

IBM i Support for Attaching an iSCSI VTL
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Version 1.5

Background

The purpose of supporting an iSCSI virtual tape library (VTL) is to provide an offering that improves the performance of save and restore operations over Ethernet. This support is only tested and supported with a VTL from Falconstor and with a library type of Falcon on the PowerVS infrastructure.

Note: The design point for managing the system configuration uses SQL or Advanced Analysis Macros which will be covered in this document.

Installation and Configuration

Prerequisites

IBM i version 7.2

Must have technical refresh 9 installed (MF99109).

Backup/Recovery group PTF SF99715 level 84, April 02 2024 update contains PTFS needed to run iSCSI, except the SQL and IPsec below:

MF69659

MF70034

To enable configuration using SQL, install PTF SI74769, which will require:

SI85770

SI76926

SI80334

SI79738

To enable IPsec and VPN (which requires Navigator), install PTFS:

SI73743

SI78187

SI80253

SI77743

SI76925

IBM i version 7.3

Must have technical refresh 13 installed (MF99213).

Backup/Recovery group PTF SF99724 level 67, April 2 2024 update contains PTFS needed to run iSCSI.

To enable configuration using SQL install the latest cumulative PTF package.

To enable IPsec and VPN (which requires Navigator), install PTF:

SI79923

IBM i version 7.4

Must have technical refresh 9 installed (MF99309).

Backup/Recovery group PTF SF99664 level 42, April 2 2024 update contains PTFS needed to run iSCSI :

MF69817

To enable configuration using SQL, install
SI85869
SI84630

To enable IPsec and VPN (which requires Navigator) install the latest cumulative PTF package.

IBM i version 7.5

Backup/Recovery group PTF SF99954 level 12, April 2 2024 update contains PTFS needed to run iSCSI and the latest cumulative PTFS enable IPsec and VPN (which requires Navigator).

Configuring the VTL

A Virtual Tape Library must be installed. Details are not provided by IBM for the installation process.

IBM® Navigator for i can be used to configure iSCSI targets on a system. Refer to [documentation](#) for additional information.

A virtual library/drives/media must be created. Recommended type-model information is because a large portion of the compatibility testing was done with the specified type-model.

- Library: IBM only supports the Falconstor 3584. This library will be reported to the system as a 3584-403, which supports live partition mobility which is a requirement on PowerVS.
- Drives: IBM recommends IBM LTO3 or newer drives. There is a restriction that only one drive type may be in any library attached to IBM i.
- Media:

You must also create the permission information to allow the controlling system to attach to the library. (The library needs to be added to an iSCSI client definition, which defines the information required for the system to access the virtual libraries)

The IBM i design for iSCSI does not allow multiple communications connections between a given i partition and target VTL.

The preferred method for configuring and IBM i partition is SQL Services. If there is something preventing using SQL, the configuration may be done using an advanced analysis macro.

iSCSI Configuration – SQL Services

ADD_ISCSI_TARGET procedure

The ADD_ISCSI_TARGET procedure configures an iSCSI target such as a Virtual Tape Library (VTL). After changes to the iSCSI configuration, an IPL of the iSCSI Virtual I/O Processor (IOP) must be done for the changes to take effect. Use the Hardware Service Manager function in the System Service Tools to IPL the iSCSI Virtual IOP. The device type of the IOP is 298A.

