

IBM Aggregated Sysplex Pricing and Sysplex Verification

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Version History

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1. The Aggregated Sysplex Pricing

1.1. Introduction

IBM allows monthly license charge software licenses to be aggregated across a qualified Parallel Sysplex when certain criteria are met.

To qualify, machines must comply with the criteria in each of the following four categories: hardware, software, operation and verification. Machines that meet all the criteria are known as 'actively coupled'. Please use the navigation links above to access the details for each of these categories.

- [Hardware Criteria to be considered 'actively coupled'](#)
- [Software Criteria to be considered 'actively coupled'](#)
- [Operational Criteria to be considered 'actively coupled'](#)
- [Verification Criteria to be considered 'actively coupled'](#)

1.2. Criteria to be considered 'actively coupled'

Hardware Criteria

You must have two or more eligible mainframes that are physically attached via coupling links to a common Coupling Facility. In addition, time synchronization must be provided using either timer links to a common Sysplex Timer or coupling links transporting Server Time Protocol ("STP") timing information in an STP Coordinated Timing Network ("CTN").

Note: If a Coupling Facility is divided into multiple logical partitions (LPARs), all mainframes must be attached to the same Coupling Facility LPAR.

Eligible Mainframes

Eligible Mainframes are listed in the [Mainframe Exhibits section of the z Systems Software Contracts web site](#) with one of the following notations:

- "PSLC=YES" in the PSLC column
- "PSLC=Agg" in the PSLC column
- "WLC" or "(A)" in the WLC column

Coupling Facility list

Qualifying Coupling Facilities may be one of the following:

- Standalone Coupling Facilities, as listed in the Machine column of the Standalone Coupling Facility entry on the [Mainframe Exhibits section of the z Systems Software Contracts web site](#).

- Mainframes in which LPARs may be configured to act as Coupling Facilities, as listed in the [Mainframe Exhibits section of the z Systems Software Contracts web site](#). Mainframes which qualify are designated by the letters "CF" in the Coupling Facility column.

Software Criteria

All images that comprise the Parallel Sysplex environment must run an eligible operating system. In addition, each image in the sysplex must have at least one eligible systems enablement function common and activated to use the coupling facility.

Eligible Operating Systems

The following programs at the stated release level or higher, or subsequent versions, are required.

- z/OS V3 (5655-ZOS)
- z/OS V2 (5650-ZOS)
- z/OS V1(5694-A01)

Eligible Systems Enablement functions

- Application Data Sharing including:
 1. IMS/TM: with IMS DB or DB2
 2. CICS: with IMS DB or DB2 or VSAM RLS
 3. TSO and DB2 data sharing
 4. An eligible Independent Software Vendors Data Base
- WebSphere MQ shared message queues (added 2 Nov 2004)
- HSM common recall queues (added 2 Nov 2004)
- Enhanced catalog sharing (added 2 Nov 2004)
- GRS Star Implementation
- JES2 Checkpoint in the coupling facility
- RACF database caching
- SmartBatch multisystem processing
- Automated tape sharing and switching (no longer available after z/OS V1.1)
- VTAM Generic Resources
- VTAM MULTINODE Persistent Sessions
- System logger SYSLOG (OPERLOG)
- System logger LOGREC
- System logger Resource Recovery Services

Operational Criteria

The images participating in the sysplex and running the selected systems enablement function must account for at least 50% of the total z/OS on each machine in the Parallel Sysplex. A mainframe can only be in one Parallel Sysplex for aggregation purposes.

System Integrated Information Processors (zIIPs) are factored into the PLEXCALC calculation, as z/OS elements can execute on these processors. However, LPARs that predominantly run their workloads on these specialized engines will not be considered in the final certification process. It is important to note that zAAPs and zIIPs cannot serve as the primary basis for determining the



PrimaryPlex. Instead, the workload must predominantly utilize General CP processors and have an indication of shared workloads across the CPUs to meet the criteria.

Additionally, Internal Coupling Facility (ICF) engines and Integrated Facility for Linux (IFL) engines are excluded from the calculation, as they do not support z/OS workloads.

Verification Criteria

The customer must notify IBM when they build a new Parallel Sysplex which qualifies for aggregated pricing. If all terms and conditions are met, aggregated Parallel Sysplex pricing will apply on receipt of the notification.

The customer must notify IBM when they add an additional mainframe into an existing qualified Parallel Sysplex. If all terms and conditions are met, aggregated Parallel Sysplex pricing will apply on receipt of the notification.

Customers that do not meet the criteria for 'actively coupled' are not entitled to the benefits of aggregated Parallel Sysplex pricing.

For guidance and compliance, IBM may require verification of these criteria via a completed [Sysplex Verification Package](#).

