

**IBM Sysplex Verification Package**  
**4 April 2012**

Please send questions about this package to:  
[sysplex@us.ibm.com](mailto:sysplex@us.ibm.com)

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Dear Valued IBM Customer,

Welcome to the Sysplex Verification Package! This document will explain to you the IBM Parallel Sysplex verification process to help you validate to IBM that you comply with our Parallel Sysplex Aggregation terms and conditions. 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)

For a quick reference of these terms and conditions, please visit the Parallel Sysplex Aggregation website at <http://ibm.com/systems/z/swprice/sysplex/>

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, z/OS.e, OS/390 or MVS operating system (referred to in the remainder of this document as 'MVS-based') 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 MVS-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' on page 3 of this document and produce a set of reports that are described on pages 5 – 6 of this document. The **form** and the **reports** must be submitted to IBM together, which we will be referred to as **a completed Sysplex Verification Package**. You will need to submit one completed Sysplex Verification Package per PricingPlex.

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

- you create a new PricingPlex<sup>1</sup>,
- you change any machine (e.g., model upgrades or model downgrade) in the PricingPlex<sup>1</sup>, 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.

IBM may also request that you submit a completed Sysplex Verification Package during compliance-related activities.

Thank you for cooperation...

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<sup>1</sup> 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.

**Verification Form**

In the technical section, below, please fill in all the requested fields. For a detailed explanation of each field on the Verification Form, please see page 4.

<b>Technical Section</b>	
1. Name of PrimaryPlex	
2. Common Systems Enablement Function used by the named PrimaryPlex	
3. Coupling Facility Structure(s) used by aforementioned Systems Enablement Function	
4. Selected start date and end date	start date _____ end date _____
5. Prime Shift Hours (and optional 2 consecutive eliminated hours)	_ _ :00 local time – _ _ :00 local time (optional) eliminated hours ___ & ___
6. Type / Model / Five-Digit Serial Number of each Machine in the PricingPlex	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____

In the certification section, below, please read the certification statement and then place your signature in the indicated space:

<b>Certification Section</b>	
I have read the requirements for aggregated pricing, as outlined on the Parallel Sysplex website ( <a href="http://ibm.com/systems/z/swprice/sysplex/">http://ibm.com/systems/z/swprice/sysplex/</a> ) which are also outlined in the applicable IBM contract attachment (PSLC, WLC, zNALC, or AWLC). I have completed the form, above, and attached the required reports (described on pages 5 – 6 ) which support an application for aggregation pricing. I certify that all the information I am submitting is true and accurate.	
Signature	
Date	
Printed Name	
Customer Name	
IBM Customer Number	

In the comments section, below, please add any comments that you would like to be seen by the IBMer reviewing your completed Sysplex Verification Package:

<b>Comments Section</b>

## Verification Form Explanation

Please review the explanations for each field in each section to better understand how to complete the Verification Form on page 3.

<b>Technical Section</b>	
1. Name of PrimaryPlex	<i>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.</i>
2. Common Systems Enablement Function used by aforementioned PrimaryPlex	<i>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.</i>
3. Coupling Facility Structure(s) used by aforementioned Systems Enablement Function	<i>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.</i>
4. Selected start date and end date	<i>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.</i>
5. Prime Shift Hours (and optional 2 consecutive eliminated hours)	<i>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.</i>
6. Type / Model / Five-Digit Serial Number of each Machine in the PricingPlex	<i>Please indicate the machine type / model / five digit serial number (eg, 2097-714-12345) of each machine, across which you are trying to aggregate MSUs.</i>

## 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.*

## Reports: Overview & Instructions

### 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, on page 3. 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 Parallel Sysplex Aggregation website, <http://ibm.com/zseries/swprice/sysplex>. PlexCalc is an MVS 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 (page 3).

**Coupling Facility Activity Reports:** The Coupling Facility Activity Report is a standard post-processor 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
//*STEP LIB DD DISP=SHR, DSN=CEE.SCEERUN
//MFPINPUT DD DISP=(OLD,DELETE), DSN=*.RMFSORT.SORTOUT
//MFPMSGDS 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 <http://publibz.boulder.ibm.com/epubs/pdf/erbzra41.pdf>. The single Coupling Facility Activity Report will describe the entire selected duration that you indicated on the Verification Form (page 3) 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 (page 3), 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.

Note 2: if you experience a problem with your end date in the header of your Coupling Facility Activity Report, please apply the PTF associated with APAR OA14557.

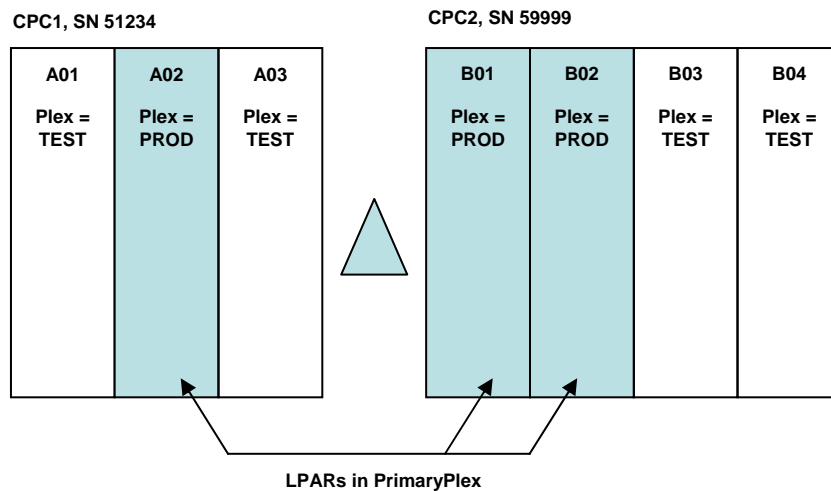
## Interpreting the Sysplex Verification Package

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

<b>Technical Section</b>	
1. Name of PrimaryPlex	<i>PROD</i>
2. Common Systems Enablement Function used by aforementioned PrimaryPlex	<i>OPERLOG</i>
3. Coupling Facility Structure(s) used by aforementioned Systems Enablement Function	<i>SYSTEM_OPERLOG</i>
4. Selected start date and end date	start date <i>Monday, 25 July 2005</i> end date <i>Friday, 29 July 2005</i>
5. Prime Shift Hours	<i>09:00 local time – 17:00 local time</i>
6. Five-Digit Serial Numbers of all the Machines in the PricingPlex	<i>2097-714-51234</i> <i>2097-723-5999</i>



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

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

## Pre-Submission Checklist

- Filled in completely the Verification Form, on page 3
- Produced one Sysplex Calculator Report for all MVS-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.