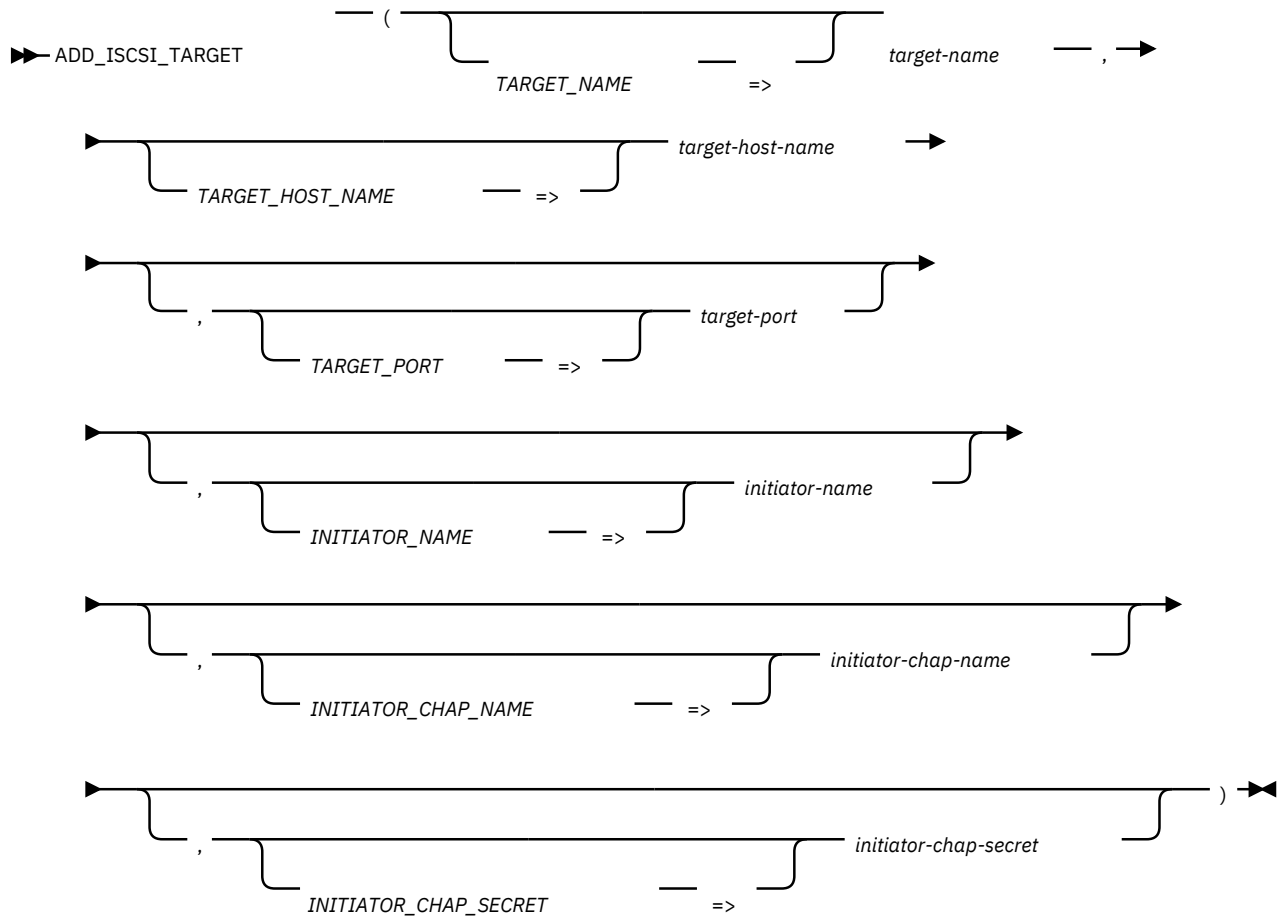
Virtual Tape Library devices are supported using the iSCSI protocol. After an IPL of the iSCSI IOP is completed, the system will automatically create tape resources and will create and vary on tape device descriptions. Once varied on, the tape devices can be used for save/restore operations.

A maximum of 16 iSCSI targets can be configured on the system.

The INITIATOR_CHAP_NAME and INITIATOR_CHAP_SECRET parameters are used if Challenge Handshake Authentication Protocol (CHAP) authentication for the connection is needed. Target authentication of the IBM i initiator is specified using the INITIATOR_CHAP_NAME and INITIATOR_CHAP_SECRET parameters. Specify NULL for both parameters if CHAP authentication will not be used.

If NULL is specified for the INITIATOR_CHAP_NAME parameter, NULL must also be specified for the INITIATOR_CHAP_SECRET parameter.

Authorization: The caller must have *IOSYSCFG special authority.



The schema is QSYS2.

target-name

A character or graphic string that contains the iSCSI target name. The administrator of the iSCSI target system supplies this value.

target-host-name

A character or graphic string that contains the TCP/IP host name or IP address of the iSCSI target.

target-port

An integer value (1-65535) specifying the remote TCP/IP port that the remote iSCSI target is listening on. If this parameter is omitted, the default value of 3260 is used. 3260 is the well-known port number for the iSCSI protocol.

initiator-name

A character or graphic string that contains the initiator name for local system. The user can supply an initiator name or use the default initiator name generated by the system. Specify NULL to use the system generated initiator name. The system generates a default initiator name using the Universal Unique Identifier (UUID) for the partition. The UUID is available when the IBM i is running on POWER8 or later hardware. If the IBM i is running on POWER7 hardware or earlier, an initiator name must be specified. To view the default initiator name generated by the system before configuring an iSCSI target, use the iSCSI_info view.

The IBM i uses the iSCSI Qualified Name (IQN) naming format for its initiator name. The following guidelines should be used when constructing an initiator name. An IQN type name consists of the following components:

- The string "iqn." (to distinguish the name as an iqn type name.)

- A date code in the format yyyy-mm. From RFC7143: This date must be a date during which the naming authority owned the domain name used in this format and should be the first month in which the domain name was owned by this naming authority at 00:01 GMT of the first day of the month
- A dot (.)
- The reverse domain name of the naming authority creating this iSCSI name. For example "com.ibm"
- Optional: Colon (:) followed by product and/or system specific information. The IBM i default name uses `ibmi.<uuid>-i<initiator index>`. The uuid is a 32 character hexadecimal identifier for the partition. The initiator index is a zero-based index. Since one initiator is supported on IBM i the initiator index is always '0'

The following is an example of a default initiator name generated for IBM i:

```
iqn.1924-02.com.ibm:ibmi.4520920efdc3454db06b96a56d912aa5-i0
```

initiator-chap-name

A character or graphic string that contains the initiator CHAP name to be used by the iSCSI target to authenticate the IBM i initiator. This can be thought of as the user name used by the IBM i initiator to access the target. The administrator of the iSCSI target system supplies this name. Specify NULL if initiator CHAP authentication is not being used.

initiator-chap-secret

A character or graphic string that contains the initiator CHAP secret to be used by the iSCSI target to authenticate the IBM i initiator. This can be thought of as the password used by the IBM i initiator to access the target. The administrator of the iSCSI target system supplies this value. Specify NULL if initiator CHAP authentication is not being used. If specified the initiator CHAP secret must be at least 12 characters in length.