2. IBM Sysplex Verification Package

2.1. Introduction

IBM's Parallel Sysplex Aggregation Terms and Conditions are formally documented in the following IBM contracts:

- Attachment for Parallel Sysplex License Charges (PSLC) (INTC/Z125-5205)
- Attachment for IBM System z Workload License Charges (WLC) (INTC/Z125-6516)
- Attachment for zNALC License Charges on IBM System z (zNALC) (INTC/Z125-7454)
- Attachment for IBM System z Advanced Workload License Charges (AWLC) (INTC/Z125-8538)

Throughout this document, the term 'PricingPlex' will be used to indicate a group of machines over which you would like to aggregate the MSUs for software pricing purposes. If all terms are met, aggregation of MSUs is possible under four IBM pricing metrics: PSLC, WLC, zNALC, and AWLC. Aggregation is not applicable on standalone machines. Aggregation only applies to machines with pricing metrics PSLC, WLC, zNALC, or AWLC.

Throughout this document, the term 'PrimaryPlex' will be used to indicate a group of LPARs housing separate instances of the z/OS which all belong to the same Parallel Sysplex. By definition, the LPARs belonging to the PrimaryPlex must exist across two or more machines. Also, by definition, the LPARs belonging to the PrimaryPlex must generate 50% or more of the z/OS based workload on each machine where the PrimaryPlex exists. The 50% requirement can be met by the utilization of a single, individual LPAR running on a machine that belongs to the PrimaryPlex, or by combining LPAR utilizations from more than 1 LPAR found a single machine, that belong to the PrimaryPlex.

To complete the verification process, you must fill in the Verification Form and produce a set of reports that are described in this document. The form and the reports must be submitted to IBM together, which we refer to as a completed Sysplex Verification Package. You will need to submit one completed Sysplex Verification Package per PricingPlex.

A downloadable version of the Verification Form can be found in the following link:

<https://ibm.biz/SysplexVerForm>.

IBM will request that you submit a completed Sysplex Verification Package whenever:

- You create a new PricingPlex*,
- You change any machine (e.g., model upgrades or model downgrade) in the PricingPlex , or
- You have an anniversary checkpoint for an overlay agreement, such as an Enterprise License Agreement (known as Enterprise Software and Services Offering in some regions) or an Open Infrastructure Offering, or
- You have an anniversary checkpoint under your AWLC, WLC, or PSLC contract.
- As part of the annual Sysplex Pricing revalidation process.
- During compliance-related activities.



*In the case that you are adding or changing a machine in an existing PricingPlex or creating a new PricingPlex, you must notify IBM in writing to obtain aggregated charges. IBM will provide such charges beginning on the first day of the month following your notification. You then have two calendar months to submit your completed Sysplex Verification Package. If you do not submit an acceptable package within the two-calendar month window, IBM has the right to automatically disaggregate the software charges until you can provide a completed Sysplex Verification Package

2.2. Verification Form Explanation

Please review the explanations for each field in each section to better understand how to complete the Verification Form.

Technical Section	
1. Name of PrimaryPlex	It is a requirement that each machine wishing to aggregate must have 50% or more of its MVS-based workload originating from LPARs that participate in a common Parallel Sysplex. If this common Parallel Sysplex meets the 50% rule, then we refer to this Parallel Sysplex as the PrimaryPlex. Please indicate the PrimaryPlex that meets the 50% rule and exists on all the machines in the proposed PricingPlex.
2. Common Systems Enablement Function used by the named PrimaryPlex	It is a requirement that all LPARs participating in the PrimaryPlex must exploit a common systems enablement function, either Application Data Sharing (e.g., DB2 data sharing) or Resource Sharing (e.g., JES2 checkpoint in Coupling Facility). Please indicate the common systems enablement function(s) that all the participating LPARs exploit.
3. Coupling Facility Structure(s) used by aforementioned Systems Enablement Function	Each common systems enablement function relies on a structure (list, lock or cache) in the Coupling Facility. Based on the common systems enablement function(s) you named, please indicate the associated structure names.
4. Selected start date and end date	You should pick 5 consecutive business days that best capture your prime shift, normal mode of operations. The default is Monday through Friday. If you need to deviate, provide an explanation Comments Section of the Verification Form.
5. Prime Shift Hours (and optional 2 consecutive eliminated hours)	You should pick 8 consecutive business hours that best capture your prime shift, normal mode of operations. The default is set to 09:00 to 17:00, local time. There is one exception to the 8 consecutive hours: IBM allows you to eliminate up to two consecutive hours each day, most commonly needed if you have unusual workloads running during lunchtime. If you need to deviate from the 09:00 – 17:00 timeframe or eliminate hours, provide an explanation in the Comments Section of the Verification Form.
6. Type / Model / Five-Digit Serial Number of each Machine in the PricingPlex	Please indicate the machine type / model / five-digit serial number (e.g., 2097-714-12345) of each machine, across which you are trying to aggregate MSUs.

