

CPU sizing with SMF113, LPAR Design and zPCR tools

Thierry Deleris, BPCE-IT
Alain Maneville, IBM

IBM Systems
Technical Events
ibm.com/training/events

- Technical University
- Munich 2017

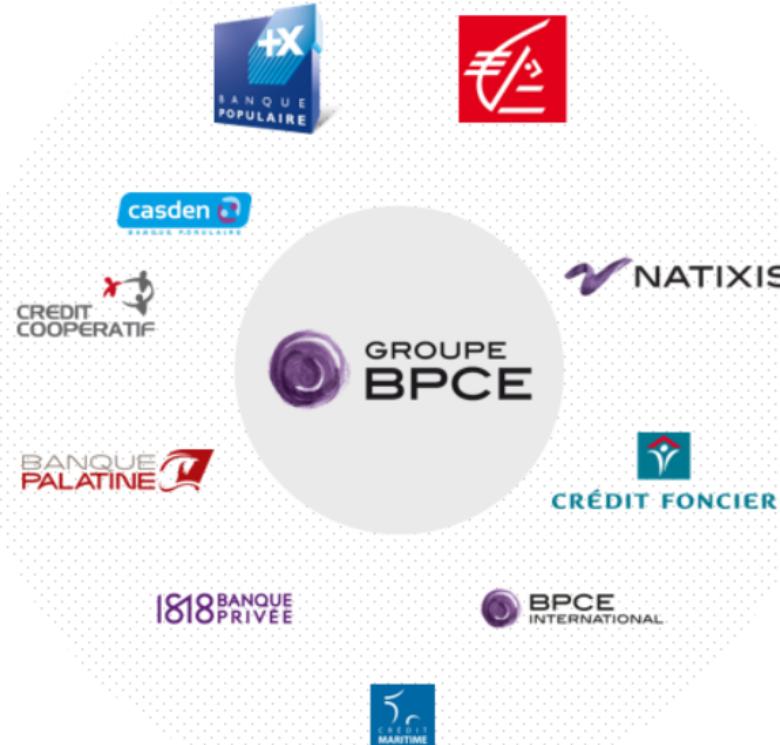




Groupe BPCE

2^e GROUPE
BANCAIRE
EN FRANCE ⁽¹⁾

avec des marques
reconnues



(1) Parts de marché : 21,5 % en épargne clientèle et
20,7 % en crédit clientèle (source : Banque de France
T4-2016 - toutes clientèles non financières).



Groupe BPCE

CHIFFRES CLÉS

9 millions de sociétaires

108 000 collaborateurs

Présent dans 48 pays

31,2 millions de clients

8 000 agences

20% du financement de l'économie française⁽¹⁾

Chiffres au 31/12/2016.

(1) 20,7 % de parts de marché en crédits toutes clientèles non financières (source : Banque de France - T4-2016).



BPCE-IT z Servers Configuration

Topaze room

B1

z13 2964-737
38.840 MIPS LSPR - 4.553 MSU

N° de série :
C70A7

8 zIIP



B3

z13 2964-401
250 MIPS LSPR - 31 MSU

N° de série :
C73B7

11 ICF

5 IFL



Saphir room

B2

z13 2964-736
37.972 MIPS LSPR - 4.452 MSU

N° de série :
C73A7

8 zIIP



B4

z13 2964-401
250 MIPS LSPR - 31 MSU

N° de série :
C7397

11 ICF

5 IFL

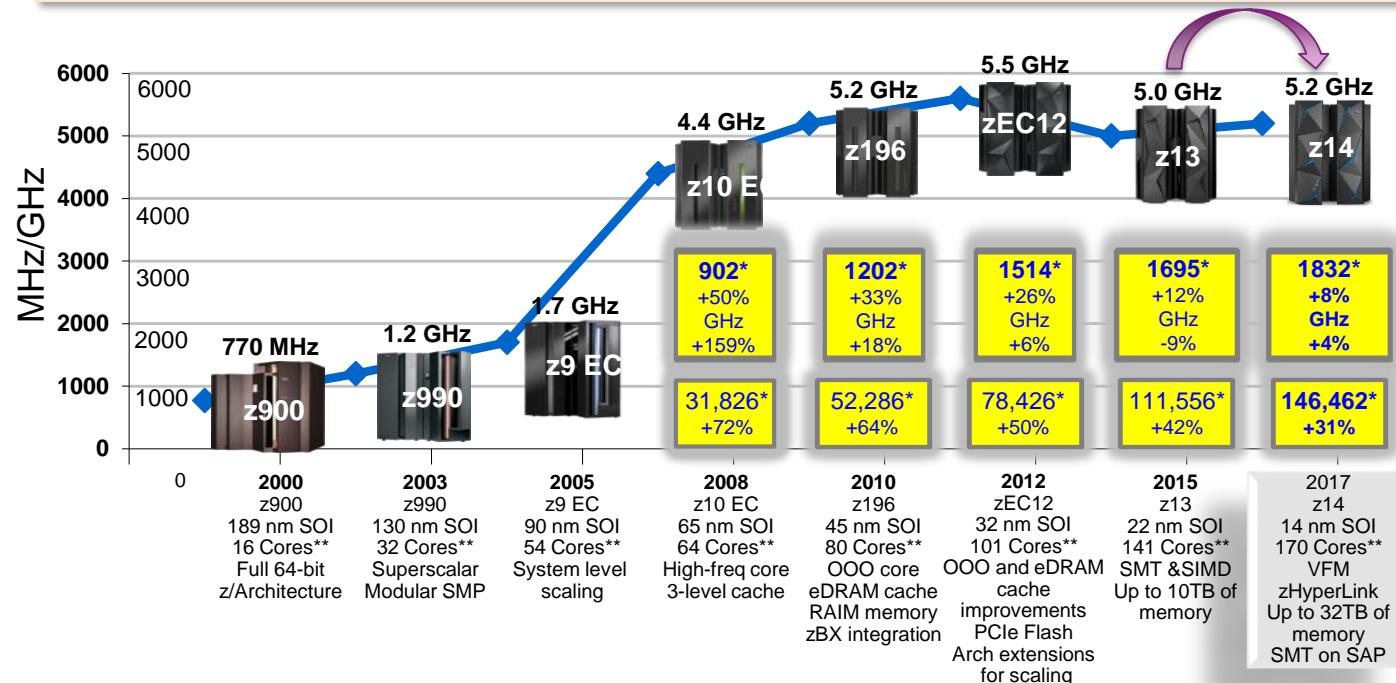




IBM

Objectives

For the **B1 Server**, evaluate the **z14 3906-7xx Model** required to guarantee at least the same current Capacity for this Server on a **z13 2964-737 Model**





