2 subsystem ID that you entered is correct.

RAAM998I *

Explanation: This message will appear in the system log and indicates that a severe error was encountered while attempting to allocate, open, or write to the Monitor VSAM file. The message text will contain more specific information about the error.

RAAP messages

Messages that begin with RAAP are issued from the Manager online facility and appear on the message line on ISPF panels.

RAAP000I Some required QMF files are not allocated; Trying to continue...

Explanation: Certain QMF data sets are required to be allocated to your TSO session to run QMF. This message indicates that some of the required data sets are not allocated to your session. Although QMF may operate successfully, some functions require these data set allocations. See *Installing and Managing Db2 QMF for TSO/CICS* to determine the required data set allocations for QMF.

RAAP001E Select one of the valid actions listed below

Explanation: Review the list of supported actions at the bottom of this panel and select the desired action. If you leave this field blank, the LIST (L) action will be selected for you. If you want to exit this panel, enter the END command.

RAAP002E Value must be "Q" (DSQDEBUG), "R" (RAADEBUG), "B" (Both), "N" (None)

Explanation: To log QMF debug messages, specify the letter to direct the output to the appropriate files. Q will write to the standard QMF DSQDEBUG file, R will write to the RAADEBUG file, B will write to both of these files, and N disables QMF debug message logging.

RAAP003E Resource group cannot be left blank

Explanation: You must enter the name of a resource group to perform the desired action. You can use % or _ as wildcard characters in the name if you wish to obtain a list of available resource groups. For example, to list all resource groups that start with the letter R, enter R% in this field.

RAAP004E Resource group not found in database

Explanation: The resource group specified does not exist in the database. Check for incorrect entry. Also, this resource group may have been dropped or may not contain any HPO resource options.

RAAP005E Wildcard characters are not allowed with specified action

Explanation: This action does not support multiple entries. You must specify a unique entry without any wildcard characters (% or _).

RAAP006I Archive was not performed; Cancel request honored

Explanation: The error log entry was not archived due to your cancel command.

RAAP007I Archive was performed successfully

Explanation: The error log entry was removed from the database and written to the error log archive data set.

RAAP008I Delete was not performed; Cancel request honored

Explanation: The selected item was not deleted due to your cancel command.

RAAP009I Delete was performed successfully

Explanation: The selected item was successfully removed from the database.

RAAP010E Select one and only one row for processing

Explanation: You can only assign one resource group to this user profile.

RAAP011E Select one of the valid actions listed on the panel

Explanation: Review the list of supported actions at the top of this panel and select the desired action. If you want to exit this panel, enter the END command.

RAAP012E Duplicate user profile rows found

Explanation: The QMF user profile table should contain unique rows. Check with your administrator to have the extra rows deleted.

RAAP013E Action must be either "A" (assign) or "U" (unassign)

Explanation: While processing assignments from this panel, you can either assign this resource group to a user profile or unassign this resource group from a user profile. Note that you cannot assign this resource group to a user profile that is already assigned to this resource group. You also cannot unassign a resource group from a user profile unless it is already assigned to this resource group.

RAAP014E Selection filter must be either "1" or "2"

Explanation: The selection filter is used to determine what profiles will be displayed on the next panel. A value of 1 will display all user profiles, including those that are and those that are not assigned to this resource group. A value of 2 will display only those user profiles that are already assigned to this resource group.

RAAP015I   **Resource group common controls have been saved in the database**

Explanation: The resource group, including the description and common options that you just entered, has been saved in the database.

RAAP016E   **SQL error was detected**

Explanation: An SQL error occurred while processing your action. More specific information is displayed as the error occurs.

RAAP017I   **Schedule * controls have been saved in the database**

Explanation: The resource group scheduled controls, including all limit values and options that you just entered, have been saved in the database.

RAAP018E   **Environment must be a valid QMF environment value or "-" (NULL)**

Explanation: Enter a valid value for environment. Enter a dash (-) to specify NULL. If you are building a selection list, use % to specify all environments.

RAAP019E   **Object(s) not dropped**

Explanation: An error occurred while dropping the objects that you selected. The objects were not dropped.

RAAP020E   **No qualifying error log entries found in database**

Explanation: No entries were found in the Q.ERROR_LOG table that matched your selection criteria. Check that you specified the correct date, time, and user.

RAAP021E   **No qualifying user profile found in database**

Explanation: No entries were found in the Q.PROFILES table that matched your selection criteria. Check that you entered the correct creator, translation, and environment.

RAAP022E   **Translation must be a valid QMF translation value or "*"**

Explanation: Enter a valid QMF translation value. Valid values are ENGLISH, UPPERCASE, FRANCAIS CANADIEN,DANSK, FRANCAIS, DEUTSCH, ITALIANO, NIHONGO, HANGEUL, PORTUGUES, ESPANOL, SVENSKA, FRANCAIS (SUISSE), and DEUTSCH (SCHWEIZ). If you enter *, the configuration default translation will be used.

RAAP023E   **Set asc/desc option to either "A" or "D"**

Explanation: You can list the error log entries in ascending or descending order. If you want to list the oldest error log entries first, enter a value of A for ascending (94/01/01 will display before 94/12/31). If you want to list the newest error log entries first, enter a value of D for descending (94/12/31 will display before 94/01/01).

RAAP024E   **Characters per line must be between 22 and 999 inclusive**

Explanation: The page width (the number of characters per line) that you specify must be within the QMF supported limits, which are 22 to 999, inclusive

---

RAAP025E   **Lines per page must be between 1 and 999 inclusive**

Explanation: The page length (the number of lines per page) that you specify must be within the QMF supported limits, which are 1 to 999, inclusive.

RAAP026E   **Please select one and only one "CASE" option**

RAAP027E   **Please select one and only one "DECIMAL" option**

RAAP029E   **Please select one and only one "TRACE" option**

RAAP030E   **Please select either YES or NO for "CONFIRM" option**

RAAP031E   **Please select either REL or ER for "MODEL" option**

Explanation: Select one and only one of the listed values.

RAAP032E   **User profile already exists; Cannot create a duplicate**

Explanation: You cannot create a user profile with the specified creator, translation, and environment. If you

want to change the attributes of an existing user profile, use the edit option.

RAAP033I   Action was terminated; Cancel request honored

Explanation: No action was processed due to your cancel command.

RAAP034I   * objects dropped; * objects not dropped

Explanation: Some of the objects that you selected were dropped; others were not, due to errors. Build a new selection list to determine which objects have not been dropped.

RAAP035E   DB2 subsystem * not configured

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the specified Db2 subsystem.

RAAP036E   No entries archived due to error

Explanation: The selected entries were not archived due to errors.

RAAP037E   No entries deleted due to error

Explanation: The selected entries were not deleted due to errors.

RAAP038E   Resource group already exists; Cannot create a duplicate

Explanation: You cannot create a resource with the specified name. If you want to make changes to an existing resource group, use the edit option.

RAAP039E   * entries archived; * entries not archived

Explanation: Some of the error log entries were archived; others were not, due to errors. Build a new selection list to determine which entries still exist.

RAAP040E   * entries deleted; * entries not deleted

Explanation: Some of the error log entries were deleted; others were not, due to errors. Build a new selection list to determine which entries still exist.

RAAP041E   Cannot unassign a profile that is not assigned to this resource grp

Explanation: You can only unassign a user profile if it is already assigned to this resource group.

RAAP042E   Cannot assign a profile that is already assigned

Explanation: This assignment already exists. To reassign a profile, first unassign it, then assign it.

RAAP043E   Creator cannot be left blank

Explanation: This field cannot be left blank. You can use % and _ as wildcard characters in the creator for some actions, which are listed on the panel. For all other actions, you must specify the exact creator.

RAAP044I   Resource group does not exist; This action will create it

Explanation: You have selected to edit this resource group, however it does not contain any HPO resource options. This edit action will allow you to create the resource group with HPO resource options.

RAAP045I   User profile was not created; Cancel request honored

Explanation: The user profile was not created due to your cancel command.

RAAP046E   Wildcard characters are not allowed in this field

Explanation: You can specify multiple entries in this field. You must specify a unique entry without any wildcard characters (% or _).

RAAP047I   User profile was not modified; Cancel request honored

Explanation: The user profile was not modified due to your cancel command.

RAAP048E   Error allocating temporary JCL file

Explanation: The generated JCL will reside in a temporary data set that is created automatically. An error occurred while creating the data set. Associated error messages may be written to the terminal.