Example

- Configure an iSCSI target.

```
CALL QSYS2.ADD_ISCSI_TARGET( TARGET_NAME=>'iqn.2000-03.com.swvtl:vtl.vtltest.test-47',
TARGET_HOST_NAME=>'vtltest.ibm.com', INITIATOR_CHAP_NAME=>'username',
INITIATOR_CHAP_SECRET=>'ChapSecretPW');
```

- Configure an iSCSI target.

```
CALL QSYS2.ADD_ISCSI_TARGET( TARGET_NAME=>'iqn.2000-03.com.swvtl:vtl.vtltest.test-47',
TARGET_HOST_NAME=>'vtltest.aaa.demo.aaa.com', INITIATOR_NAME=>'iqn.1924-
02.com.ibm:ibmi.45200920efdc3454db06b96a56d912aa5-i0', TARGET_PORT=>3260,
INITIATOR_CHAP_NAME=>'username', INITIATOR_CHAP_SECRET=>'ChapSecretPW');
```

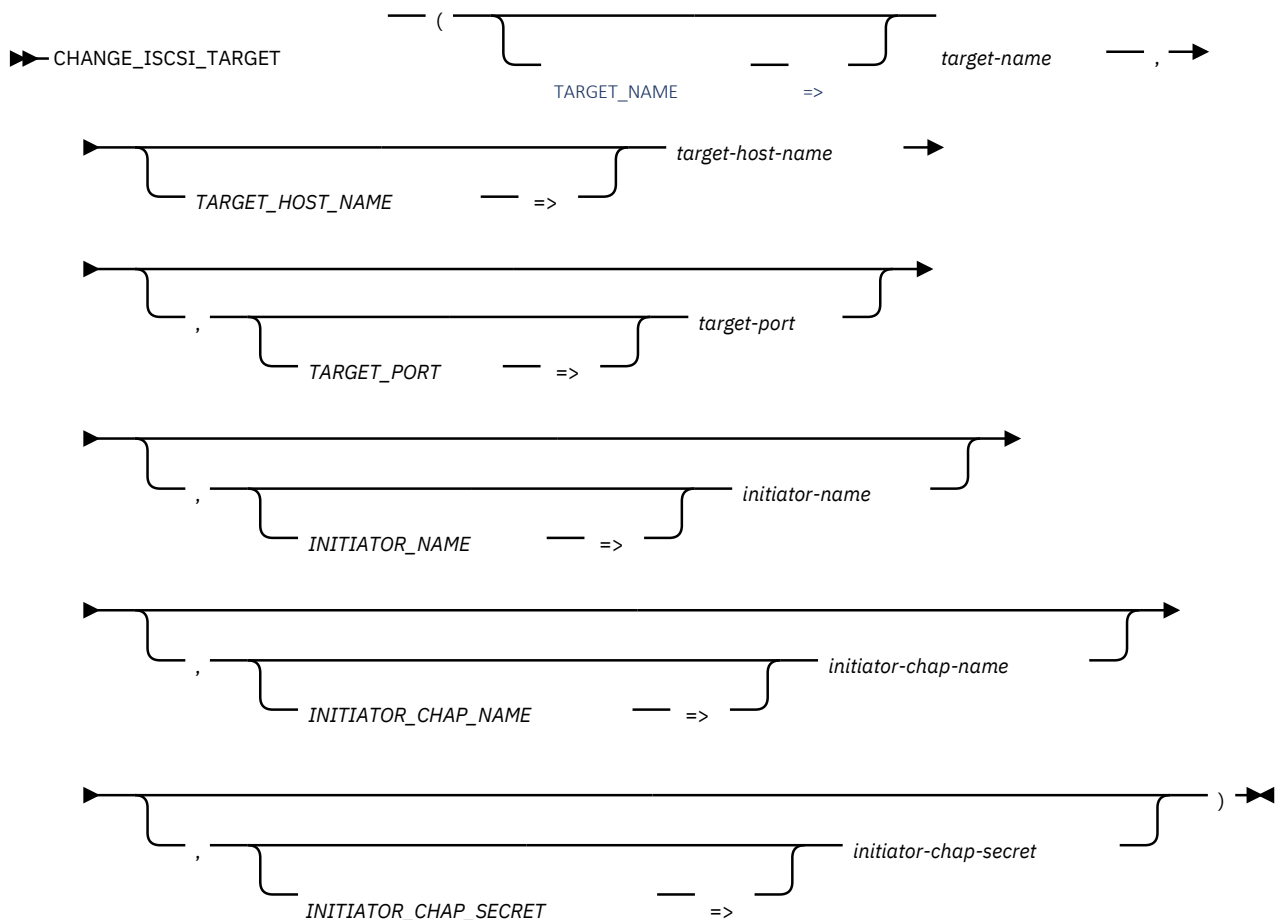
CHANGE_ISCSI_TARGET procedure

The CHANGE_ISCSI_TARGET procedure changes the configuration of an existing iSCSI target such as a Virtual Tape Library (VTL). Upon successful completion of the procedure, the new configuration parameters will be used the next time the iSCSI Virtual I/O Processor (IOP) is IPLed. Use the Hardware Service Manager function in the System Service Tools to IPL the iSCSI Virtual IOP. The device type of the IOP is 298A. The parameters associated with Challenge Handshake Authentication Protocol (CHAP) authentication are the only parameters that can be changed in the iSCSI target configuration.