- **Evaluate current configuration (i.e. z13)**
 - Workload characterization
 - Select typical day and period for reference
 - Establish a Workload Characterization hint by LPAR
 - PR/SM definition
 - Capacity Sizing
- **Select a final configuration (i.e. z14)**
 - Workload characterization
 - Adjustment of LPAR Workload Characterization hint for new architecture
 - PR/SM definition
 - Different z14 Model hypothesis
 - HiperDispatch comparison with current configuration
 - Capacity Sizing
 - Different model hypothesis comparison



IBM

Evaluate our current z13 configuration





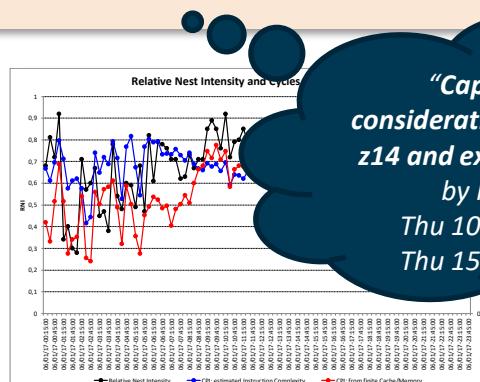
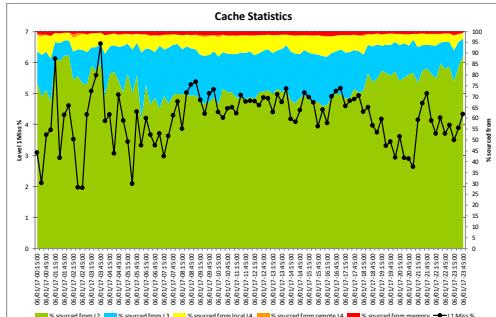
Workload characterization from SMF 113

WLM Home Page ➔ « SMF113 Reporting Tool »

https://www-03.ibm.com/systems/z/os/zos/features/wlm/WLM_Further_Info_Tools.html#SMF113



- SMF 113 records provide insight into the usage of hardware cache structures of your partitions.
- This reporting tool
 - Provides a set of REXX programs which process SMF 113 subtype 2 data from all processors types : z10, z196, zEC12, z123, z14
 - The output is a CSV file including the most common metrics which can be calculated from the SMF 113 counters
 - There is also a spreadsheet to display the most basic statistics for cache access and cycles per instructions thanks to pre defined chart sets

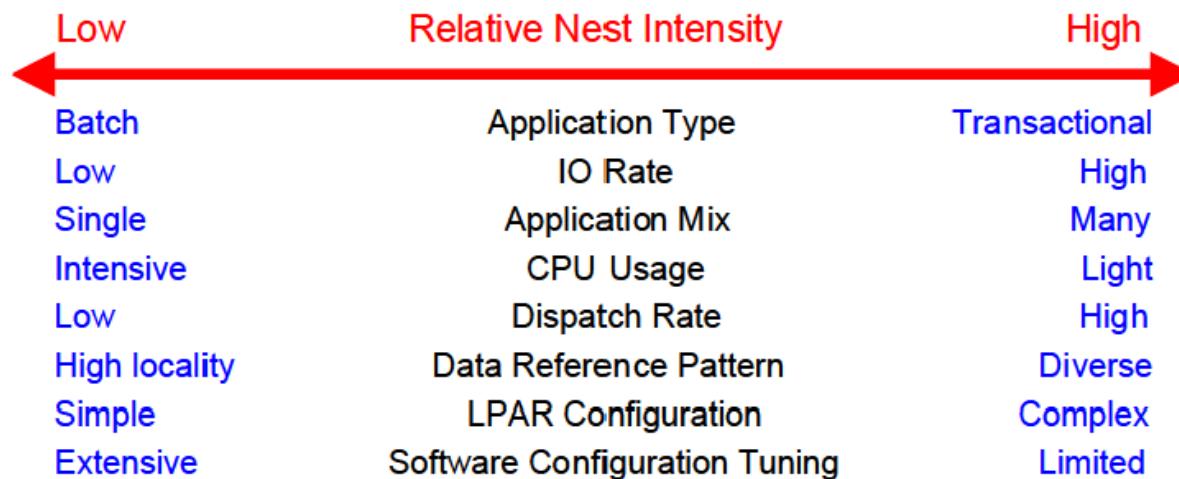


Z016480
“Capacity Planning considerations for the New IBM z14 and experiences from z13”
by Robert Vaupel
Thu 10:15-11:15 Sydney
Thu 15:15-16:15 Sydney



Factors that influence Relative Nest Intensity

- Many factors influence the capacity required by a Workload
- They are reflected by the Relative Nest Intensity (RNI)
 - **LOW RNI** : Light use of the Memory hierarchy
 - **AVERAGE RNI** : Represent the majority of customer workloads
 - **HIGH RNI** : Heavy use of the Memory hierarchy





Workload Characterization – RNI Formulas



System	Relative Nest Intensity (RNI)
z10	$(1.0 \times \#L2LP + 2.4 \times \#L2RP + 7.5 \times \#MEMP) / 100$
z196	$1.67 \times (0.4 \times \#L3P + 1.0 \times \#L4LP + 2.4 \times \#L4RP + 7.5 \times \#MEMP) / 100$
zEC12	$2.3 \times (0.4 \times \#L3P + 1.2 \times \#L4LP + 2.7 \times \#L4RP + 8.2 \times \#MEMP) / 100$
z13	2.6 $2.3 \times (0.4 \times \#L3P + 1.6 \times \#L4LP + 3.5 \times \#L4RP + 7.5 \times \#MEMP) / 100$
z14	2.4 $2.4 \times (0.4 \times \#L3P + 1.5 \times \#L4LP + 3.2 \times \#L4RP + 7.0 \times \#MEMP) / 100$