RAAP049E   Not authorized to access objects for this owner

Explanation: You are not able to set your CURRENT SQLID to this ID. Any owner that you specify must be one of your valid SQLIDs.

RAAP050E   User cannot be left blank

Explanation: You must enter a value in the User field for this error log action.

RAAP051E   Message number cannot be left blank

Explanation: You must enter a value in the Message field for this error log action.

RAAP052E   Object(s) not found

Explanation: No object with this owner, name, and type exists in the database.

RAAP053I   Position the cursor on the desired row and select a valid action

Explanation: Review the list of supported actions at the top of this panel and select the desired action. If you want to exit this panel, enter the END command.

RAAP054E   Value must be positive integer

Explanation: You cannot enter alphabetic or special characters in this field. You must enter a positive integer.

RAAP055E   Value must be either "Y" (yes) or "N" (no)

Explanation: The only acceptable values for this field are yes or no.

RAAP056E   From Time cannot be left blank

Explanation: You must specify the From Time. To specify 8 a.m., enter 08:00. To specify noon, enter 12:00. To specify 3 p.m., enter 15:00. To specify midnight, enter 24:00.

RAAP057E   Timer interval must be between 0 and 6000 seconds

Explanation: The asynchronous timer will activate every "n" wall-clock seconds, where "n" is equal to the value that you enter in this field. The largest acceptable value is 6000 seconds (100 minutes).

RAAP058I   Schedule * does not exist; This action will create it

Explanation: You requested to edit this schedule, but it does not exist. This edit session will allow you to create the schedule.

RAAP059I   Schedule * not stored in database; Cancel request honored

Explanation: The schedule definition was not saved due to your cancel command.

RAAP060E   Table not found in database

Explanation: The table name that you entered cannot be found in the Db2 catalog. The Db2 subsystem ID specified may not be correct or you may have entered the table name or creator name incorrectly.

RAAP061I   Calculation for spill file completed

Explanation: The spill file allocation calculation is complete. The result is displayed on the panel.

RAAP062I   RUNSTATS has not been run on table; Space estimated for 1000 rows

Explanation: The spill file allocation is directly related to the number of rows in the specified table. Because the number of rows could not be obtained from the Db2 catalog, an estimate of 1000 rows was used.

RAAP063E   Device type not recognized

Explanation: Enter one of the following device types: 3350, 3380, or 3390.

RAAP064E   Owner cannot be left blank

Explanation: You must enter the owner of the objects to process. You can use % and _ as wildcard characters in the owner to select multiple objects if you are selecting the LIST action. For all other actions, you must specify the exact name.

RAAP065E   Name cannot be left blank

Explanation: You must enter the name of the objects to process. You can use % and _ as wildcard characters in the name to select multiple objects for some actions, which are listed on the panel. For all other actions, you must specify the exact name.

RAAP066E   Type can be "Q" (queries), "P" (procs), "F" (forms), "A" (analytics),

Explanation: You must enter one of the object types listed. If you leave this field blank, % will be assumed as a default.

RAAP067E   Invalid parameter

Explanation: An invalid parameter was passed to a Manager program.

RAAP068E   "TO" object name cannot be left blank

Explanation: You cannot leave the name of the "TO" object blank. You can either keep the same name as the "FROM" object or change the name.

RAAP069E   Invalid object name; QMF reserved words cannot be used

Explanation: You cannot use any of the following QMF reserved words as the name of a QMF object: ANALYTICS, CHART, DATA, FORM, FORM., PROC, PROFILE, QUERY, REPORT, and TABLE.

RAAP070I   User profile has been successfully created

Explanation: The user profile that you just entered has been added to the database.

RAAP071I   User profile was successfully updated

Explanation: The changes that you made to the user profile have been copied to the database.

RAAP072I   Assignment request(s) have been processed

Explanation: Your assignment requests have been processed and the database has been updated.

RAAP073I   No assignments were requested

Explanation: No assignments were processed because you did not select any of the rows on this panel.

RAAP074E   Archive data set allocation error; Cannot continue

Explanation: Make sure that the data set specified on the Error Log panel exists and is cataloged.

RAAP075E   Archive data set must have DSORG = PS and LRECL = 131

Explanation: The error log data set specified on the Error Log panel must conform to these DCB requirements.

RAAP076E   Archive data set not specified; Action not allowed

Explanation: You cannot request the ARCHIVE action unless you specify the name of a data set in which to archive the error log entries.

RAAP077E   Archive data set does not exist or has been archived/migrated

Explanation: Make sure that the data set specified on the Error Log panel exists and is cataloged.

RAAP078E   Not able to browse unless object is SQL or prompted query or proc

Explanation: Object Manager allows you to browse SQL and prompted queries and procedures. You cannot browse forms or any other types of queries.

RAAP079E   "TO" object owner cannot be left blank

Explanation: You cannot leave the "TO" object owner blank. You can either keep the same owner as the "FROM" object or you can change the owner.

RAAP080E   DB2 subsystem cannot be left blank

Explanation: You must set a valid Db2 subsystem ID before invoking this option.

RAAP081E   Resource group does not contain any HPO resource options

Explanation: To process this resource group, it must contain HPO resource options. This message indicates that only sample governor resource options exist for this resource group. You can edit this resource group to add the desired HPO resource options.

RAAP082E   Error allocating skeleton data set

Explanation: An error occurred while trying to allocate QMFHPO.SRAASKEL to your session.

RAAP083E   "TO" DB2 subsystem * not configured

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the specified Db2 subsystem.

RAAP085E   Cannot migrate/copy objects to a previous release of QMF

Explanation: You cannot migrate/copy a QMF object to a previous release of QMF, due to downward incompatibilities. Migrating to a new release is fully supported because QMF versions are upward compatible. Migrating to the same release is also supported.

RAAP086I   Action was not performed; Cancel request honored

Explanation: The action you selected was not performed due to your cancel command.

RAAP087E   "TO" information cannot be the same as "FROM"

Explanation: When performing an action against an object, the "TO" information must be different than the "FROM" information.

RAAP088E   **"TO" DB2 subsystem cannot be left blank**

Explanation: You cannot leave the "TO" Db2 subsystem ID blank. You can either specify the same Db2 subsystem as the "FROM" subsystem, or you can change it. In either case, both the "FROM" and the "TO" Db2 subsystems must exist on the local MVS subsystem.

RAAP089E   **From Date cannot be left blank**

Explanation: This field cannot be left blank to browse an error log entry. Specify the date in the format requested on the panel.

RAAP090I   **Object's status changed from * to ***

Explanation: This object's restricted flag has been changed successfully.

RAAP091E   **Error connecting to DB2 * (RC=*, REASON=*) Error opening Plan * (RC=*, REASON=*)**

Explanation: Either of these messages may appear while connecting to the specified Db2 subsystem. Check the return code (RC) and reason code (REASON) in *Db2 Messages and Codes*. Also check that the Db2 subsystem ID that you entered is correct.

RAAP092I   **Detail does not exist for schedule *; Browse bypassed**

Explanation: You have requested to browse the specified schedule. The schedule does not exist, so the browse request was bypassed.

RAAP093E   **Start and stop dates must be valid dates of the form YYYYMMDD**

Explanation: All dates are verified for correctness down to the number of days in a given month. For example, 19910229 is not a valid date because 1991 was not a leap year.

RAAP094E   **Schedule number must be between 0 and 255**

Explanation: There can be up to 255 schedules per resource group. Zero is used to indicate that no further schedule processing is desired, but is not a valid schedule number.

RAAP095E   **Start and stop times must be valid times of the form HHMM**

Explanation: Time fields are verified for correctness. Times must be between 0000 and 2400.

RAAP096E   **Not able to compile unless object is query or procedure**

Explanation: You can invoke Compiler only with queries or procedures. Forms cannot be selected for this action

RAAP097E   **.*ADHOCP is only valid for procs**

Explanation: Ad hoc procs are tracked with a name of *ADHOCP. You must select an object type of P (for proc) when selecting an object name of *ADHOCP.

RAAP098E   **History not found for this object**

Explanation: No historical data was found for this object. Either the HPO Activity Log is disabled or the log data sets have not yet been summarized into the Db2 tables.

RAAP099E   **Not able to rename more than one object at a time**

Explanation: You can only rename objects one at a time.

RAAP100E   **Data set name cannot be left blank**

Explanation: You must specify the name of a data set that exists and is cataloged. JCL will be generated and written to this data set.

RAAP101E   **Not all job card lines can be left blank**

Explanation: You must fill in at least one of the fields for the job card. If only one line is required for the job card, use the first line.