Certification Section
While IBM will be the final arbiter, we expect that you are submitting a completed Sysplex Verification Package because you believe that you have a set of machines (listed under item 6 in the Technical Section of the Verification Form) which qualify for aggregation. Likewise, IBM expects that you have generated the required reports with accuracy and complete data disclosure, selecting days and hours that best represent your prime shift, during normal mode of operations. By signing the certification section, you are attesting that you have met all of these criteria and accurately completed your Sysplex Verification Package.

Comments Section

If there is anything that you need IBM to know about your technical or business environment, this is the field where you would provide such explanations. If you have needed to deviate from the suggested Monday through Friday, 9am to 5pm duration, please provide an explanation of the cause of the deviation in this section. Also, if there is anything unusual that appears on your required reports (see page 5 – 6), you should provide a description and explanation of the cause here in the comments section.

If you have multiple Sysplex Aggregations, a separate Verification Form must be submitted for each aggregation.

2.3. Reports

Overview

To produce a completed Sysplex Verification Package, you will need to generate two types of reports:

Sysplex Calculator Report: report that demonstrates the percentage of the MVS-based workload on each machine that is generated by LPARs that belong to the PrimaryPlex.

Coupling Facility Activity Report: report that demonstrates whether each LPAR in the PrimaryPlex communicates with structures, exploiting the common systems enablement function, in the common Coupling Facility.

In both of these types of reports, you should report on the duration that you indicated on the Technical Information Section of the Verification Form. Namely:

- five consecutive business days, typically Monday through Friday
- 40 prime shift hours, typically 9am to 5pm

Any deviations from the Monday through Friday, 9am to 5pm duration should be explained in the Customer Comments section of the Verification Form. IBM will allow you to eliminate up to two consecutive hours per day, most commonly needed if you run unusual workloads during lunchtime. For example, if you choose to eliminate the hours of noon and 1pm and you have a start time of 9am, then your end time would be 7pm instead of 5pm. Sysplex aggregation terms are intended to apply based upon your typical daytime interactive workloads, therefore it is not possible to specify a time period which crosses the midnight boundary.

Sysplex Calculator Instructions

The Sysplex Calculator (PlexCalc) is a no-charge, web downloadable tool that runs on the mainframe and post-processes Systems Measurement Facility (SMF) 70 records. You will need to analyze all the SMF 70 records from every LPAR of every machine on the machines in the PricingPlex. These records need not be sorted. The PlexCalc report will explain whether the machines analyzed meet the 50% rule.

You may download a copy of PlexCalc from the following link:

https://www.ibm.com/resources/mrs/assets?source=swg-zsltd&S_PKG=plexcalc



PlexCalc is an z/OS job written in JCL with a load-and-go object deck. To run PlexCalc, you must simply download the tool, upload it to your mainframe and adjust the JCL (shown below) to fit your environment:

verify parameters, see comments in job for more details

```
//EXTR EXEC PGM=LOADER,PARM='/',CUSTOMERNAME'
```

change SMF DD to point to your SMF dataset

```
//SMF DD DISP=SHR,DSN=HLQ.SMF.DATA
```

change the output dataset name to fit your environment

```
//OUTPUT DD DISP=(,CATLG),DSN=HLQ.PLEXCALC.CSV,UNIT=SYSDA,  
// SPACE=(TRK,(15,15))
```

Detailed instructions for using PlexCalc are provided on the website. The single PlexCalc report will describe the entire selected duration that you indicated on the Verification Form.

Note: Sysplex Calculator (PLEXCALC) tool is periodically revised. Any customers who have previously downloaded the calculator should be sure to download the last updated release.

Coupling Facility Activity Report Instructions

The Coupling Facility Activity Report is a standard postprocessor report included with the RMF component of z/OS that analyzes SMF 74.4 records. You will need to analyze all the SMF 74.4 records from every LPAR which participates in your PrimaryPlex, across all the machines in your PricingPlex. These records must be sorted before generating the Coupling Facility Activity Report. If you are turning on RMF Monitor III simply to generate SMF74.4 records for this sysplex verification activity, consider using RMF Monitor III with the NOCACHE, NOOPD and NOVSAMRLS options to minimize the overhead of running RMF Monitor III. The Coupling Facility Activity Report will explain whether the LPARs analyzed are actively connected and communicating with structures in the coupling facility.