Modified in
February 2017

- For z13 & z14 :
 - **#L3P** % of L1 misses sourced from the shared chip-level L3 cache
 - **#L4LP** % of L1 misses sourced from the local drawer L4 cache
 - **#L4RP** % of L1 misses sourced from the remote drawer L4 cache
 - **#MEMP** % of L1 misses sourced from Memory



Workload Characterization - Table

L1 Miss %	Relative Nest Intensity (RNI)	Workload Characterization
< 3%	$\geq 0,75$	Average
	$< 0,75$	Low
3% à 6%	$> 1,0$	High
	0,6 à 1,0	Average
> 6%	$< 0,6$	Low
	$\geq 0,75$	High
	$< 0,75$	Average

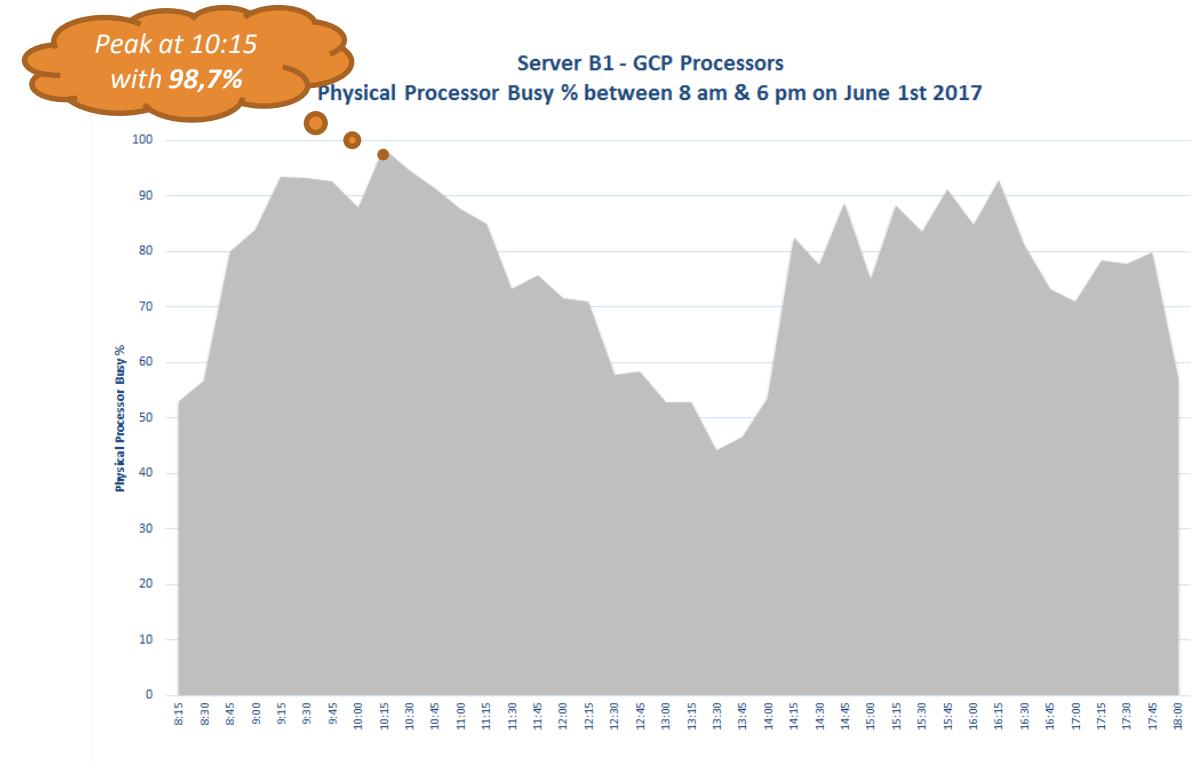
Workload Characterization is function of L1 Miss % and Relative Nest Intensity

A same Workload Characterization could be issued by different combination of L1 Miss % and Relative Nest Intensity

Apply to all processors from z10
Table may change based on feedback



Workload Characterization – Retained day



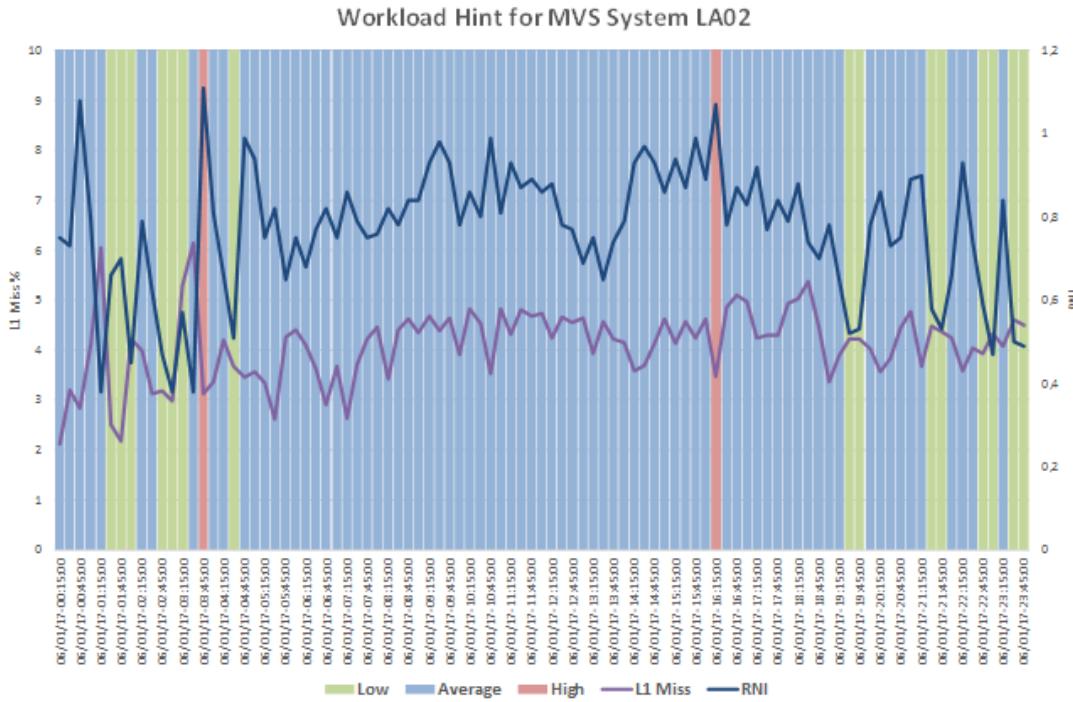
In this study we will retain as reference day **June 1st 2017 between 8 am and 6 pm for the B1 z Server**