RAAP102E   **Flag must be "E" (edit) or "S" (submit)**

Explanation: To edit the JCL after it is generated, set this flag to E. To submit the JCL automatically after it is generated, set this flag to S. To bypass JCL generation and job submission, enter the END command.

RAAP103E   **Error occurred while invoking ISPF edit session**

Explanation: An error occurred while editing the generated JCL. Check with your system administrator and make sure that you are authorized to create and allocate temporary data sets.

RAAP104E   **Both TSO and CICS processing cannot be set to "N"**

Explanation: You must specify that either TSO and/or CICS logs be processed. You cannot set both to N.

RAAP105I   No object activity information available

Explanation: No historical data was found for this object. Either the HPO Activity Log is disabled or the log data sets have not yet been summarized into the Db2 tables.

RAAP106E   HPO Activity Log records not written; File I/O error

Explanation: The actions performed in this session were not recorded into the HPO Activity Log data sets due to file I/O problems. All actions were accepted, however they will not appear in the log.

RAAP107E   Action not performed; Errors indicated in status log

Explanation: The action you selected was not performed due to errors. The errors are described on the displayed status log panel.

RAAP108I   Action performed successfully

Explanation: The action that you selected was completed without errors or warnings.

RAAP109E   Action performed with warnings as indicated in status log

Explanation: The specified action was completed, however warnings were detected. The status log panel lists all of the actions attempted and the result of each.

RAAP110E   Not authorized to select this option

Explanation: Only system administrators are allowed to select this option.

RAAP111E   Day values must be in range of 1-7, inclusive

Explanation: Values for the day of the week are given as numbers, where 1=Sunday, 2=Monday, 3=Tuesday, 4=Wednesday, 5=Thursday, 6=Friday, and 7=Saturday.

RAAP112I   Schedule * has been deleted from database

RAAP113E   Schedule * not deleted; May not exist in database

Explanation: The schedule specified was not deleted.

RAAP114E   No schedules found for resource group *

Explanation: No schedules exist for the specified resource group.

RAAP115E   Schedule number must be in range from 1 to 255

Explanation: Valid schedule numbers are between 1 and 255, inclusive.

RAAP116E   Value must be valid date in format specified

Explanation: You must specify a valid date in the form specified on the panel.

RAAP117E   Resource Group name must be supplied here

Explanation: Enter a valid resource group name or * for all resource groups. This field cannot be left blank.

RAAP118E   Invalid filtering criteria information

Explanation: You either specified From Time and not To Time or To Time and not From Time, or you entered an invalid value for Environment or Mode. Verify the values you entered in the Optional Filtering section.

RAAP119E   Object has not been compiled or registered

Explanation: No cross reference list is available because the object has not been compiled or registered with the End User Facility.

RAAP120E   From Date may not be greater than To Date

Explanation: You must enter a From Date that is earlier than the To Date. Dates must be entered in the format specified on the panel.

RAAP121E   From Time may not be greater than To Time

Explanation: You must enter a From Time that is earlier than the To Time. Times must be entered in the format specified on the panel.

RAAP122I   No query text available to browse for this run

Explanation: You requested to browse SQL text, but none is available for this entry. The SQL column must contain a value of Y for this entry to be eligible for SQL text browsing.

RAAP123E   Not able to analyze unless object is query

Explanation: You cannot analyze procedures or forms, only queries.

RAAP124E   Unrecognized command

Explanation: The command that you entered on the command line is not valid.

RAAP125I   Starting Query Analyzer; Please wait...

Explanation: The results of the analysis will be displayed when Query Analyzer is finished.

RAAP126E   Error allocating temporary data set; Cannot analyze

Explanation: An error occurred while allocating a temporary data set to use as input to Query Analyzer.

RAAP127I   Object remarks updated

Explanation: The remarks have been successfully modified for the object.

RAAP128E   Object remarks not updated

Explanation: The remarks were not updated due to a system error.

RAAP129E   Error connecting to location

Explanation: You cannot connect to the specified location from this Db2 subsystem.

RAAP130E   "TO" DB2 location must be left blank

Explanation: Because the "TO" Db2 subsystem is running Db2 Version 2 Release 2, the "TO" Db2 location must be left blank.

RAAP131E   Detail history available only for queries or procs

Explanation: You can only obtain detail history for queries and procs.

RAAP132E   Use *ADHOC only to view ad hoc query history

Explanation: Ad hoc queries are tracked with a name of *ADHOC. You must select an object type of Q (for query) when selecting an object name of *ADHOC.

RAAP133E   Use *ADHOCP only to view ad hoc proc history

Explanation: Ad hoc procedures are tracked with a name of *ADHOCP. You must select an object type of P (for proc) when selecting an object name of *ADHOCP.

RAAP134E   Specified command not defined

Explanation: The entered command is not defined for this panel.

RAAP135E   Command needs argument

Explanation: Command requires at least one space following it and preceding an argument.

RAAP136E   Invalid argument for command

Explanation: Command argument is not valid.

RAAP137E   Only one argument allowed for command

Explanation: This command requires one and only one argument.

RAAP138E   Specified object name not found

Explanation: The object name could not be located as specified.

RAAP139E   Selection invalid; TSO Activity Log has not been configured

Explanation: The product has not been configured to track QMF TSO activity. Therefore, you cannot select the TSO Activity Log for processing.

RAAP140E   Selection invalid; CICS Activity Log has not been configured

Explanation: The product has not been configured to track QMF CICS activity. Therefore, you cannot select the CICS Activity Log for processing.

RAAP141I   Additional list filters have been applied to detail records

Explanation: This message will appear when the list filters are carried through and applied to detail history records. This indicates that some detail records are not shown, due to the filter specifications on the Additional List Filter panel.

RAAP142E   Value must be a positive integer less than 32768

Explanation: The maximum allowable value for this field is 32768.

RAAQ messages

Messages that begin with RAAQ are issued from the Query Analyzer online facility and appear on the message line on ISPF panels and within a QMF session.

RAAQ000E   DB2 subsystem * not configured

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the specified Db2 subsystem.

RAAQ001E   DB2 subsystem ID cannot be left blank

Explanation: You must enter a valid Db2 subsystem ID.

RAAQ002E   Please select one of the options listed below

Explanation: Choose one of the selection options listed on this panel.

RAAQ003E   Select one query source

Explanation: You may analyze a query that exists in a data set or you may enter ad hoc query text in the space provided. You cannot leave both of these areas blank.

RAAQ004E   Select only one query source

Explanation: You may analyze a query that exists in a data set or you may enter ad hoc query text in the space provided. Only one of these sources can be selected at a time.

RAAQ005E   Error allocating skeleton data set

Explanation: An error occurred while trying to allocate QMFHPO.SRAASKEL to your session.

RAAQ007E   Not all job cards can be left blank

Explanation: You must fill in at least one of these fields for the job card. If only one line is required for the job card, use the first line.

RAAQ008E   Flag must be "E" (edit) or "S" (submit)

Explanation: To edit the JCL after it is generated, set this flag to E. To submit the JCL automatically after it is generated, set this flag to S. To bypass JCL generation and job submission, enter the END command.

RAAQ009E   Error invoking ISPF edit session

Explanation: An error occurred while editing the generated JCL. Check with your system administrator and make sure that you are authorized to create and allocate temporary data sets.

RAAQ010E   Data set name cannot be left blank

Explanation: You must specify the name of a data set that exists and is cataloged. JCL will be generated and written to this data set.

RAAQ011E   Data set must have RECFM = PS or PO

Explanation: You must specify the name of a sequential data set or a partitioned data set.

RAAQ012E   Member name not allowed with sequential data sets

Explanation: You cannot specify a member name for the data set because it is a sequential data set.

RAAQ013E   Member name cannot be left blank for PDS

Explanation: If you specify a partitioned data set, you must also specify a member name.

RAAQ014E   Data set must have LRECL = 79 or 80

Explanation: The data set that you specify must have a record length of either 79 or 80. No other record length is supported.

RAAQ015E   Error processing input data set; Analysis not performed

Explanation: An unexpected error was encountered. Your query was not analyzed, but processing will continue.

RAAQ016I   Default values will be saved

Explanation: Any changes that you made to the default parameter settings will be saved in your ISPF profile.

RAAQ017E   Failure attempting to run REXX program *

Explanation: The named REXX program could not be found. Make sure that the library containing the EXEC is allocated to your session.

RAAQ020I   Default values not saved; Cancel request honored

Explanation: Any changes that were just made to the default parameter settings have been discarded due to your cancel command.