If you use the provided JCL (below) for generating the Coupling Facility Activity Report, you will be able to sort your SMF 74.4s and then generate one report for all the LPARs in the Primary Technical Sysplex which describes the entire selected duration that you indicated on the Verification Form (page 3).

```
//RMFJOB JOB (0,0),'RMPPE',CLASS=A,MSGCLASS=X,NOTIFY=&SYSUID  
//RMFSORT EXEC PGM=SORT,REGION=0M  
//SORTIN DD DISP=SHR,DSN=INPUT.SMF.SMFDATA  
//SORTOUT DD DISP=(NEW,PASS),UNIT=SYSDA,SPACE=(TRK,(2000,200))  
//SORTWK01 DD DISP=(NEW,DELETE),UNIT=SYSDA,SPACE=(TRK,(2000,200))  
//SORTWK02 DD DISP=(NEW,DELETE),UNIT=SYSDA,SPACE=(TRK,(2000,200))
```



```
//SORTWK03      DD      DISP=(NEW,DELETE),UNIT=SYSDA,SPACE=(TRK,(2000,200))
//SYSPRINT      DD      SYSOUT=*
//SYSOUT        DD      SYSOUT=*
//SYSIN         DD      *
    SORT FIELDS=(11,4,CH,A,7,4,CH,A),EQUALS
    MODS E15=(ERBPPE15,36000,,N),E35=(ERBPPE35,3000,,N)
//*****
//*              RMF POSTPROCESSING
//*****
//RMFPP         EXEC     PGM=ERBRMFPP,REGION=0M
//*STEPLIB      DD      DISP=SHR,DSN=CEE.SCEERUN
//MFPIINPUT     DD      DISP=(OLD,DELETE),DSN=*.RMFSORT.SORTOUT
//MFPMMSGDS     DD      SYSOUT=*
//SYSIN         DD      *
    DATE(07132005,07202005)
    RTOD(0900,1700)
    NOSUMMARY
    SYSRPTS(CF)
    MAXPLEN(050)
    SYSOUT(X)
    DINTV(4000)
```

To learn more about generating Coupling Facility Activity Reports, please consult the RMF Report Analysis Guide at <https://www.ibm.com/docs/en/zos/3.1.0?topic=rmf-zos-resource-measurement-facility-report-analysis>. This link specifically refers to z/OS Version 3.1. Please ensure you refer to the documentation for the version you are using. The single Coupling Facility Activity Report will describe the entire selected duration that you indicated on the Verification Form if you use the supplied JCL.

Note: in the case that you've chosen to eliminate one or two hours, as explained in item 5 of the Technical Section of the Verification Form, you should still include those hours in your Coupling Facility Activity Report. For example, if you choose to eliminate the hours of noon and 1pm and you have a start time of 9am, then your Coupling Facility Activity Report should cover the hours from 9am until 7pm, including the eliminated hours. Including these eliminated intervals will not negatively impact your Coupling Facility Activity Report.

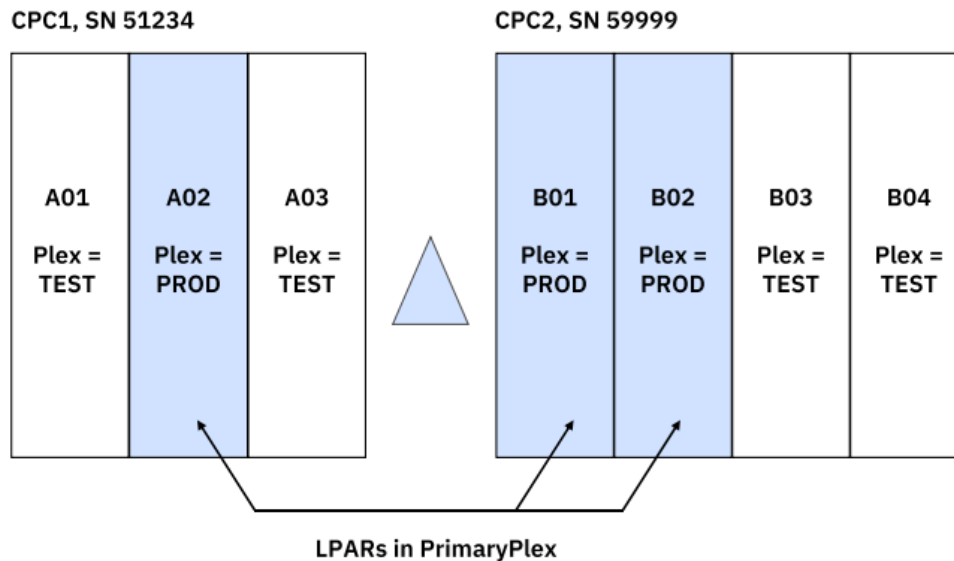
2.4. Interpreting the Sysplex Verification Package

Once you submit your completed Sysplex Verification Package to IBM, we will make an assessment of the package and be the final arbiter of whether your machines will qualify for aggregation. Below, please find an end-to-end example beginning with a high-level data center diagram showing the customer environment (Exhibit 1), followed by a sample completed Verification Form (Exhibit 2), a sample Sysplex Calculator Report (Exhibit 3) and a sample CF Activity Report (Exhibit 4). Each is described independently and then the assessment process is described at the end of this section.