The INITIATOR_CHAP_NAME and INITIATOR_CHAP_SECRET parameters are used to change the CHAP authentication for the connection. Specify NULL for both parameters to stop using CHAP authentication.

If NULL is specified for the INITIATOR_CHAP_NAME parameter, NULL must also be specified for the INITIATOR_CHAP_SECRET parameter.

Authorization: The caller must have *IOSYSCFG special authority.



The schema is QSYS2.

target-name

A character or graphic string that contains the iSCSI target name that was specified for an iSCSI target previously added using the ADD_ISCSI_TARGET procedure.

target-host-name

A character or graphic string that contains the TCP/IP host name or IP address of the iSCSI target previously added using the ADD_ISCSI_TARGET procedure.

target-port

An integer value (1-65535) specifying the remote TCP/IP port for the iSCSI target previously added using the ADD_ISCSI_TARGET procedure. If this parameter is omitted, the default value of 3260 is used.

initiator-name

A character or graphic string that contains the initiator name that was specified for an iSCSI target previously added using the ADD_ISCSI_TARGET procedure. Specify NULL if the system default initiator name was used when the target was added to the system.

initiator-chap-name

A character or graphic string that contains the initiator CHAP name to be used by the iSCSI target to authenticate the IBM i initiator. This can be thought of as the user name used by the IBM i initiator to access the target. The administrator of the iSCSI target system supplies this name. Can contain the following special value:

***SAME**

No change is made to this configuration parameter. This is the default value.

initiator-chap-secret

A character or graphic string that contains the initiator CHAP secret to be used by the iSCSI target to authenticate the IBM i initiator. This can be thought of as the password used by the IBM i initiator to access the target. The administrator of the iSCSI target system supplies this value. Can contain the following special value:

***SAME**

No change is made to this configuration parameter. This is the default value.

Example

- Modify the CHAP values for an iSCSI target.

```
CALL QSYS2.CHANGE_ISCSI_TARGET(TARGET_HOST_NAME => '10.1.1.5',  
TARGET_NAME => 'iqn.2000-03.com:vtl.Test-1',  
INITIATOR_CHAP_NAME => 'username',  
INITIATOR_CHAP_SECRET=>'ChangedChapPW');
```

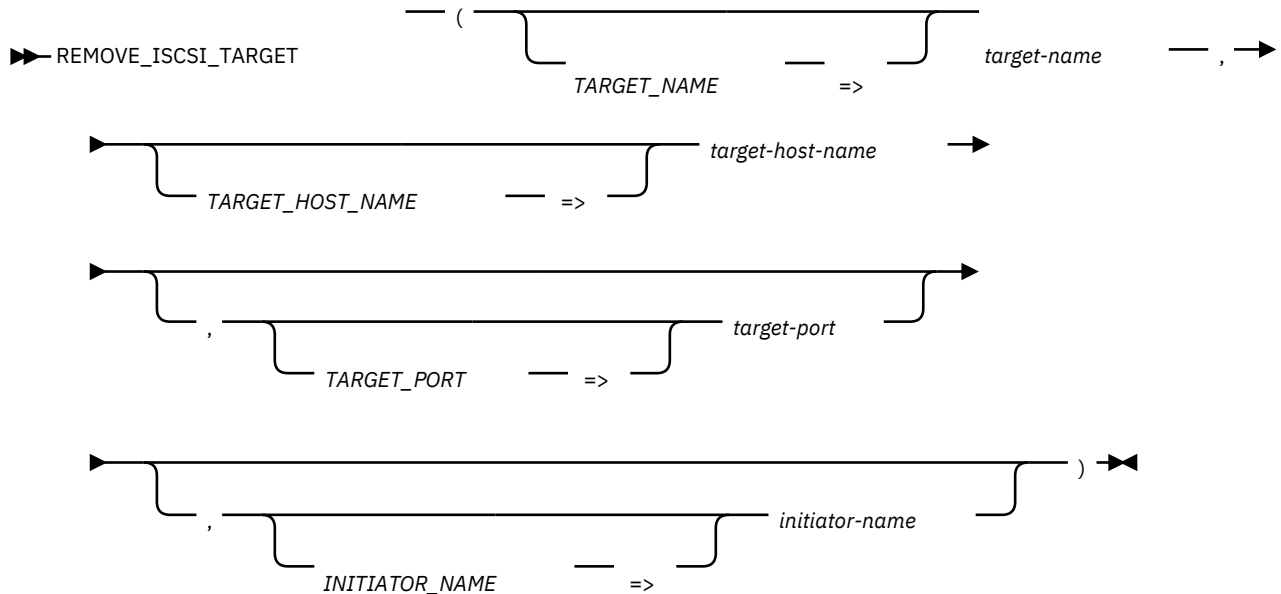
- Modify the CHAP values to stop using CHAP authentication for an iSCSI target.

```
CALL QSYS2.CHANGE_ISCSI_TARGET(TARGET_HOST_NAME => '10.1.1.5',  
TARGET_NAME => 'iqn.2000-03.com:vtl.ROCH.demo-1',  
INITIATOR_CHAP_NAME => NULL, INITIATOR_CHAP_SECRET=>NULL);
```