IBM

Workload Characterization - Analysis



Based on the previous z13
RNI formula and the L1
Miss % we get for each
LPAR it's **Workload**
Characterization by interval
of time for the retained day



Green

→ *Low workload
characterization*

Blue

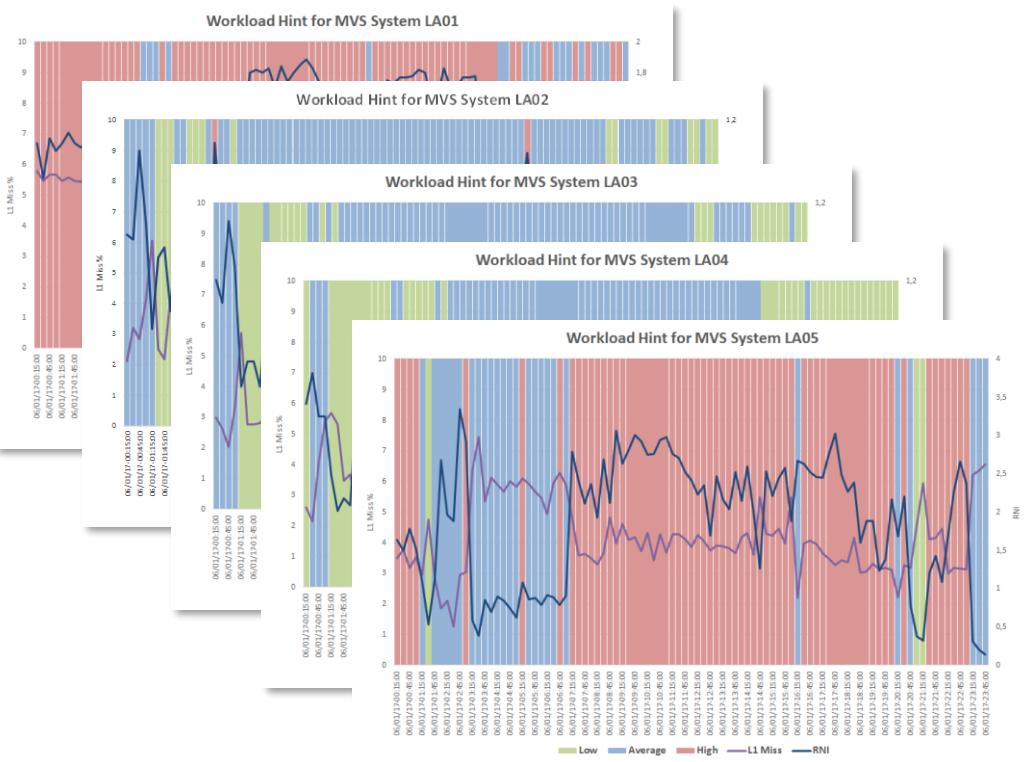
→ *Average workload
characterization*

Red

→ *High workload
characterization*



Workload Characterization - Analysis



Period selection criterias

- Typical periods when our most important work is running
→ OLTP (8 am / 6 pm)
- High CEC utilization and contention between LPARs

*In doubt
Use the higher characterization*





Workload Characterization - Results

As a result, we get for each LPAR a Workload characterization that we could use for the next steps of our CPU Sizing :



MVS Id	Workload Hint
LA01	High
LA02	Average
LA03	Average
LA04	Average
LA05	High
LA06	High
LA07	High
...	...



PR/SM Configuration – LPAR Design

WLM Home Page ➔ « LPAR Design »

https://www-03.ibm.com/systems/z/os/zos/features/wlm/WLM_Further_Info_Tools.html#Design



- The LPAR Design tool assists you in planning the LPAR layout of your Central Processor Complexes.
- The tool allows you to specify all partitions, the number of logical processors, their weights and their Workload Characterization hint.
- If you run your system in **Hiperdispatch** mode it also assists you in displaying the number of high, medium and low processors as a result of your definition.
- In addition zIIPs offload processors and IFL processors are also supported.
- You can upload or download the results from / to a zPCR study.