Sample High-Level Data Center Diagram

In the sample High-Level Data Center Diagram, below, our sample customer has two machines (CPC1 and CPC2) and two Parallel Sysplexes (PROD and TEST). They would like CPC1 and CPC2 to be aggregated in a PricingPlex. CPC1 has three LPARs (A01, A02, A03) and CPC2 has four LPARs (B01, B02, B03, B04). The PROD Parallel Sysplex is identified as the PrimaryPlex because it spans all the machines in the proposed PricingPlex and because it is the largest consumer of CPU cycles on each machine.

Exhibit 1, Sample High-Level Data Center Diagram.



Sample Completed Verification Form

In the sample completed Verification Form, below, our sample customer has filled in each of the fields in the Technical Section. They have listed that their PrimaryPlex is called 'PROD' and that their common systems enablement function is System Logger SYSLOG (also known as OPERLOG). They have selected the last week in July as their duration and accepted the defaults of Monday – Friday, 9am until 5pm. Lastly, there are two 2097 machines in their PricingPlex machines: a model 714 with serial number 51234 and a model 723 with serial number 59999.

Exhibit 2, Sample Completed Verification Form

Technical Section	
1. Name of PrimaryPlex	PROD
2. Common Systems Enablement Function used by the named PrimaryPlex	OPERLOG
3. Coupling Facility Structure(s) used by aforementioned Systems Enablement Function	SYSTEM_OPERLOG
4. Selected start date and end date	start date Monday, 25 July 2005 end date Friday 29 July 2005



5. Prime Shift Hours (and optional 2 consecutive eliminated hours)	09:00 local time – 17:00 local time
6. Type / Model / Five-Digit Serial Number of each Machine in the PricingPlex	2097-714-51234 2097-723-5999

Sample Sysplex Calculator Report

In the sample Sysplex Calculator Report, below, our sample customer has run the Sysplex Calculator to analyze all of the LPARs on both machines in their proposed PricingPlex. When checking this report, IBM first checks to make sure that all the machines which are proposed to be included in the PricingPlex are shown on the report. The machines analyzed are listed at the top of the report, under the section labeled 'Machine'. Then IBM checks to make sure that all LPARs on the proposed machines are shown on the report. Any LPAR which is detected but where data has not been analyzed is marked with a (1) or (2). The footnote that accompanies this mark is, "This LPAR has general CPs assigned yet SMF data for this LPAR was not provided in the input stream." The only acceptable reason for LPARs to be excluded is if those LPARs are not running an MVS based operating system. Lastly, IBM checks the summary statements, below the 'Machine' section. These summary statements identify a PrimaryPlex on each machine, if one exists. LPARs in the same Parallel Sysplex are only considered a PrimaryPlex if those LPARs contribute 50% or more of the MVS-based workload on a given machine. As long as all the same PrimaryPlex is identified on all machines and that PrimaryPlex matches the one designated on the Technical Section of the Verification Form, then the customer passes this element of the verification.

In this sample, both CPC1 and CPC2 are found to have a PrimaryPlex of PROD. This also matches the customer's entry on the Verification Form and, therefore, this customer would pass the Sysplex IBM Sysplex Verification Package Calculator stage of the verification.

The sample shown in this document only displays the header of the Sysplex Calculator report. The details of the report include an interval-by-interval assessment of each LPAR. When reviewing this report, IBM will check the interval data to ensure that the intervals in the Sysplex Calculator Report match the intervals shown on the Verification Form.

Exhibit 3, Sample Sysplex Calculator Report Header

```
===== SYSPLEX CALCULATOR =====
Release Date                12/19/2005
Customer Name               CUSTOMER NAME

Machine      Serial      MSUs      LPARs
CPC1         p1234        300      A01, A02, A03
CPC2         p9999        350      B01, B02, B03, B04
```

Based on IBM's Parallel Sysplex Aggregation criteria, Sysplex Calculator has determined that the PrimaryPlex for CPC1 is PROD Based on IBM's Parallel Sysplex Aggregation criteria, Sysplex Calculator has determined that the PrimaryPlex for CPC2 is PROD



Machine =>	CPC1	CPC1	CPC1	CPC2	CPC2	CPC2	CPC2
LPAR =>	A01	A02	A03	B01	B02	B03	B04
Sysid =>	SYA1	SYA2	SYA3	SYB1	SYB2	SYB3	SYB4
SysName =>	SYA1	SYA2	SYA3	SYB1	SYB2	SYB3	SYB4
Plex =>	TEST	PROD	TEST	PROD	PROD	TEST	TEST
Contribution % =>	40.9%	53.9%	5.2%	37.2%	29.9%	29.9%	2.9%
Contribution MSU =>	95	125	12	117	94	94	9