RAAQ021E   Member not found in PDS

Explanation: The member specified is not found in the data set. Check that you have entered the name correctly and that the member exists.

RAAQ022E   Database cannot be blank if table space is specified

Explanation: If you specify table space name, then you must also specify a database name. You can, however, specify a database without a table space.

RAAQ023E   Error allocating temporary JCL file

Explanation: The generated JCL will reside in a temporary data set that is created automatically. An error occurred while creating the data set. Associated error messages may be written to the terminal.

RAAQ026E   Data set does not exist or has been archived/migrated

Explanation: The specified data set could not be found. You must specify the name of a data set that exists and is cataloged.

RAAQ100E   Call attachment failure on connect

RAAQ101E   Call attachment failure on open

Explanation: An error occurred while Query Analyzer either was connecting to Db2 or opening its application plan. In either case, query analysis will be bypassed, and your session will continue normally.

RAAQ102E   Call attachment failure on disconnect

Explanation: An error occurred while Query Analyzer was disconnecting from Db2. Query analysis was performed, and your session will continue normally.

RAAQ105E   Configuration module not found; Cannot analyze query

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the current Db2 subsystem. Query analysis will not be performed, but your session will continue normally.

RAAQ108E   No database/table space name given for PLAN_TABLE creation

Explanation: A PLAN_TABLE does not exist and no database/table space for creating one is specified in the active resource group. As a result, a PLAN_TABLE cannot be created and query analysis will be bypassed.

RAAQ109E   Query is not a SELECT statement

Explanation: Non-SELECT SQL is ignored by Query Analyzer.

RAAQ110E   SQL error in EXPLAIN processing

Explanation: The query could not be processed by the EXPLAIN command. Either a PLAN_TABLE does not exist or there is an error in the query. Your session will continue normally.

RAAR messages

Messages that begin with RAAR are issued from the Compiler runtime routines. They appear in the SYSOUT DD for batch programs and on the message line for online TSO and CICS programs when running programs generated with the HPO/Runtime option.

RAAR001E   Invalid function code *

Explanation: An invalid function code was passed to the runtime modules. Verify any changes that may have been made to the control variables and flow of the generated program.

RAAR002E   Illegal call after end of data

Explanation: Once the runtime modules have indicated the end of the report, they do not expect to be called again. Verify any changes made to the control flow of the generated program.

RAAR004E   Form contains illegal variable reference

Explanation: The generated program's form contains a variable reference which is not allowed by QMF. See *Db2 QMF Reference* for allowed variable references.

RAAR005E   Report page longer than physical page

Explanation: The page length specified is not large enough to hold any report data after formatting the page header and footer. Either increase the page length or reduce the size of the page header or footer.

RAAR006E   Fixed area wider than physical page

Explanation: The fixed columns in this report exceed your page width. Either increase the page width or reduce the number of fixed columns.

RAAR007E   Error opening report DD *

Explanation: A REPORTnn DD could not be opened. Make sure that the appropriate report DDs are defined in your JCL. Up to 99 of these DDs may be required.

RAAR008E   Invalid data type * in form

Explanation: The generated program's form contains a column with an unrecognized data type. If you have modified the program, refer to the column in error and make sure that the value for its data type is one of the following: INTEGER (0), SMALLINT (1), DECIMAL (2), FLOAT (3), VARCHAR (4), DATE (5), TIME (6), TIMESTAMP (7).

RAAR009E   Report DD format error

Explanation: The runtime modules have encountered an error while writing a record to one of the report

DDs. The report DDs must have RECFM = F.

RAAR010E   Error writing report DD

Explanation: The runtime modules have encountered an error while writing a record to one of the report DDs. Verify the definition of each report DD.

RAAR011E   Memory exhausted

Explanation: The program has exhausted the available memory. If the report does not make use of any of the xPCT usage codes or the ACROSS usage code, increase the region size. If the report does make use of any of the usage codes, modify the program to make use of a spill file.

RAAR012E   Error opening spill file

RAAR013E   Error writing spill file

RAAR014E   Error reading spill file

Explanation: An error occurred while processing the spill file. If your JCL does not define a RAASPILL DD, then add one.

RAAR015E   Could not get LRECL for report DD

Explanation: The runtime modules was unable to obtain the characteristics of the DD named REPORT01. This is most likely because the DD is not defined. Verify your JCL.

RAAR016E   Report DD record format must be fixed

Explanation: The REPORTnn DDs must have RECFM = F.

RAAR017E   Page width must be between 22 and 999

Explanation: The page width (which is the minimum of the value of the PAGE-WIDTH variable in the program and one less than the LRECL on the REPORTnn DDs) must be between 22 and 999. Verify the definition of the PAGE-WIDTH variable and your JCL.

RAAR018E   Queue buffer too small for report data

Explanation: A queue buffer (and its size) is passed to the runtime modules at initialization time. This is the

buffer in which each row of an online report is returned to the program. This message indicates that the buffer is not wide enough to hold a row of the report.

RAAR019E   Error creating queue; RC = *

Explanation: An error occurred when creating the ISPF table which is used to store the online report.

**RAAR020E   Error executing REXX EXEC
                    RAARCXPR; RC=*, REASON=***

Explanation: An error was received from the REXX EXEC named RAARCXPR in QMFHPO.SRAAEXEC. This EXEC is executed to evaluate FORM.CALC expressions. Make sure that this library is allocated to the SYSEXEC DD and that the named EXEC exists in the library.

**RAAR021E   Unexpected value returned by
                    RAARCXPR**

Explanation: This message should not be received unless modifications have been made to the RAARCXPR EXEC. Verify that no modifications have been made.

RAAR022E   *

Explanation: An expression passed to the RAARCXPR EXEC for evaluation contained a REXX error. The message text contains the REXX error message. This is not an error in the invocation of the REXX EXEC, but rather a REXX error in a FORM.CALC expression.

**RAAR023E   User edit error 99101: unrecognized edit
                    code ***

Explanation: The DSQUEDIT module containing user edit routines that was loaded does not implement the specified edit code. Check that the library containing the desired DSQUEDIT module is allocated to STEPLIB.

**RAAR024E   User edit error 99102: improper input
                    data type for edit code ***

**RAAR025E   User edit error 99103: invalid input
                    value for item to be formatted**

**RAAR026E   User edit error 99104: item to be
                    formatted too short**

**RAAR027E   User edit error 99105: not enough room
                    for result in ECSRSLT**

RAAR028E   User edit error * for edit code *

**RAAR030E   Authorization failure; Cannot generate
                    report**

RAAR998E   Unknown error *

RAAR999E   Unexpected internal error *

Explanation: An unexpected error occurred.

RAAU messages

Messages that begin with RAAU are issued from the End User Facility and appear on the message line on ISPF panels or CICS maps.

RAAU001E   Severe error; Internal ISPF table could not be created

Explanation: An unexpected error was encountered.

RAAU002E   Error submitting job for report *

Explanation: An error occurred while submitting JCL to run the selected report. Additional information may be written to the terminal by TSO.

RAAU003E   Report list is empty

Explanation: There are no reports registered in the system for the specified report owner. If the specified owner is not one of your primary or secondary SQLIDs, a search is made only for shared reports with that owner.

RAAU004E   Report LRECL must be numeric

Explanation: The logical record length (LRECL) that you specify for the printed report must be numeric.

RAAU005E   Error during CAF (SSID=* PLAN=* RC=* REASON=*)

Explanation: An error occurred while attempting to connect to Db2. Check the return code (RC) and the reason code (REASON) in *Db2 Messages and Codes*.

RAAU006E   SQL error detected; SQLCODE = *

RAAU007E   SQL warning detected; SQLCODE = *

Explanation: An SQL error or warning occurred. Check the SQL code in *Db2 Messages and Codes*.

RAAU008E   Please select one of the options listed below

Explanation: Choose one of the selection options listed on this panel.

RAAU009E   DB2 subsystem ID cannot be left blank

Explanation: You must enter a valid Db2 subsystem ID.

RAAU010E   DB2 subsystem * not configured

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the specified Db2 subsystem.

RAAU011I   Default values not saved; Cancel request honored

Explanation: Any changes that you made to the default parameter settings have been discarded.

RAAU012I   Default values will be saved

Explanation: Any changes that you made to the default parameter settings will be saved in your ISPF profile.

RAAU013E   Invalid selection code; Use "S" or "E"

Explanation: To select a report, use a selection code of S. Technical users can use a selection code of E to edit JCL to run the report.