ID=BPCE17 - LPARDesign-HD-V9-T01 Current zPCR Version-9.0e - SpecCfgYES

This macro evaluates the LPAR definition for HD eligible processors

To create a copy of this spreadsheet Optional but recommended

To start

2 - Change Configuration
 Machine-Type: 2984-737
 EIP
 IFL

Accept SPECIAL Conf? YES

To save results To get help

Copyright IBM France 2017

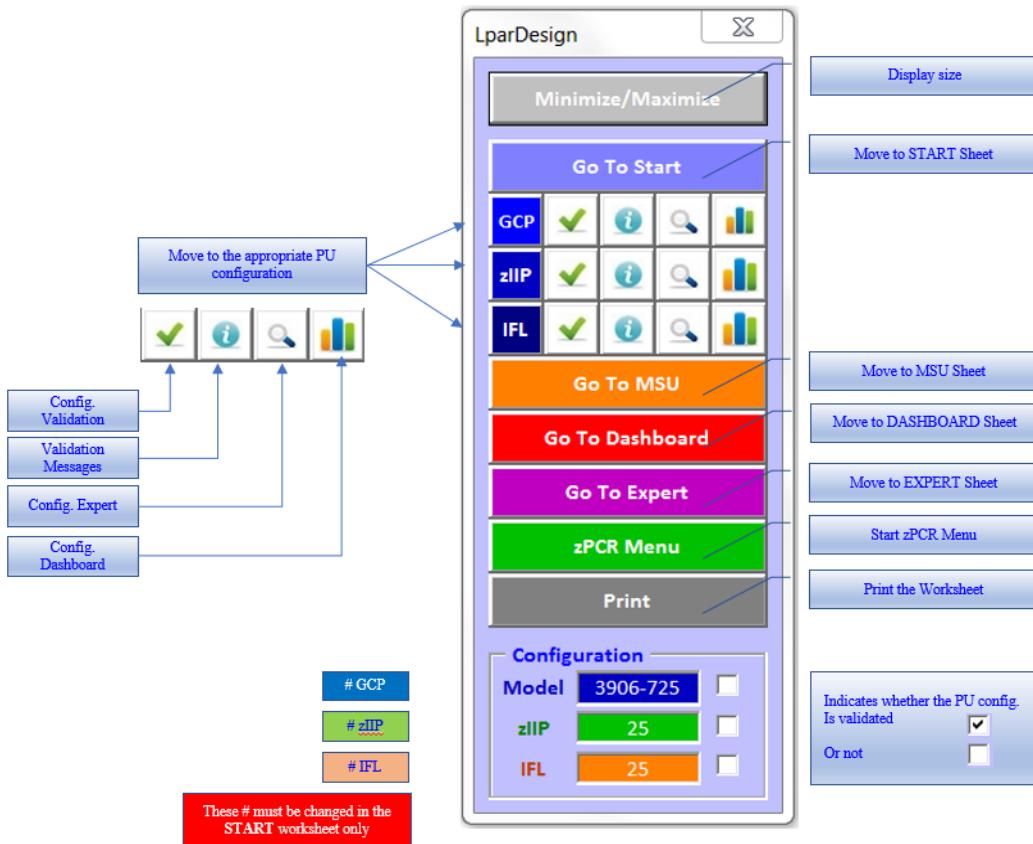
DISCLAIMER OF WARRANTIES:
The following [enclosed] macro is sample code created by Alain Maneville - IBM France.
This sample code is part of any standard IBM product and is provided to you solely for the purpose of assisting you in the PR/SM LPAR Configuration.
The code is provided "AS IS", without any kind of IBM guarantee that it will be free for any damages arising out of your use of such sample code,
even if you have been advised of the possibility of such damage.
The DASHBOARD HD code and the zPCR code have been written by Thierry Delrieu (a customer from BPCE-EIT)
The CONFIG-MSU code has been written by Robert Vaupel - IBM (STSM, z/OS Workload and Performance Management)
Support - Support will be provided on a "best effort" basis. Send the spreadsheet for an analysis to alain.maneville@ibm.com

ID=BPCE17 - LPARDesign-HD-V9-T01 Current zPCR Version-9.0e - SpecCfgYES			
CPU-LP VALUE			
LPNAME	WEIGHT	RSP	NAME
L001	15	2	0.4%
L002	210	0	6.7%
L003	15	1	4.0%
L004	487	0	12.9%
L005	15	1	4.0%
L006	25	1	6.8%
L007	8	0	2.1%
L008	50	0	13.3%
L009	2	0	0.5%
L010	14	1	3.8%
L011	5	0	1.4%
L012	10	0	2.8%
L013	10	0	2.8%
L014	170	0	46.8%
L015	15	0	4.1%
L016	15	0	4.1%
L017	658	0	18.6%
L018	15	0	4.1%
L019	82	0	2.2%
L020	79	0	2.1%
L021	15	0	4.0%
L022	21	0	5.6%
L023	15	0	4.0%
L024	218	0	5.7%
L025	15	0	4.0%
L026	170	0	4.6%
L027	7	0	0.8%
L028	7	0	0.8%
L029	3	0	0.8%
L030	7	0	0.8%
L031	3	0	0.8%

Session z016309
"Caches, PR/SM and HiperDispatch - What is new in z14"
by Alain Maneville
Tue 15:15-16:15 Sydney
Fri 11:00-12:00 Atlanta



LPAR Design – Navigation & Action Bar





PR/SM Configuration – LPAR Design - Start

ID=BPCE-IT - LPARDesign-HD-V9-T01 Current zPCR Version-9.1 - SpecCfg=YES

This macro evaluates the LPAR definition for HD eligible processors

To create a copy of this spreadsheet [Create a copy...](#) Optional but recommended

To start [Change Customer Name / ID](#)

Accept SPECIAL ConF ? YES

Select the number of zIIP processors availables

2 - Change Configuration
Machine-Type 2964-737
#zIIP 8
#IFL 0

To save results ==> [Save as...](#) To get help ==> [Help](#)

No IFL in this configuration



Select the reference
Machine type

LparDesign

Minimize/Maximize

[Go To Start](#)

GCP	✓	i	?	!
zIIP	✓	i	?	!
IFL	✓	i	?	!

[Go To MSU](#)

[Go To Dashboard](#)

[Go To Expert](#)

[zPCR Menu](#)

[Print](#)

Configuration

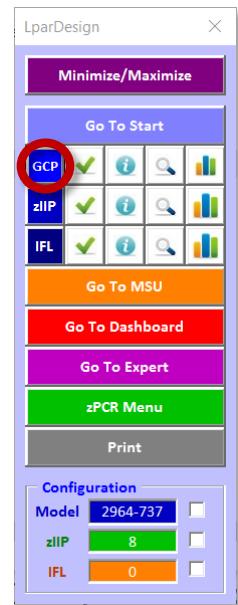
Model	2964-737	<input type="checkbox"/>
zIIP	8	<input type="checkbox"/>
IFL	0	<input type="checkbox"/>