Sample Coupling Facility Activity Report

In the sample Coupling Facility Report, below, our sample customer has run the provided JCL to analyze all of the LPARs in the PrimaryPlex. The Coupling Facility Activity Report has many sections, but we are focusing on the 'Structure Activity' section and looking only at the structure indicated on the Verification Form. First, IBM checks that each LPAR participating in the PrimaryPlex is included on the report for the designated structure. IBM can determine which LPARs participate in the PrimaryPlex by examining the Sysplex Calculator Report. Each LPAR is listed by LPAR Name, then SYSNAME (which is used on the Coupling Facility Report) and lastly Sysplex Name. Secondly, we review the report to ensure that each LPAR participating in the PrimaryPlex makes some requests to the structure which was designated on the Verification Form. The expected volume of requests will vary depending on the selected Common Systems Enablement Function and associated structure.

In this sample, we've chosen to examine the structure 'SYSTEM_OPERLOG' because the customer has indicated on the Verification Form that their common Systems Enablement Function is OPERLOG and the structure in the coupling facility supporting OPERLOG is named 'SYSTEM_OPERLOG'. The three LPARs which participate in the PrimaryPlex (SYSNAMEs A02, B01 and B02) are all listed with requests (#REQ TOTAL) to the specified structure, SYSTEM_OPERLOG.

Exhibit 4, Sample Coupling Facility Activity Report



z/OS V1R6		SYSPLEX PROD CONVERTED TO z/OS V1R5 RMF					START 07/25/2005-09.00.00 INTERVAL 010.00.000 END 07/29/2005-17.00.00 CYCLE 01.000 SECONDS				
COUPLING FACILITY NAME = FACIL03											
COUPLING FACILITY STRUCTURE ACTIVITY											
STRUCTURE NAME = SYSTEM_OPERLOG TYPE = LIST STATUS = ACTIVE											
SYSTEM		# REQ	REQUESTS		STATUS = ACTIVE		DELAYED REQUESTS				
NAME	TOTAL	#	% OF	-SERV TIME(MIC) -	REASON	#	% OF	--- AVG TIME(MIC) ---			
	AVG/SEC	REQ	ALL	AVG	STD_DEV	REQ	REQ	/DEL	STD_DEV	/ALL	
A02	206	SYNC	157	5.2	21.2	54.8	NO SCH	0	0.0	0.0	0.0
	0.01	ASync	49	1.6	528.5	340.9	PR WT	0	0.0	0.0	0.0
		CHNGD	0	0.0	INCLUDED	IN ASync	PR CMP	0	0.0	0.0	0.0
							DUMP	0	0.0	0.0	0.0
B01	1759	SYNC	1757	58.7	16.0	17.2	NO SCH	0	0.0	0.0	0.0
	0.07	ASync	2	0.1	435.5	159.1	PR WT	0	0.0	0.0	0.0
		CHNGD	0	0.0	INCLUDED	IN ASync	PR CMP	0	0.0	0.0	0.0
							DUMP	0	0.0	0.0	0.0
B02	1027	SYNC	1013	33.9	22.4	48.4	NO SCH	0	0.0	0.0	0.0
	0.03	ASync	14	0.5	1106.5	1118.9	PR WT	0	0.0	0.0	0.0
		CHNGD	0	0.0	INCLUDED	IN ASync	PR CMP	0	0.0	0.0	0.0
							DUMP	0	0.0	0.0	0.0
TOTAL	2992	SYNC	2927	97.8	18.5	34.0	NO SCH	0	0.0	0.0	0.0
	0.10	ASync	65	2.2	650.1	632.6	PR WT	0	0.0	0.0	0.0
		CHNGD	0	0.0			PR CMP	0	0.0	0.0	0.0
							DUMP	0	0.0	0.0	0.0

2.5. Pre-Submission Checklist

- ✓ Filled in completely the Verification Form.
- ✓ Produced one Sysplex Calculator Report for all z/OS-based LPARs, across all the Machines in the proposed PricingPlex.
- ✓ Produced one Coupling Facility Activity Report for all LPARs that participate in the PrimaryPlex, across all the Machines in the proposed PricingPlex.
- ✓ Submitted entire completed package to your IBM representative.

3. Sysplex Calculator (Plexcalc) Details

3.1. Sysplex Calculator Overview

The Sysplex Calculator (PlexCalc) is a no-charge, downloadable tool from IBM that can help you assess whether your Parallel Sysplex qualifies for aggregation. This tool is designed to analyze Systems Measurement Facility (SMF) data from two or more machines and produce a report describing which Parallel Sysplex each machine belongs to, if any, based upon the 50 percent criterion stated on this website.