REMOVE_ISCSI_TARGET procedure

The REMOVE_ISCSI_TARGET procedure permanently ends use of an iSCSI target such as a Virtual Tape Library (VTL). Once the iSCSI configuration object is updated, an IPL of the iSCSI Virtual I/O Processor is required in order for the existing iSCSI connection to be ended.

Authorization: The caller must have *IOSYSCFG special authority.



The schema is QSYS2.

target-name

A character or graphic string that contains the iSCSI target name that was specified for an iSCSI target previously added using the ADD_ISCSI_TARGET procedure.

target-host-name

A character or graphic string that contains the TCP/IP host name or IP address of the iSCSI target previously added using the ADD_ISCSI_TARGET procedure.

target-port

An integer value (1-65535) specifying the remote TCP/IP port for the iSCSI target previously added using the ADD_ISCSI_TARGET procedure. If this parameter is omitted, the default value of 3260 is used.

initiator-name

A character or graphic string that contains the initiator name that was specified for an iSCSI target previously added using the ADD_ISCSI_TARGET procedure. Specify NULL if the system default initiator name was used when the target was added to the system.

Example

- Remove an iSCSI target.

```
CALL QSYS2.REMOVE_ISCSI_TARGET(TARGET_NAME => 'iqn.2000-03.com.swvtl:vtl.vtltest.test-47', TARGET_HOST_NAME=>'vtltest.xxx.aaa.com');
```

- Remove an iSCSI target with initiator name and target port specified.

```
CALL QSYS2.REMOVE_ISCSI_TARGET(TARGET_NAME => 'iqn.2000-03.com.swvtl:vtl.vtltest.test-47',TARGET_HOST_NAME=>'vtltest.xxx.aaa.com', INITIATOR_NAME=>'iqn.1924-02.com.ibm:ibmi.4520920efdc3454db06b96a56d912aa5-i0', TARGET_PORT => 3260);
```

ISCSI_INFO view

The ISCSI_INFO view returns iSCSI configuration information for the system.

One row is returned for each iSCSI target that is configured.

If no iSCSI targets are configured, one default row is returned. The target configuration values in that row are NULL except for the INITIATOR_NAME column. The INITIATOR_NAME column contains the default initiator name generated by the system. This is useful when configuring the iSCSI target system. Note that the default initiator name is generated on systems running on POWER8 or later hardware

Authorization: The caller must have *IOSYSCFG special authority.

The following table describes the columns in the view. The system name is ISCSI_INFO. The schema is QSYS2.

Table 1. ISCSI_INFO view

Column Name	System Column Name	Data Type	Description
TARGET_NAME	TGT_NAME	VARCHAR(223) Nullable	The iSCSI target name of the iSCSI target.
TARGET_HOST_NAME	TGT_HOST	VARCHAR(255) Nullable	The TCP/IP host name of the iSCSI target.
TARGET_PORT	TGT_PORT	INTEGER Nullable	TCP/IP target port being used for iSCSI Connection.
INITIATOR_NAME	INIT_NAME	VARCHAR(223)	The iSCSI initiator name associated with the iSCSI target.
INITIATOR_CHAP_NAME	INIT_CHAP	VARCHAR(255) Nullable	The Challenge-Handshake Authentication Protocol (CHAP) name used by the IBM i iSCSI initiator to authenticate with the iSCSI target. Contains the null value if CHAP authentication is not in use.
RESOURCE_NAME	RESOURCE	VARCHAR(10) Nullable	Resource Name of the iSCSI Virtual I/O Processor (IOP).
TARGET_STATUS	TGT_STATUS	VARCHAR(25) Nullable	Current status of the iSCSI target. ACTIVE Connection to the iSCSI target is active ACTIVE PENDING CHANGE Connection to iSCSI target is active. A change to the target configuration will take effect when an IPL of the iSCSI Virtual IOP is completed. ACTIVE PENDING REMOVE Connection to iSCSI target is active. The connection to the target will end when an IPL of the iSCSI Virtual IOP is completed. CONNECTING System is attempting to make a connection to the iSCSI target. CONNECTING PENDING CHANGE System is attempting to make initial connection to the iSCSI target. A change to the target configuration will take effect when an IPL of the iSCSI Virtual IOP is completed. CONNECTING PENDING REMOVE

System is attempting to make initial connection to the iSCSI target. Attempts to connect to the target will end when an IPL of the iSCSI Virtual IOP is completed.