RAAU014E   Selection code of "E" is not valid for online reports

Explanation: A selection code of E is only valid for batch reports. This action is only recommended for technical users who are familiar with JCL.

RAAU015E   No reports were selected

Explanation: To select a report, use a selection code of S. Technical users can use a selection code of E to edit JCL to run the report. You can select more than one report at a time.

RAAU016E   Error invoking ISPF edit session

Explanation: An error occurred while editing the generated JCL. Check with your system administrator and make sure that you are authorized to create and allocate temporary data sets.

RAAU017I   Report not processed; Cancel request honored

Explanation: The report will not be processed due to your cancel command.

RAAU018E   Please enter a numeric value for this input variable

Explanation: You cannot specify alphabetic characters when entering numeric values. Check the variable data type and enter a valid number.

RAAU019E   )IF out of sequence in skeleton at line *

RAAU020E)ELSE out of sequence in skeleton at line *

RAAU021E Unrecognized token in skeleton at line *

Explanation: The skeleton JCL data set contains an invalid control code. Verify that the installation process was successful and complete.

RAAU022E Report copies must be a number between 1 and 254

Explanation: If you specify a number of report copies, the value must be a positive integer that does not exceed 254.

RAAU023E Report owner must be valid SQLID

Explanation: You must specify one of your primary or secondary SQLIDs as the report owner. That is, you must be authorized in Db2 to change your CURRENT SQLID to this report owner.

RAAU024E Specified command not defined

Explanation: Valid commands are LOCATE, SELECT, and EDIT, and any abbreviations of these commands.

RAAU025E Specified command requires an argument

Explanation: You must specify a report name as an argument to the command.

RAAU026E Specified report not found

Explanation: The report that you have specified does not exist. Check the spelling of the report name.

RAAU027E Error allocating temporary JCL data set *

Explanation: The JCL will be generated in a temporary data set that is created automatically. An error occurred while creating the data set. Associated error messages may be written to the terminal.

RAAU028E Error allocating skeleton data set *

Explanation: An error occurred while trying to allocate QMFHPO.SRAASKEL to your session.

RAAU029E Value must be blank, "T" (TSOID), or "P" (PRIMEID)

Explanation: Your QMF profile can be keyed by either your TSO logon ID or by your primary Db2 authorization ID. Enter the desired value.

RAAU030I Starting QMF; Please wait...

Explanation: A QMF session must be started to run this report. This message will be displayed until QMF is started.

RAAU031E *

Explanation: Any error or warning messages returned by QMF are listed with this error.

RAAU032E Error starting QMF; QMF message *; Start parameter *

Explanation: A QMF session must be started to run this report. The report cannot be run because this process failed. The QMF error message number and the start parameter in error are both indicated in the message. See *Db2 QMF Messages and Codes* for more information.

RAAU033I Job submitted for report *

Explanation: The report you selected will be run in batch. This message indicates that the batch job has been submitted for processing.

RAAU034I Variable set * accepted; Ready for next set

Explanation: Because you pressed Enter after the previous set of input variables were specified, you now have to make a decision whether to specify another set of input variables, run the report with all sets previously specified, or abort all report requests. Follow the instructions in the panel header for valid keys and commands.

RAAU035E Data set must exist, have DSORG = PS or PO, and have LRECL = 80

RAAU036E Data set must exist before JCL can be generated

Explanation: You must specify the name of a data set that has the listed DCB characteristics.

RAAU037E Member name cannot be specified without data set name

Explanation: You cannot leave the data set name blank if you specify a member name.

RAAU038E Cannot specify member name in this field

Explanation: You cannot specify the member name as part of the data set name. For example, PDS.LIBRARY(MEM) is invalid. Specify the member name in the Member field.

RAAU039E   **Member name cannot be specified for sequential data sets**

Explanation: You cannot specify a member name for a sequential data set.

RAAU040E   **Member name must be specified for partitioned data sets**

Explanation: If you specified a partitioned data set, you must specify a member name in the Member field.

RAAU041E   **Error connecting to location**

Explanation: You cannot connect to the specified location from this Db2 subsystem. Check with your system or database administrator.

RAAU042E   **Data set name is required**

RAAU043E   **Data set must have DSORG = PS or PO**

RAAU044E   **Data set LRECL must be ***

RAAU045E   **Space units must be "C" (cylinders), "T" (tracks), or "B" (blocks)**

RAAU046E   **Value must be an integer greater than zero**

RAAU047E   **Value must be an integer greater than or equal to zero**

RAAU048E   **Directory blocks specification is inconsistent with member name specification**

RAAU049E   **Record format must be "F", "FB", "V", or "VB"**

RAAU050E   **Unable to retrieve attributes of specified data set**

RAAU051E   **Unit is required**

RAAU052E   **Error allocating DATAOUT**

RAAU053E   **Disposition must be "S" (SHR) or "O" (OLD)**

RAAU054E   **Data set must exist**

RAAU056E   **Error allocating DATAIN**

RAAU057E   **Input and output data sets cannot be the same**

RAAU058E   **Loop too long in skeleton at line ***

RAAU059E   **Nested loop in skeleton at line ***

RAAU060E   **Unexpected)ENDLOOP in skeleton at line ***

RAAU061E   **Invalid)LOOP syntax in skeleton at line ***

RAAU062E   **Disposition must be "S" (SHR), "O" (OLD), or "M" (MOD) when data set exists**

RAAU063E   **Disposition must be "N" (NEW) when data set does not exist**

RAAU064E   **SYSOUT flag must be "Y" (yes) or "N" (no)**

RAAU065E   **Record format must be "FA", "FBA", "VA", or "VBA"**

RAAU100E   **Invalid scroll amount**

Explanation: The scroll amount that you entered is invalid. Valid values are MAX, HALF, PAGE, DATA, CSR, or an integer.

RAAU101E   **Invalid selection code; Use "S"**

Explanation: To select a report, use a selection code of S.

RAAU102E   **No reports found**

Explanation: No reports have been assigned to this transaction ID.

RAAU103E   **Queue overflow; Report list truncated**

Explanation: The maximum number of registered reports that can be displayed is 32767. More than 32767 registered reports were found, but only the first 32767 will be displayed.

RAAU104E   **Invalid argument to command**

Explanation: The command that you entered does not accept the type of argument that you entered. For example, the LOCATE command (when entering variable values) can only accept a numeric argument.

RAAU105E   **Only one argument to command is allowed**

Explanation: The command that you entered accepts only one argument.

RAAU106E   **No host variables found in registration database**

Explanation: The row for the selected report in the

Q.REPORTS table (the Db2 table holding the report registration information) contains a value of Y for the VARIABLES column.

However, the Q.REPORT_VARIABLES table does not contain any rows for the report. You (or your administrator) must resolve this inconsistency before you can run the report.

RAAU107E   **Queue overflow; Host variable list truncated'**

Explanation: The maximum number of variables that can be used by a registered report is 32767. More than 32767 variables were found for this report, but only the first 32767 will be displayed.

RAAX messages

Messages that begin with RAAX are primarily issued from the HPO Configuration Dialog and common functions.

RAAX000E   **Please select one of the options listed below**

Explanation: Choose one of the selection options listed on this panel.

RAAX001E   **DB2 subsystem ID cannot be left blank**

Explanation: You must enter a valid Db2 subsystem ID. This selects the subsystem to be configured.

RAAX002I   **Configuration parameters not saved; Cancel request honored**

Explanation: The configuration parameters were not saved due to your cancel command. Previous values remain in effect.

RAAX003E   **Field cannot be left blank**

Explanation: You must enter a value in this field. There is no default value.

RAAX005E   **Invalid QMF version; Must be "9.1", "10.1", "11.1", or "11.2"**

Explanation: Enter one of these supported QMF versions and releases. If your QMF version and release is higher than 11.2 enter 11.2.

RAAX006E   **Translation must be a valid QMF translation value**

Explanation: Enter the default value to use for Translation for this QMF installation. Valid values are ENGLISH, UPPERCASE, FRANCAIS CANADIEN, DANSK, FRANCAIS, DEUTSCH, ITALIANO, NIHONGO, HANGEUL, PORTUGUES, ESPANOL,

SVENSKA, FRANCAIS (SUISSE), and DEUTSCH (SCHWEIZ).

RAAX007E   **Data set does not exist or has been archived/migrated**

Explanation: The specified data set could not be found. You must specify the name of a data set that exists and is cataloged.

RAAX008E   **Flag must be "Y" (yes) or "N" (no)**

Explanation: The only acceptable values for this flag are yes or no.