PR/SM Configuration – LPAR Design – GCP Configuration

ID=BPCE-IT - LPARDesign-HD-V9-T01 Current zPCR Version-9.1 - SpecCfg=YES LPAR DEFINITION (CP) TOLERATION=%										
CFG-LP-VALID? Machine-type MSU Total Weight Max LPAR	vMachine		Shared-Pool							
	#PhyProc	37	37							
	#LPs (non-ICF, non-DED)	81	Ded-Pool							
	Ratio LP/PP (base)	2,19	0							
	LSPR-AVG-V2R2-MI	38 640								
	#LPARs	36								
LPARNAME	WEIGHT	#LP	%SHARE (By Pool)	RESERVED	Guaranteed #PP	Wkld LSPR	MinReq#LP	Check#LP	HD-HIGH#	HD-MED#
LA01	15	2				High				
LA02	219	5				Average				
LA03	291	5				Average				
LA04	457	7				Average				
LA05	27	2				High				
LA06	28	2				High				
LA07	5	1				High				
LB01	10	1				Low				
LB02	2	1				High				
LB03	2	1				High				
LB04	5	1				High				
LB05	16	2				Average				
LB06	796	10				Average				
LB07	656	9				Average				
LB08	103	2				Average				
LB09	52	2				High				
LB10	79	2				High				
LB11	13	1				High				
LB12	31	2				Average				
LB13	52	1				High				
LB14	215	3				Average				
LB15	17	1				Low				
LB16	75	2				High				
LC01	170	3				Average				
LC02	70	2				Average				
LC03	7	1				High				
LC04	3	1				High				

For each LPAR using GCP processor specify its Weight, GCP LP count and retained Workload Characterization in the corresponding columns





PR/SM Configuration – LPAR Design – GCP Configuration

ID=BPCE-IT - LPARDesign-HD-V9-T01 Current zPCR Version-9.1 - SpecCfg=YES LPAR DEFINITION (CP)

CFG-LP-VALID?	YES					
Machine-type	2964-737					
MSU	4 553					
Total Weight	3 536					
Max LPAR	85					
#LPARs: 36						
LPARNAME	WEIGHT	#LP	%SHARE (By Pool)	RESERVED	Guaranteed #pp	Wkld L P
LA01	15	2	0.4%		0,16	High
LA02	219	5	6.2%		2,29	Aver
LA03	291	5	8.2%		3,04	Aver
LA04	457	7	12.9%		4,78	Aver
LA05	27	2	0.8%		0,28	High
LA06	28	2	0.8%		0,29	High
LA07	5	1	0.1%		0,05	High
LB01	10	1	0.3%		0,05	Low
LB02	2					
LB03	2					
LB04						
LB05						
LB06						
LB07						
LB08						
LB09						
LB10						
LB11	13					
LB12	31	2	0.6%		0,32	Average
LB13	52	1	1.5%		0,54	High
LB14	215	3	6.1%		2,25	Average
LB15	17	1	0.5%		0,18	Low
LB16	75	2	2.1%		0,78	High
LC01	170	3	4.8%	z13,z13s Rule	1,78	Average
LC02	70	2	2.0%		0,73	Average
LC03	7	1	0.2%		0,07	High
LC04	3	1	0.1%		0,03	High

Configuration Validation

Delete selected LPAR

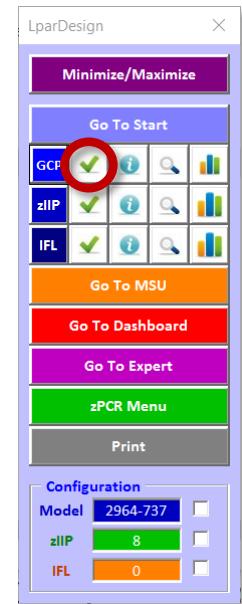
HD supported on 2964

GCP Processors Configuration Validation Comments :

Info There are 36 LPARS - Configuration is - valid(LP)
HiperDispatch Support YES
Machine Type is 2964
HiperDispatch Calculation completed

OK

Infos, Warnings, Errors after validation and HiperDispatch calculation of the GCP LPARS





PR/SM Configuration – LPAR Design – GCP Configuration

Share %

Guaranteed
#PP

HiperDispatch
calulation results

Active LP
(For zPCR study)