FAILED

The system failed to connect to the target. The administrator should check the configuration values.

FAILED PENDING CHANGE

The system failed to connect to the target. A change to the target configuration will take effect when an IPL of the iSCSI Virtual IOP is completed.

FAILED PENDING REMOVE

The system failed to connect to the target. Attempts to connect to the target will end when an IPL of the iSCSI Virtual IOP is completed.

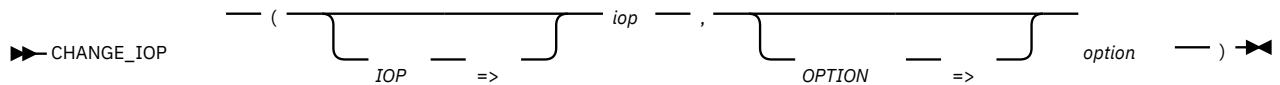
PENDING ADD

The target has been configured, but the system has not attempted a connection. The system will attempt to connect to the target when the iSCSI Virtual IOP is completed.

CHANGE_IOP procedure

The CHANGE_IOP procedure initiates an operation on an I/O Processor. This procedure can be used to perform functions that are available in the Hardware Service Manager.

Authorization: The caller must have *IOSYSCFG special authority.



The schema is QSYS2.

iop

A character or graphic string that identifies the I/O processor. The following special value can be specified:

ISCSI

The iSCSI virtual I/O processor is changed by this procedure. The iSCSI virtual I/O processor is used to connect to iSCSI target devices such as a virtual tape library. This procedure can be used after changes are made to the iSCSI configuration using the ADD_ISCSI_TARGET, CHANGE_ISCSI_TARGET, or REMOVE_ISCSI_TARGET procedures. Existing connections to iSCSI targets will be ended. If the IPL option is used, new connections will be established based on the iSCSI configuration.

option

A character or graphic string that identifies the operation to perform on the I/O processor.

IPL

IPL the I/O processor.

Example

- IPL the iSCSI I/O Processor.

```
CALL QSYS2.CHANGE_IOP(IOP=>'ISCSI', OPTION=>'IPL');
```

Advanced Analysis Configuration

The AA macro for IBM i iSCSI configuration is `iscsiswiconfig`. The main options for this macro are:

-dumpinitiators: Dump configuration and status information for iSCSI initiators.

Before configuring any iSCSI targets, the `-dumpinitiators` option can be used to get the default initiator name for the IBM i partition. The system generates a default initiator name using the Universal Unique Identifier (UUID) for the partition. The UUID is available when the IBM i is running on power 8 or later hardware. If the IBM i is running on power 7 hardware or earlier, the system administrator must supply the IBM i initiator name. Note: The configuration displayed is the one currently active in the IOP, If you change the configuration it will not be displayed until the IOP is re-IPLed.

-dumptargets: Dump configuration and status information for all iSCSI targets. Note: The configuration displayed is the one currently active in the IOP, If you change the configuration it will not be displayed until the IOP is re-IPLed.

-addtarget: Configure a new target on the system using the following parameters:

-initiatorname: (Required) Initiator name for local system. The user can supply an initiator name or pass the keyword `*GENERATE`. If `*GENERATE` is specified, the system will use the default initiator name. The system generates a default initiator name using the Universal Unique Identifier (UUID) for the partition. The UUID is available when the IBM i is running on power 8 or later hardware. If the IBM i is running on power 7 hardware or earlier, the system administrator must specify the initiator name. The `-dumpinitiators` option can be used before adding a target to see the system generated initiator name.

The IBM i uses IQN type naming format for its default initiator name. An IQN type name consists of the following:

The string "iqn." (to distinguish the name as an iqn type name)

A date code in the format `yyyy-mm`. From RFC7143: This date must be a date during which the naming authority owned the domain name used in this format and should be the first month in which the domain name was owned by this naming authority at 00:01 GMT of the first day of the month.

A dot (.)

The reverse domain name of the naming authority creating this iSCSI name. For example, "com.ibm".

Optional: Colon (:) followed by product and/or system specific information. The IBM i default name uses `ibmi.<uuid>-i<initiator index>`. The uuid is a 32 character hexadecimal identifier for the partition. The initiator index is a zero-based index. Since there is one initiator is supported on IBM i the initiator index is always '0'.

The following is an example default initiator name for IBM i:

```
iqn.1924-02.com.ibm:ibmi.4520920efdc3454db06b96a56d912aa5-i0
```

-targethostname: (Required) Host name of internet address for iSCSI target system