The Sysplex Calculator is designed to analyze SMF data from any mainframe running an eligible operating system that generates RMF-compliant SMF70 records. While the Sysplex Calculator is designed to assist you in determining eligibility for Parallel Sysplex Aggregation, final eligibility determination can only be made by IBM through your IBM representative.

Key points are as follows:

- The Sysplex Calculator calculates the average utilization over a 40-hour prime shift window of time during a normal work week.
- The body of the report summarizes data as 'average MSUs consumed per hour'.
- The default input is 9am to 5pm, Monday through Friday (40 hours total) which represents IBM's view of 'prime shift'. The defaults may be adjusted through the parameters, but it is still expected that you analyze 40 total hours from 5 consecutive business days. The 'prime shift' cannot cross the midnight boundary.
- In establishing your prime shift hours, IBM will allow you to eliminate up to 2 consecutive hours per day if you wish not to consider lunchtime utilization, in the case that your lunchtime utilization patterns are not aligned with your 'prime shift' utilization patterns.
- In the event that different LPARs are running in different timezones, you may specify which LPAR represents local time (referred to as the MASTER) and all other LPAR timestamps will be adjusted to match the master.

3.2. Sysplex Calculator: Downloading the tool

The link below will take you directly to a sign-in with the IBM ID:

https://www.ibm.com/resources/mrs/assets?source=swg-zsltd&S_PKG=plexcalc

- If you already have an IBM ID then use it and click the "Continue" link.
- If you have not yet registered for an IBM ID then click the "Create an IBMID" link on that same page to create a new IBM ID.

You will then be taken to the System z Software Licensing Tool Downloads page where you can click the "Download" button.

3.3. Sysplex Calculator: Selecting SMF Data for the Input Stream

The Sysplex Calculator is an SMF post-processor. It can post process SMF70 records from any mainframes that generate RMF-compliant SMF70 records. SMF data in the input stream need not

be sorted. You may list multiple physical datasets in the SMF DD statement of the Sysplex Calculator.

The Sysplex Calculator's intent is to determine which Parallel Sysplex, if any, a mainframe belongs to based upon IBM's 50% Parallel Sysplex Aggregation criterion. To make such a determination, you must include SMF70 records from every MVS-based LPAR on a given mainframe in the input datastream. The reason that the Sysplex Calculator needs data every LPAR is because the calculator is using a field in the SMF70 record which only appears in the header section (i.e., SMF70XNM is not an indexed field). If you wish to analyze more than one mainframe at a time, simply include all the SMF data in the input datastream.

The Sysplex Calculator is designed to analyze 40 'prime shift' hours (default is 9am to 5pm, Monday through Friday). If necessary, you may use the Sysplex Calculator parameters to specify a different range of days and/or a different range of hours, but the range cannot cross the midnight boundary. You may also eliminate up to 2 consecutive hours per day if you wish not to consider lunchtime utilization, in the case that your lunchtime utilization patterns are not aligned with your 'prime shift' utilization patterns.

Please be sure to structure your input data stream to include all necessary records. If you analyze less than 40 hours or fail to include SMF70 records from all LPARs on a given machine, the Sysplex Calculator may draw incorrect conclusions.

3.4. Sysplex Calculator: How to Run the Tool

Overview

- Launch the Sysplex Calculator file (plexcalc.exe) on your PC to de-compress the file (it is a self-extracting zip file). The decompressed file will be named plexcalc.bin.
- Upload the file (PLEXCALC.BIN) to your host system. Use binary transfer and move the file to an 80 byte fixed dataset. FTP is the recommended method of file transfer.
- Customize and run the job to run on your host system.
- Download the job output (a text file) from your host system to your PC.
- View the downloaded output file with any spreadsheet or text editor that recognizes the "comma separated values" file format.

Create a Dataset On the Host

Go to ISPF 3.2 to allocate a new 80 byte fixed dataset called HLQ.CALC.JCL

1. Record Format = FB for Fixed Block
2. Record Length = 80
3. Directory Blocks = 0
4. Block Size = 0 (system determined block size)

Upload to the Host from your PC

1. [Download](#) the Sysplex Calculator
2. Begin FTP Session - command is "ftp"
3. Change FTP mode to binary - command is "bin"
4. Put the PLEXCALC.BIN file onto the host, overwriting the new MVS file called CALC.JCL - command is "put PLEXCALC.BIN CALC.JCL"