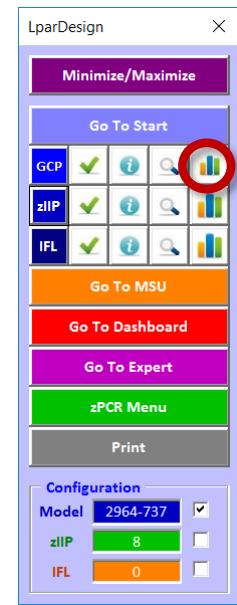
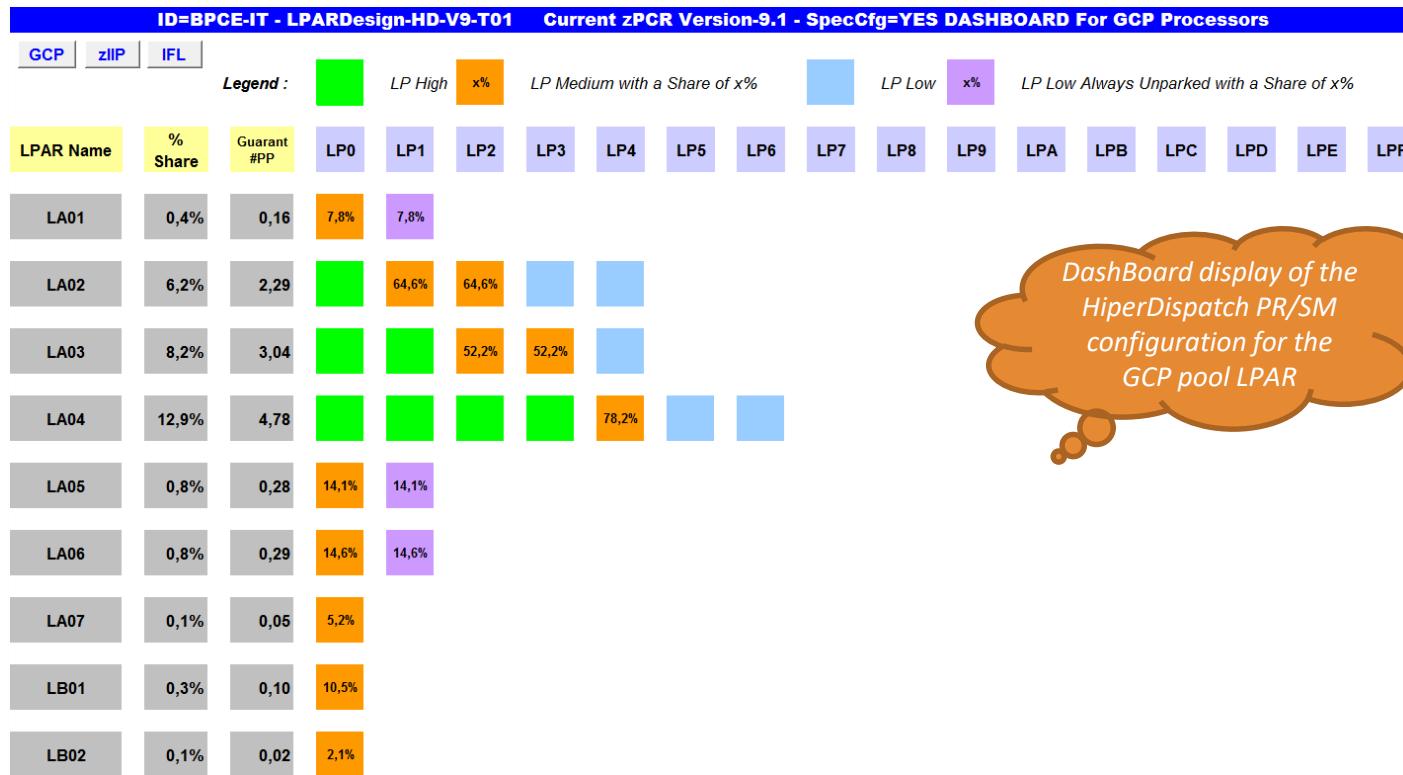
z13
2964-737

LPARNAME	WEIGHT	#LP	%SHARE (By Pool)	RESERVED	Guaranteed #PP	Wkld LSPR	MinReq#LP	Check#LP	HD-HIGH#	HD-MED#	HD-MED%	HD-LOW#	#Active LPs	#Report LPs	
LA01	15	2	0,4%		0,16	High	1	OK	0	1	15,7%	1	2	1	
LA02	219	5	6,2%		2,29	Average	3	OK	1	2	64,6%	2	3	3	
LA03	291	5	8,2%		3,04	Average	4	OK	2	2	52,2%	1	4	4	
LA04	457	7	12,9%		4,78	Average	5	OK	4	1	78,2%	2	5	5	
LA05	27	2	0,8%		0,28	High	1	OK	0	1	28,3%	1	2	1	
LA06	28	2	0,8%		0,29	High	1	OK	0	1	29,3%	1	2	1	
LA07	5	1	0,1%		0,05	High	1	OK	0	1	5,2%	0	1	1	
LB01	10	1	0,3%		0,10	Low	1	OK	0	1	10,5%	0	1	1	
LB02	2	1	0,1%		0,02	High	1	OK	0	1	2,1%	0	1	1	
LB03	2	1	0,1%		0,02	High	1	OK	0	1	2,1%	0	1	1	
LB04	5	1	0,1%		0,05	High	1	OK	0	1	5,2%	0	1	1	
LB05	16	2	0,5%		0,17	Average	1	OK	0	1	16,7%	1	2	1	
LB06	786	10	22,5%		8,33	Average	9	OK	7	2	66,5%	1	9	9	
LB07	656	9	18,6%		6,86	Average	7	OK	6	1	86,4%	2	7	7	
LB08	103	2	2,9%		1,08	Average	2	OK	0	2	53,9%	0	2	2	
LB09	52	2	1,5%		0,54	High	1	OK	0	1	54,4%	1	2	1	
LB10	79	2	2,2%		0,83	High	1	OK	0	1	82,7%	1	2	1	
LB11	13	1	0,4%		0,14	High	1	OK	0	1	13,6%	0	1	1	
LB12	31	2	0,9%		0,32	Average	1	OK	0	1	32,4%	1	2	1	
LB13	52	1	1,5%		0,54	High	1	OK	0	1	54,4%	0	1	1	
LB14	215	3	6,1%		2,25	Average	3	OK	1	2	62,5%	0	3	3	
LB15	17	1	0,5%		0,18	Low	1	OK	0	1	17,8%	0	1	1	
LB16	75	2	2,1%		0,78	High	1	OK	0	1	78,5%	1	2	1	
LC01	170	3	4,8%	z13,z13s Rule		1,78	Average	2	OK	0	2	88,9%	1	2	2
LC02	70	2	2,0%		0,73	Average	1	OK	0	1	73,2%	1	2	1	
LC03	7	1	0,2%		0,07	High	1	OK	0	1	7,3%	0	1	1	
LC04	3	1	0,1%		0,03	High	1	OK	0	1	3,1%	0	1	1	
LC05	11	1	0,3%		0,12	Average	1	OK	0	1	11,5%	0	1	1	
LC06	3	1	0,1%		0,03	Average	1	OK	0	1	3,1%	0	1	1	
LC07	20	1	0,6%		0,21	High	1	OK	0	1	20,9%	0	1	1	
LC08	1	1	0,0%		0,01	High	1	OK	0	1	1,0%	0	1	1	
LC09	50	1	1,4%		0,52	High	1	OK	0	1	52,3%	0	1	1	
LC10	26	1	0,7%		0,27	Average	1	OK	0	1	27,2%	0	1	1	
LC11	3	1	0,1%		0,03	Low	1	OK	0	1	3,1%	0	1	1	
LC12	5	1	0,1%		0,05	Low	1	OK	0	1	5,2%	0	1	1	
LC13	1	1	0,0%		0,01	High	1	OK	0	1	1,0%	0	1	1	