- targetname**: (Required) Target name: The target name is similar to the initiator name. This name is provided by the administrator of the target VTL.
- targetport**: (Optional) Target port number, default is 3260
- initiatorchapname**: (Optional) Initiator CHAP name. **Note**: All characters in the CHAP name are translated to upper case. Thus, the user configuration on the VTL console must be all upper case.
- initiatorchapsecret** : (Optional) Initiator CHAP secret. **Note**: All characters in the CHAP secret are translated to upper case. Thus, the user configuration on the VTL console must be all upper case.
- reiplscsiop**: Re-IPL the iSCSI IOP, ends connections to iSCSI targets and makes new connections based on configuration.
- removetarget**: Remove an existing target from the system using the following parameters:
 - initiatorname**: (Required) Initiator name for local system. The user can supply an initiator name or pass the keyword *GENERATE. If *GENERATE is specified, the system will use the default initiator name.
 - targethostname**: (Required) Host name of internet address for iSCSI target system
 - targetname**: (Required) Target name
 - targetport**: (Optional) Target port number, default is 3260
- changetarget**: Change an existing target on the system using the following parameters (note this can be used to change CHAP parameters):
 - initiatorname**: (Required) Initiator name for local system. The user can supply an initiator name or pass the keyword *GENERATE. If *GENERATE is specified, the system will use the default initiator name.
 - targethostname**: (Required) Host name of internet address for iSCSI target system
 - targetname**: (Required) Target name
 - targetport**: (Optional) Target port number, default is 3260
 - initiatorchapname**: (Optional) Initiator CHAP name. **Note**: All characters in the CHAP name are translated to upper case. Thus, the user configuration on the VTL console must be all upper case.
 - initiatorchapsecret** : (Optional) Initiator CHAP secret. **Note**: All characters in the CHAP secret are translated to upper case. Thus, the user configuration on the VTL console must be all upper case.
- clearconfig**: Clear iSCSI configuration, removes all configured iSCSI targets and takes system back to the GA state.
- newname**: Specify one or more of the parameters needed for target configuration. Since Advanced Analysis allow a limited number of characters for parameters, the -newname and -appendname parameters allow the administrator to break the target specification into several shorter macro commands. The specify one of the names needed to configure an iSCSI target, specify -newname with -initiatorname, -targetname, -targethostname, initiatorchapname, or initiatorchapsecret and the parameter value. If there is not enough room to specify the entire name, the -appendname can be used to specify the rest of the parameter. When all necessary names are specified, the -commit option should be used to configure the target. The system stores one set of target configuration parameters, so an administrator can configure only one

target at a time using this method. `-newname` replaces any previous target configuration parameter that may have been specified. Specify one of the following with `-newname`:

-initiatorname: (Optional) Initiator name for local system. Not needed if using the system generated initiator name. See `-addtarget -initiatorname` for information about initiator names.

-targethostname: (Optional) Host name of internet address for iSCSI target system

-targetname: (Optional) Target name. The target name is similar to the initiator name. This name is provided by the administrator of the target VTL.

-initiatorchapname: (Optional) Initiator CHAP name. **Note:** All characters in the CHAP name are translated to upper case. Thus, the user configuration on the VTL console must be all upper case.

-initiatorchapsecret : (Optional) Initiator CHAP secret. **Note:** All characters in the CHAP secret are translated to upper case. Thus, the user configuration on the VTL console must be all upper case.

-appendname: Append to name for target configuration, use one of the following:

-initiatorname: (Optional) Append to the initiator name for local system. Not needed if using the system generated initiator name.

-targethostname: (Optional) Append to the host name or internet address for iSCSI target system

-targetname: (Optional) Append to the target name

-initiatorchapname: (Optional) Initiator CHAP name. **Note:** All characters in the CHAP name are translated to upper case. Thus, the user configuration on the VTL console must be all upper case.

-initiatorchapsecret : (Optional) Initiator CHAP secret. **Note:** All characters in the CHAP secret are translated to upper case. Thus, the user configuration on the VTL console must be all upper case.

-setport: Specify port number for target configuration to be finalized with `-commit`. Not needed if the default iSCSI port is being used.

-targetport (Required when `-setport` is specified)

-commit: Configure a target using parameters previously specified with `-newname`, `-appendname`, and `-setport`.

In order to configure iSCSI on the IBM i, the administrator needs to know the following information:

- The TCP/IP host name or IP address of the VTL that is the iSCSI target.
- The iSCSI target name of the VTL. The administrator of the iSCSI target can supply this name.
- The IBM i iSCSI initiator name.

If running on power 8 or later hardware, a system generated initiator name can be generated and will have the following format:

iqn.1924-02.com.ibm:ibmi.6B9CE26E559E4763824F597B5ED7077A-i0
where 6B9CE26E559E4763824F597B5ED7077A is the UUID of the system.

Normally, the macro with desired options is too long to issue as a single macro invocation in Advanced Analysis. Each name in a target configuration specification can be configured in separate macro invocations using the `-newname` option of the `iscsiswiconifg` macro. After all names have been specified, the configuration change is finalized using the `-commit` option of the `iscsiswiconifg` macro. If a name is too long to specify in a single macro invocation, it can be split across multiple invocation using the `-appendname` option. Note that `iscsiswiconifg -newname -initiatorname` is not needed if using the system generated initiator name.