RAAX009E   **Invalid data set name prefix**

Explanation: Enter the prefix of the names of the CICS libraries at your site. This field is validated by checking for the existence of either a CICS .LOADLIB library or a .SDFHLOAD library.

RAAX010I   **Saving configuration parameters; Please wait...**

Explanation: The configuration parameters are being saved in QMFHPO.SRAALOAD. Please wait while the library is updated.

RAAX011E   **Error allocating temporary data set; RC = ***

Explanation: A severe error occurred while issuing a TSO command to save the configuration parameters. Additional information may be written to your terminal.

RAAX012E   Error writing data sets

Explanation: An error occurred writing a temporary data set used as input to the assembler.

RAAX013E   Assembler error writing configuration module; Use batch option

Explanation: To build the configuration module, an assembler program is created and assembled automatically. All errors encountered during the assemble process are considered severe. If an error occurs, you will browse the output from the assemble (which will contain more information about the error).

RAAX014E   Linkage editor error writing configuration module: Use batch option

Explanation: To build the configuration module, an assembler program is created, assembled, and link-edited automatically. If an error occurs, you will browse the output from the link-edit (which will contain more information about the error).

RAAX021I   Configuration parameters saved

Explanation: The configuration parameters have been saved.

RAAX022E   Cannot bind plans or packages until subsystem is configured

Explanation: The application plans and packages cannot be bound until the subsystem is configured (by selecting option 1 from the HPO Configuration Dialog Selection Menu).

RAAX023I   Binding plans; Please wait...

Explanation: The selected plans are being bound online. Please wait for this process to finish. Status information will be written to your terminal as the bind proceeds.

RAAX024I   Plans bound successfully

Explanation: The plans were successfully bound.

RAAX025E   Error binding plans

Explanation: An error occurred while binding the selected plans. More information should have been written to your terminal. If not, try binding the plans in batch.

RAAX026E   Member not allowed

Explanation: You must not specify a member in this field. The name of a partitioned data set (PDS) is expected. Enter a name without specifying a member.

RAAX027E   Invalid DCB info; Must be DSORG=PS, RECFM=FB, LRECL=550

Explanation: You must enter the name of a data set that has the DCB characteristics listed. Either specify the name of an existing data set with the proper characteristics, or enter the name of a nonexistent data set which you will subsequently be allowed to create online.

RAAX028E   Space units must be "T" (tracks) or "C" (cylinders)

Explanation: Enter the units for the following space allocations for the data set to be created.

RAAX029E   Invalid space quantity

Explanation: Enter a quantity (in the units specified in the previous field) for the primary or secondary space allocation for the data set.

RAAX030I   Data set(s) created

Explanation: The specified data sets have been created with the proper DCB information and the specified space allocations.

RAAX031E   Invalid DB2 version; Must be "9.1", "10.1", or "11.1".

Explanation: Enter one of these supported DB2 versions and releases. If your DB2 version and release is higher than 11.1 enter 11.1.

RAAX032E   Member must be specified

Explanation: You must enter a member name with a data set name in this field.

RAAX033E   Invalid data set; Must be VSAM

Explanation: The specified data set is invalid. You must enter the name of a VSAM file. The specified data set is invalid.

RAAX034E   Cannot specify SQL text log without activity log

Explanation: SQL text cannot be logged without logging activity. If you specify an SQL text log, you must also specify an activity log.

RAAX035E   Invalid DCB info; Must be DSORG=PS, RECFM=VB, LRECL=4070, BLKSIZE=4074

Explanation: You must enter the name of a data set that has the DCB characteristics listed. Either specify the name of an existing data set with the proper characteristics, or enter the name of a nonexistent data set which you will subsequently be allowed to create online.

RAAX036E   CPU time must be non-negative integer

Explanation: You must specify a number for the CPU time threshold value.

RAAX037I   Configuration does not exist; This action will create it

Explanation: No configuration information was found for the specified Db2 subsystem. Proceeding with the configuration process will create it. Configuration values from the last subsystem configured will be carried forward as default values.

RAAX038E   Unrecognized command

Explanation: The command that you entered on the command line is not valid.

RAAX039I   No plans were selected for bind

Explanation: You did not select any plans on the Bind Application Plans panel.

RAAX040E   Foreground configuration not supported with IEV90 assembler

Explanation: The IEV90 assembler has been detected on the system. In this case, saving the configuration parameters in the foreground is not supported. You must use the batch option.

RAAX041I   No packages were selected for bind

Explanation: You did not select any packages on the Bind Packages panel.

RAAX042I   Binding packages; Please wait...

Explanation: The packages for the components that you selected are being bound online. Please wait for this process to finish. Status information will be written to your terminal as the bind proceeds

RAAX043I   Packages bound successfully

Explanation: The packages for the components you selected have been successfully bound.

RAAX044E   Error binding packages

Explanation: An error occurred while binding the packages for the selected components. More information should have been written to your terminal. If not, try binding the packages in batch.

RAAX045E   Not all job cards may be left blank

Explanation: You must fill in at least one of these fields for the job card. If only one line is required for the job card, use the first line.

RAAX046E   Member cannot be specified with temporary data set

Explanation: When you are using a temporary data set for generated JCL, you cannot specify a member name. The temporary data set created will be a sequential data set.

RAAX047E   Invalid DCB info; Must be DSORG=PS or PO

Explanation: You must specify the name of a sequential data set or a partitioned data set.

RAAX048E   Member name has invalid syntax

Explanation: The member name that you entered does not conform to PDS member naming rules.

RAAX049E   Flag must be "E" (edit) or "S" (submit)

Explanation: To edit the JCL after it is generated, set this flag to E. To submit the JCL automatically after it is generated, set this flag to S. To bypass JCL generation and job submission, enter the END command.

RAAX050E   Could not open data set *

Explanation: The specified data set could not be opened. Verify that the data set exists, that you have permission to read it, etc.

RAAX051E   Error editing data set *

Explanation: The specified data set could not be edited. Verify that the data set exists, that you have permission to read it, etc.

RAAX052I   JCL submitted

Explanation: JCL to save configuration information, bind plans, or bind packages has been submitted.

RAAX053E   Error submitting JCL; RC = *

Explanation: An error occurred while submitting JCL. Additional information may be written to your terminal by TSO.

RAAX054E   Error writing data set *

Explanation: An error occurred while writing the specified data set. Verify that the data set is not full, that you have permission to write it, etc.

RAAX055E   Error reading data set *

Explanation: An error occurred reading the specified data set. Verify that the data set exists, that you have permission to read it, etc.

RAAX056E   Invalid control statement at line * of *

Explanation: The skeleton data set contains an invalid control code. Verify that the installation process was successful and complete.

RAAX057E   Too many)IF's at line * of *

Explanation: The nesting of)IF's in the skeleton data set is too great. The maximum nesting level is 10. Verify that the installation process was successful and complete.

RAAX058E   Unexpected)ELSEIF at line * of *

Explanation: An)ELSEIF was found in the skeleton data set without a preceding)IF. Verify that the installation process was successful and complete.

RAAX059E   Unexpected)ELSE at line * of *

Explanation: An)ELSE was found in the skeleton data set without a preceding)IF. Verify that the installation process was successful and complete.

RAAX060E   Unexpected)ENDIF at line * of *

Explanation: An)ENDIF was found in the skeleton data set without a preceding)IF. Verify that the installation process was successful and complete.

RAAX061E   Unexpected EOF in *

Explanation: The end of the skeleton data set was reached while processing was still within an)IF or)LOOP. Verify that the installation process was successful and complete.

RAAX062E   Loop too long at line * of *

RAAX063E   Illegal nested loop at line * of *

Explanation: The skeleton data set contains an invalid construct. Verify that the installation process was successful and complete.

RAAX064E   Unexpected)ENDLOOP at line * of *

Explanation: An)ENDLOOP was found in the skeleton data set without a preceding)LOOP. Verify that the installation process was successful and complete.

RAAX065E   Unterminated)IF in loop at line * of *

Explanation: An)ENDLOOP was found in the skeleton data set without an)ENDIF to terminate an)IF within the loop. Verify that the installation process was successful and complete.

RAAX066I   Plans not bound; Cancel request honored

Explanation: The selected plans were not bound due to your cancel request.

RAAX067I   Packages not bound; Cancel request honored

Explanation: The packages for the selected components were not bound due to your cancel request.