Back on the Host, Customize the Job

1. Customize the jobcard to fit your environment

```
//PLEXCALC JOB (,),MSGLEVEL=1,MSGCLASS=O,NOTIFY=NAME
```

2. Verify parameters

```
//EXTR EXEC PGM=LOADER,PARM='/,,,CUSTOMERNAME'
```

3. Change SMF DD to point to your SMF dataset

```
//SMF DD DISP=SHR,DSN=HLQ.SMF.DATA
```

4. Change the output dataset name to fit your environment

NOTE: since the LRECL for this dataset is unusual, you might be better off sending the output to a new dataset

```
//OUTPUT DD DISP=(,CATLG),DSN=HLQ.PLEXCALC.CSV,UNIT=SYSDA,
```

```
//          SPACE=(TRK,(15,15))
```

3.5. Sysplex Calculator: How to Interpret the Output

The output from the Sysplex Calculator job is referred to as the Sysplex Calculator Report or PlexCalc Report. This report is broken in to four major sections in the following order: overview, disclaimer, summary and interval-by-interval details. Each section is explained below:

Overview and Disclaimer Sections

- Release date of the tool
- Customer name (read from parameter)
- Serial number of each machine being analyzed (only last four digits of serial number can be determined from the SMF70 record)
- Software MSU rating for each machine being analyzed
- List of LPARs for each machine being analyzed
- Footnote beside an LPAR name if an LPAR is being used as the MASTER timezone
- Footnote beside an LPAR name if an LPAR with general purpose CPs exists on a machine but no SMF data was provided
- Legal disclaimers regarding the tool (always review your Sysplex Calculator reports with IBM to ensure validity)

Summary Section

Based upon the data analyzed, the Sysplex Calculator will make a determination about which Parallel Sysplex each machine belongs to, based on the 50 percent criterion contained within IBM's Parallel Sysplex aggregation rules. A machine is said to belong to a particular Parallel Sysplex only if 50% or more of the eligible operating system workload participates in the Parallel Sysplex. For each machine, the following are the three conclusions that the Sysplex Calculator may reach, based on analysis of the prime-shift weekday intervals:

- If (looking at an average over the 40 hour prime shift data in the input stream) 50% or more workload is generated by a particular Parallel Sysplex, then the Sysplex Calculator will conclude that the machine officially belongs to that Parallel Sysplex.
- If the average utilization show that a machine belongs to one Parallel Sysplex for part of the period and another Parallel sysplex for part of the period, then the Sysplex Calculator will conclude that the machine belongs to **mixed** Parallel Sysplex. This means that the machine cannot aggregate with other machines.
- If the average utilization shows that a machine belongs to no Parallel Sysplex, then the Sysplex Calculator will conclude that the machine belongs to **none** Parallel Sysplex. This means that the machine cannot aggregate with other machines.

Interval-by-Interval Section

There are seven header rows shown in the Interval-by-Interval section:

1. The first header row shows the machine for each LPAR analyzed.
2. The second header row shows the LPAR name for each LPAR analyzed.
3. The third header row shows the SYSID name for the instance of z/OS running in each LPAR analyzed.
4. The fourth header row shows the System Name for the instance of z/OS running in each LPAR analyzed (this is used to correlate with the System Name in the Coupling Facility Activity Reports).
5. The fifth header row shows the the Parallel Sysplex name for each LPAR analyzed.
6. The sixth header row shows the average utilization contribution (in %) of each LPAR's workload, as a percentage of workload on the machine over the 40-hour prime shift period.
7. The seventh header row shows the average utilization contribution (in MSUs) of each LPAR's workload, over the 40-hour prime shift period.

For each interval, you will see an MSU value listed for each MVS-based LPAR analyzed. The MSU value represents the average MSUs consumed by that LPAR, during that interval.



Help with the Sysplex Verification Package (SVP) and the Sysplex Calculator (Plexcalc) Tool

For help completing a Sysplex Verification Package (SVP), help using the Sysplex Calculator (PlexCalc), or help interpreting the PlexCalc Report, please contact IBM support and open a case (https://www.ibm.com/mysupport/s/?language=en_US). Please be sure to include all of the following information in the IBM Support case with the z/OS Team:

- Your name
- Your email address
- Your Company's name
- Your IBM Customer Number
- A thorough description of the problem or question
- The CSV output file from PlexCalc (if appropriate)
- The full JCL and any parameters used when running PlexCalc (if appropriate)
- The full SYSPRINT output from the running of PlexCalc (if appropriate)

4. References

- [Sysplex Calculator \(Plexcalc\) Download Page](#)
- [IBM z/OS Parallel Sysplex Page](#)
- [How to request Coupling Facility Report](#)
- [IBM Z – Parallel Sysplex: Coupling Facility Information](#)
- [IBM Software Pricing Reference Guide](#)
- [Pricing for IBM z Page](#)
- [Mainframe Exhibits section of the z Systems Software Contracts web site](#)