Example using the system generated initiator name and no CHAP authentication:

```
iscsiswiconifg -newname -targetname iqn.2000-03.com.xyz:vtl.vtltest.demo-39  
iscsiswiconifg -newname -targethostname 10.1.1.5  
iscsiswiconifg -commit
```

Example with a user supplied initiator name and no CHAP authentication:

```
iscsiswiconifg -newname -initiatorname iqn.1924-02.com.ibm:ibmi:TEST-LPID-FFFFFFFF-i0  
iscsiswiconifg -newname -targetname iqn.2000-03.com.XYZ:vtl.ABC-XYB-ROCH.demo-1  
iscsiswiconifg -newname -targethostname 10.1.1.5  
iscsiswiconifg -commit
```

Example using the system generated initiator name and CHAP authentication:

```
iscsiswiconifg -newname -targetname iqn.2000-03.com.xyz:vtl.vtltest.chap  
iscsiswiconifg -newname -targethostname 10.1.1.5  
iscsiswiconifg -newname -initiatorchapname SOMECHAPNAME  
iscsiswiconifg -newname -initiatorchapsecret SOMECHAPSECRET  
iscsiswiconifg -commit
```

IPL The IOP:

After making any iSCSI configuration changes, the iSCSI controller must be IPLed in order for the changes to take effect. If the VTL has been power cycled the iSCSI controller also needs to be IPLed in order to recover the connection.

To do this use either:

- `iscsiswiconifg -reipliscsiop`
- issue the `STRSST` command.

select option 1 (Start a Service tool)

select option 7 (Hardware service manager)

select option 2 (Logical Hardware Resources)

select option 1 (System bus resources)

Scroll through the bus resources, look for one with a Type-Model or 298A-001, select option 6 for that resource.

Select option 4 to (IPL I/O Processor)

At this point you can exit hardware service manager and SST.

If it works, there should be new tape device descriptions with names TAPMLBxx. The number of tape devices created depends on the VTL configuration.

Save/Restore and Migration

This document presumes the user is familiar with save/restore operations, and only describes the differences when using a VTL. For many operations, the VTL may be used exactly like a physical tape library. However, because the connection to the library is via TCPIP, there is no support for doing a D-Mode IPL from the virtual library.

Moving a partition, and Disaster Recovery Save/Restore both have to be done in multiple steps, to allow both the required D-Mode IPL, and restoring the majority of saved data from the VTL.

Creating D-Mode Media/Saving the system

Because D-Mode cannot be done from an iSCSI VTL, saving the system using the iSCSI VTL must be done in two steps. Described here is a method to create a virtual optical IMGCLG and moving that to an IBM i partition capable of hosting an NFS D-mode/install of the target. Once the target is IPLed with TCPIP started, the VTL can be used to restore the bulk of the data being moved.

Full System Save

Create an optical based IMGCLG on the LPAR that needs to be saved.

Create media large enough to contain the SAVSYS, or for multiple media, the first should be a minimum size of 4.7GB.

Backup the OS, BRMS (if available) and any LPPs needed to use the iSCSI VTL to the virtual optical device containing the image catalog. Suggest using

GO SAVE option 22

SAVLIB LIB(QGPL)

SAVLIB LIB(QUSRSYS)

VFYIMGCLG is used to create the BOOTP directory required for NFS IPL. It can be done locally (and then the entire directory and file set moved to the save media), or the virtual media can be copied, and the VFYIMGCLG done as part of recovery process.

Example:

```
VFYIMGCLG IMGCLG(image_catalog_name) TYPE(*LIC) SORT(*YES) NFSSHR(*YES)
```

The virtual media created will be the source for D-Mode IPL

If you are doing a disaster recovery save, the IFS files representing the optical image catalog can be archived to your iSCSI attached tape.

Backup up the rest of the user data with the iSCSI attached tape. For disaster recovery saves, you need to remember that the save (both the IMGCLG from step 4, and the rest of the data from this step may need to be saved offsite.

If the save/restore operation requires the system to be in restricted state, you will need to do the following steps.

Vary the MLB off

ENDSBS SBS(*ALL) to get the machine in restricted state.

When the machine is in restricted state, you can restart TCP with STRTCP STRSVR(*NO) STRIFC(*NO) STRPTPPRF(*NO).

Do a NETSTAT, and work with Ipv4/Ipv6 interface status and start the appropriate stacks.

When the interface (NETSTAT Display TCP/IP stack status) is ACTIVE, vary the MLB back on.

Save the LIC and Operating system,

GO SAVE 21 or

GO SAVE 23

(Note: You must specify “NONE” for the "End TCP/IP wait time" menu option, or TCPIP will be shut down, causing the iSCSI VTL to become unusable.)

(Note: Some of the commands issued during GO SAVE 21 and GO SAVE 23 processing do not support specifying the volume ID, so you need to set up a mounted category for the VTL, or deallocate one of the drive resources from the VTL and vary it on as a stand-alone device to use for those operations.)

D-MODE IPL and Restore

Provision another IBM i that will be the network install server system for the recovery. Attach your iSCSI tape and restore the image catalog.

Do a D-Mode IPL from the network install server and restore the base OS

Restore programs and files saved in step 3 - “Backup the OS, BRMS (if available) and any LPPs needed to use iSCSI VTL ...”

Example:

```
GO RESTORE option 22
RSTLIB LIB(QGPL)
RSTLIB LIB(QUSRSYS)
```

Connect the restored partition to the iSCSI tape and restore the rest of the data.