RAAX068E   Invalid DCB info; Must be DSORG=PO, RECFM=F, LRECL=79

RAAX069E   Invalid DCB info; Must be DSORG=PO, RECFM=V, *<=LRECL<=7290

RAAX070E   Invalid DCB info; Must be DSORG=PO

RAAX071E   Invalid DCB info; Must be DSORG=PO, RECFM=F, LRECL=80

RAAX072E   Invalid DCB info; Must be DSORG=PO, RECFM=U

Explanation: You must specify the name of a data set with the specified DCB characteristics.

RAAX073E   Flag must be "F" (foreground) or "B" (batch)

Explanation: You must specify either F to perform the selected action online at your terminal while you wait,

or B to generate JCL to perform the selected action in batch.

RAAX074E   Temporary data set not allowed in this field

Explanation: You cannot specify a temporary data set (*TEMP) in this field.

RAAX075E   Error allocating work data sets; Use batch mode for action

Explanation: An unknown error occurred while allocating work data sets to perform the selected action online. Try selecting batch mode for the action.

RAAX076E   Work data set DCB information overridden; Use batch mode for action

Explanation: The system has overridden the DCB characteristics of a work data set needed to perform the selected action online. This is most likely the result of automatic selection of block size for allocated data sets. Try selecting batch mode for the action.

RAAX077E   Selected option is not installed

Explanation: The option that you selected has not been installed

RAAX078E   Error issuing LMINIT on data set

Explanation: A severe ISPF error occurred when issuing the LMINIT service.

RAAX079E   Error issuing LMOPEN on data set

Explanation: A severe ISPF error occurred when issuing the LMOPEN service.

RAAX080E   Could not locate required load modules

Explanation: Neither the RAACGUI or the RAARM module could be located in QMFHPO.SRAALOAD. This probably indicates an error unloading the distribution tape.

RAAX081I   Some required QMF files are not allocated; Trying to continue...

Explanation: Certain QMF data sets are required to be allocated to your TSO session to run QMF. This message indicates that some of the required data sets are not allocated to your session. Although QMF may operate successfully, some functions require these data set allocations. See *Installing and Managing Db2 QMF for TSO/CICS* to determine the required data set allocations for QMF.

RAAX082E   RAAXPR/RAAXTB cannot be found; contact product administrator

Explanation: Either RAAXPR or RAAXTB is missing from the SRAALOAD library.

RAAX083E   Invalid registration or trial module; contact product administrator

Explanation: Either the registration (RAAXPR) or trial (RAAXTB) module contains an invalid key.

RAAX084E   Number of additional log files must be an integer between 0 and 20

Explanation: Enter the number of additional log data sets to be allocated. In environments that support large numbers of simultaneous QMF users, adding additional log data sets can eliminate file contention by spreading the activity logging I/O across multiple files. Entering 0 results in no additional log data sets. A value of 5, for example, would allocate an additional 5 TSO activity and SQL log data sets. These data sets are created from the base file names you explicitly provide for the TSO activity and SQL text log data sets, and are processed automatically by HPO. A value greater than 0 should be considered on heavily utilized QMF systems.

RAAX085E   * DSN must be less than 34 characters long to use this option

Explanation: Additional log data sets will be named by appending a numeric suffix to the explicit names entered previously on the panel. As a result, the explicit names entered must be no longer than 34 characters.

RAAX086E   Error allocating * file *; RC = *

Explanation: An error occurred while allocating the specified data set. Additional messages written to the terminal may include more information about the error.

RAAX998E   User *; Program *; Abend *

Explanation: This message, written to the system log, indicates that the specified user running the specified program has encountered an abend condition. Contact product support.

RAAX999E   User *; Program *; Terminating

Explanation: This message, written to the system log, indicates that the specified program is terminating prematurely. Other error messages written to the user terminal or system log contain more information about the cause of the premature termination. Contact product support.

Notices

This information was developed for products and services offered in the US. This material may be available from IBM in other languages. However, you may be required to own a copy of the product or product version in that language in order to access it.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive, MD-NC119
Armonk, NY   10504-1785
US

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan, Ltd.
19-21, Nihonbashi-Hakozakicho, Chuo-ku
Tokyo 103-8510, Japan

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product and use of those websites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Director of Licensing
IBM Corporation
North Castle Drive, MD-NC119
Armonk, NY 10504-1785
US

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

Trademarks

IBM, the IBM logo, and ibm.com® are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. These and other IBM trademarked terms are marked on their first occurrence in this information with the appropriate symbol (® or ™), indicating US registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A complete and current list of IBM trademarks is available on the Web at http://www.ibm.com/legal/copytrade.shtml.

Java™ and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product, and service names may be trademarks or service marks of others.

Terms and conditions for product documentation

Permissions for the use of these publications are granted subject to the following terms and conditions:

Applicability: These terms and conditions are in addition to any terms of use for the IBM website.

Personal use: You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative work of these publications, or any portion thereof, without the express consent of IBM.

Commercial use: You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these publications, or reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of IBM.

Rights: Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the publications or any information, data, software or other intellectual property contained therein.

IBM reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by IBM, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

IBM MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THE PUBLICATIONS ARE PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

Privacy policy considerations

IBM Software products, including software as a service solutions, ("Software Offerings") may use cookies or other technologies to collect product usage information, to help improve the end user experience, to tailor interactions with the end user, or for other purposes. In many cases no personally identifiable information is collected by the Software Offerings. Some of our Software Offerings can help enable you to collect personally identifiable information. If this Software Offering uses cookies to collect personally identifiable information, specific information about this offering's use of cookies is set forth below.

This Software Offering does not use cookies or other technologies to collect personally identifiable information.

If the configurations deployed for this Software Offering provide you as customer the ability to collect personally identifiable information from end users via cookies and other technologies, you should seek your own legal advice about any laws applicable to such data collection, including any requirements for notice and consent.

For more information about the use of various technologies, including cookies, for these purposes, see IBM's Privacy Policy at http://www.ibm.com/privacy and IBM's Online Privacy Statement at http://www.ibm.com/privacy/details the section entitled "Cookies, Web Beacons and Other Technologies" and the "IBM Software Products and Software-as-a-Service Privacy Statement" at http://www.ibm.com/software/info/product-privacy.

Glossary

A

ad hoc query
A query that has not been named or saved; it has been submitted and executed "on the fly."

activity log
A repository for QMF session activity and object usage information, and writes to the HPO Activity Log data sets.

application plan
The output produced by the BIND process. It contains information about resources (tables, indexes) required and the access path used by Db2 to satisfy an SQL request.

B

bind   A process that compiles one or more DBRMs into an application plan.

buffering
A portion of storage used to hold input or output data temporarily, which can affect system overhead and can be limited by the amount of memory available to the executing program.

C

collection
A set of packages which are bound together with a collection ID. If you use several versions of QMF for Windows, you can use different collection names for different versions to avoid naming conflicts.

column
Contains values that have the same data type in the database. A value is similar to a field in a record. A value is the smallest unit of data that you can manipulate with SQL. The two basic components of the column definition are the name and the data type.

common controls
Controls that are common to a resource group.

D

data layer program
A general utility program providing access to Db2 in order to retrieve or manipulate data, and are generated from QMF queries.

display programs
Programs that allow you to browse a report by panel, typically before all data is read (fetched).

E

edit codes
Codes that determine how a column is formatted in a report. You use different edit codes depending on the type of data you want to format. Some edit codes include: character, date, graphic, numeric, time, timestamp, and user-defined.

enrollment
A method of granting a user profile certain authorities to start a QMF session.

error log
A time- and date-stamped log that identifies the user and message number for system or resource errors.

end user facility
Registers reports that have been generated and prepared for execution, then is used by end users to run compiled report programs.

F

filtering
A means to qualify object selection lists. An object must pass all of the enabled filters to be included in the selection list.

G

generation option
Options that allow you to control the characteristics of the program that will be generated, which are set on the Generation Options panel and the pop-up options, which can affect the speed and performance of the generated program.

governing
Establishes certain limits and controls for database and communication resources.

governor
Controls QMF session activity by obtaining thresholds and taking control of resource groups.

H

host variable
Enable you to use the same static query to retrieve different data. To retrieve different data, you do not need to rebind a package for the static query; instead, you supply different values for the host variables in the query.

Database servers specify rules for where host variables can appear in a query. Refer to documentation for your database server for these rules.

Host variables must have a specific data type. A value that you provide for a host variable must conform to that variable's data type.

L

linear procedure
Any procedure that does not begin with an IBM Object REXX comment. A linear procedure can run QMF commands, comments, blank lines, RUN commands, and substitution variables.

list To display data in an ordered format. For example, the LIST command in BASIC displays lines of a program. A list is any ordered set of data.

M

monitor
Supplies a real-time interface to QMF session activity information, accepting administrator commands and passing them on to the HPO/Governor module.

O

object A query, form, analytics, procedure, or table.

object list
Tree-structured representations of the database objects available on the server. Which objects can be viewed depends

upon your resource limits. Objects can be added and removed from the object list; also, the objects can be saved and shared with other users.

online facilities
Facilities that help organize and simplify the administration and management of QMF, including: Object Manager, Governor, Monitor, Query Analyzer, User Profile, Error Log, Spill File, HPO Activity Log JCL, and QMF startup parameters.

open enrollment
A type of enrollment that is assigned to a user profile which searches for a creator equal to SYSTEM so the user can start a QMF session.

P

package
An object containing a set of SQL statements that have been statically bound (access paths to the data are selected and some authorization checking is performed) and are available for processing.

prepare program
An interface that prepares Db2 programs, online or in batch, and involves running a precompile, bind, CICS command translation (for CICS programs), compile, and link.

procedure
An object that contains QMF commands. A procedure can be run with a single RUN command.

A procedure is a set of commands that enable you to run queries, print reports, import and export data, and perform other functions with a single command.

procedure program
A program that acts as a driver to run each of the procedure's report programs in sequence, and it requires that each report program has been generated and the report programs must have the same characteristics such as being all batch programs. Also referred to as a Proc program.

print program
A specialized program that produces a printed version of a report being

displayed by a display program, and is invoked by issuing the PRINT command.

program generator
A facility used by programmers to convert QMF reports (queries, forms, and procedures) into compiled programs, or to generate general purpose programs for accessing Db2.

Q

QMF report
The result of issuing the QMF commands RUN QUERY and PRINT REPORT, sometimes referred to as a query and often is the output of QMF procedures.

query A request for a specific result set of information from a database. You can work with an SQL query, a prompted query or a natural query.

query analyzer
Provides preemptive governing capabilities by trapping queries before they are processed by Db2.

R

report A compiled program, typically converted from a QMF query, query and form, or procedure; or a non-compiled QMF query, query and form, or procedure.

resource group
A set of related controls that restrict when a QMF session can begin, what type of session can be started, what types of QMF commands and SQL verbs can be processed, and the amount of system resources that can be consumed.

resource limits
Limits and controls that govern the use of database and communication resources. These include setting schedules, time-outs, limits, authorization to SQL verbs, binding and object tracking privileges, LOB options, and other options.

resource limits group
Users belonging to a group for which certain restrictions and permissions have been defined for schedules, time-outs, limits, SQL verbs, options, save data, binding, object tracking, and LOB options.

resource limits group schedule
The days and times during which the schedule for a resource limits group is active or inactive. The schedule includes parameters for time-outs, limits, SQL verbs, miscellaneous options, binding, save data, object tracking, and LOB options.

restricted enrollment
A type of enrollment assigned to a user profile which prohibits the user from starting a QMF session.

REXX (Restructured Extended Executor): IBM Object REXX is an interpreted, structured, procedural script programming language that allows programs and algorithms to be written in a clear structured way.

It was designed so that it would be truly easy to use for both professionals and casual users and was designed to work in several diverse application areas -- such as personal programming, command processing, application macro processing and application prototyping -- where different languages are typically used. It is, however, designed to be platform-independent.

S

scheduled controls
Controls that pertain to a specific date, day of the week, and time of day during which a resource is allowed to or prohibited from performing an action or task.

spill file
A file that can buffer excess data when there is no room in virtual storage for the current data object.

SQL query
(Structured Query Language): A standardized language for defining and manipulating data in a relational database. SQL is used to write queries in descriptive phrases.

startup parameters
Parameters that control the characteristics of a QMF session, such as environment, plan, and performance-related parameters.

static query

An SQL query that has been previously passed to a database server and bound into a package.

When a static query is executed, the database server uses the SQL text bound into the package, rather than the SQL text currently appearing in the query window. Static queries are more resource efficient than dynamic queries, but static queries cannot be edited.

static SQL

SQL statements, embedded within a program, that are prepared during the program preparation process, before the program is executed. After being prepared, the SQL statement does not change (although variable values that are specified by the statement might change).

stored procedure

A group of SQL statements that form a logical unit and perform a particular task. Stored procedures are used to encapsulate a set of operations or queries to execute on a database server. For example, operations on an employee database (hire, fire, promote, lookup) could be coded as stored procedures executed by application code. Stored procedures can be compiled and executed with different parameters and results, and they may have any combination of input, output, and input/output parameters. Stored procedures are supported by most DBMSs, but there is a fair amount of variation in their syntax and capabilities.

string delimiter

A character or string used to separate or mark the start of and end of items of data in a database, text file, or in source code. A string delimiter uses an apostrophe or quote to delimit this data.

substitution variable

A variable in a procedure or query whose value is specified by a global variable or a run-time variable. Or, it is a variable in a form whose value is specified by a global variable.

Substitution variables must begin with an ampersand (&) and can contain up to 18 characters, which can be alphabetic, numeric or one of the following characters: [! $ ~ { } ? @ # % \ _.

T

table A collection of stored data under the control of the relational database manager, consisting of a fixed number of rows and columns. You can interact with tables by running queries or by using the table editor.

U

usage code

Codes that control how data is summarized, such as at the end of a column or as a partial summary at the control breaks in a table. Which usage codes are available depend on the data in the column and the type of summary.

user profile facility

A profile created for each user that is identified by the creator, translation, and environment which is required to start a QMF session.

V

variable

A data element that specifies a value that can be changed. A variable is a symbol or name that stands for a value.

Index

A

AAQARM variable 157
activity log 83
  batch job 183
  cleanup tables 190
  data sets 183
  failure reason codes 239
  JCL panel 184
  location processing 189
  record types 231
allocate
  data sets 67
  HPO libraries 197
  libraries outside HPO 197
analysis output variables 157
analyzer
  access path reporting 149
  data 158
  data in the query information
   panel 159
  default parameters 152
  edit macro 153
  enable 150
  exit routine 149, 154
  features 149
  non-QMF queries 151
  query statistics 149
  resource group 150
  sample exit routine 156
  sample help panel 161
  start 151

B

batch job parameters 43
batch programs
  miscellaneous DDs 49
  report DDs 49
  requirements 48
batch reports
  destination 75
  multiple variable sets 73
  runtime variables 73
  single variable set 74
browse variables
  select reports 56

C

call attachment module
  attach to Db2 227
  disconnect from Db2 227
  EXEC parameters 51
  functions 227
  parameter area structure 227
  pseudocode 227
cancel limits 125
CANFLG variable 157
CICS
  data queue storage 53

clean up objects 165
command synonyms
  RCO 4
comments, sending to IBM viii
common controls 122
  create 121
  default values 128
  edit 129
compile programs 41
components
  object manager 87
configuration file
  copying 200
conventions for highlighting vii
copying
  configuration files 200
CPU time limits 125
customize
  HPO/Governor help 139

D

data layer options 28
data processing 22
Db2
  upgrading 201
Db2 tables
  format 235
  values 235
default parameters
  TSO 79

E

end user facility 69
  features 1
  maintaining reports 53
  registering reports 53
  report maintenance panel 54
  selection menu 69
  starting
    CICS 69
    TSO 69
error log
  browse 175
  display 173
  selection list 174, 175
error log entry
  archive 178
  browse 175
  delete 176
error log facility
  features 173
exit routine
  create 154
  process flow 155
export
  data set attributes 223
  outside QMF 224
  within QMF session 223

F

failure reason codes
  activity log 239
feedback, sending to IBM viii
fetched row limits 125
form fields
  supported 230
form usage codes
  supported 229

G

generate programs 3
  batch JCL 39
  data set information 33
  full dialog panel 6
  proc programs 35
  process 5
  short dialog 38
generated JCL
  description 185
generation options
  attachment facility 21
  buffering 32
  CAF module usage 21
  DSNTIAR calls 22
  environment 19
  host variable format and delimiter 27
  HPO/Runtime 32
  HPO/Sort 31
  multi-row FETCH 22
  print program name 26
  program type 20
  read data from file 24
  set 17, 34, 37
  spill file 32
  SQL type 21
  write data to file 25
governor 83
  assign resource group 132
  cancel codes 241
  common controls 120
  create resource group 120
  features 119
  scheduled controls 120
  start 120

H

help
  customize 139
highlighting conventions vii
host variable options 27
HPO activity log 83, 88
HPO/Compiler
  starting 1

IBM ®