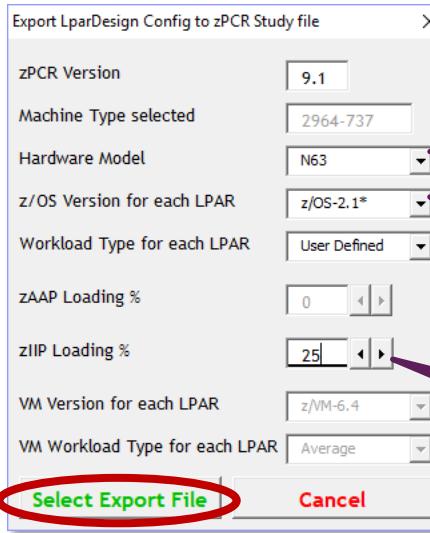
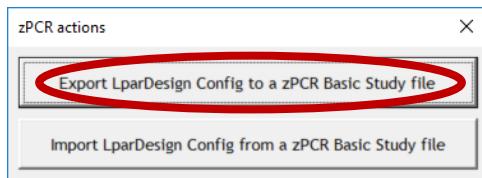


PR/SM Configuration – LPAR Design – GCP Configuration





PR/SM Configuration – Export to zPCR



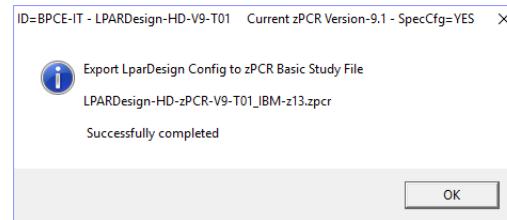
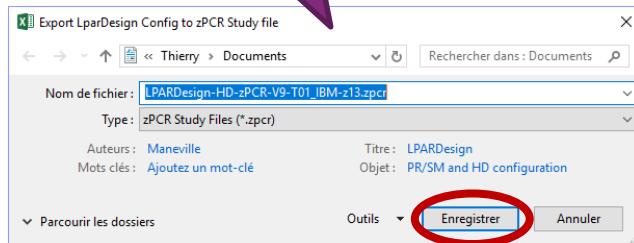
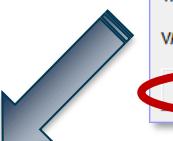
Select the correct **Harware Model** if the one proposed is not the good one

Select the **z/OS version** that will be associated to each LPAR

Adjust **zIIP Loading %** to the zIIP% retained during the reference period



Validate or modify the generated zPCR file name





Capacity Sizing

IBM TechDocs Page → zPCR (IBM's Processor Capacity Reference)

<https://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS1381>



- zPCR is a PC-based productivity tool under Windows.
- It is designed to provide capacity planning insight for IBM Z and LinuxONE processors running LPAR configurations with various workload environments under z/OS, z/VM, z/VSE, KVM, Linux, zAware, zACI, SSC, and CFCC.
- Capacity results are based on IBM's LSPR data supporting all IBM Z and Linux ONE processors including the new IBM **z14** processor family.

Welcome **Download** **Support** **Education** **Notices / FAQs**

zPCR - Processor Capacity Reference for IBM z Systems

zPCR is a PC-based productivity tool under Windows. It is designed to provide capacity planning insight for **IBM Z** and **LinuxONE processors** running LPAR configurations with various workload environments under z/OS, z/VM, z/VSE, KVM, Linux, zAware, zACI, SSC, and CFCC. Capacity results are based on IBM's **LSPR data** supporting all IBM Z and LinuxONE processors including the new **IBM z14** processor family.

Information

zPCR what's new

Product Currency

Name	ZPCR
Version	C9.1

Current available version is 9.1a since 12th September 2017

Function Selection (Untitled)

File Edit C\calculator Registration Documentation Help

zPCR
Processor Capacity Reference for IBM z Systems

Study ID:

Tab-1: Multi-Image Capacity Tab-2: Single-Image Capacity

LSPR Multi-Image Capacity Ratios

Z Systems CP/CPS **LinuxONE CP/CPS** **z Systems IFL/CPS** **Workload Categories**

**Capacity results will be relative to a 2094-701
SI capacity = 393,00 MBPS, for a 1-partition configuration**

LPAR Configuration Capacity Planning

Select capacity for specific LPAR configuration
for various General Purpose, zAAP, zJPF, IFL, IOP
and programs (XLS, VME, zVSE, Linux, zAware, CFCC)

Advanced Mode (multiple LPAR configuration support)

Configure UAR Host, Configure Partitions, Assess Capacity

**Capacity results will be relative to a 2094-701
SI capacity = 393,00 MBPS, for a 1-partition configuration**

Reference-CPU (control of zPCR function)

2094-701 @ 393,00 MBPS

QuickStart Guide

Click on Single-Image Capacity tab for LSPR Single-Image Capacity tables

Z016748
"What's new with IBM Z Capacity Planning tools?"
by Gérard Laumay
Wed 10:15-11:15 Sydney



Capacity Sizing – Load

zPCR
Processor Capacity Reference for IBM z Systems

Study ID: []

Tab-1: Multi-Image Capacity Tab-2: Single-Image Capacity

LSPR Multi-Image Capacity Ratios

z Systems GP CPs LinuxONE CPs

z Systems IFL CPs Workload Categories

Capacity results will be relative to a 2094-701 MI capacity

Check the « Advanced Mode » box

LPAR Configuration

Project Configuration

Hardware: IBM z Systems Processor models
CP types: General Purpose, zAAP, zIIP, IFL, ICF
Control System: z/OS, z/VME, z/VSE, Linux, zAware, CFCC

advanced-mode (multiple LPAR configuration support)

Enter Advanced Mode

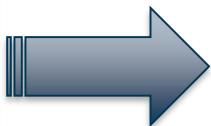
Capacity results will be relative to a 2094-701 SI capacity is 593,00 MIPS, for a 1-partition configuration

Reference-CPU (controls all zPCR function)

REF 2094-701 @ 593,00 MIPS

QuickStart Guide

Click on Single-Image Capacity tab for LSPR Single-Image Capacity tables



Click on the « Enter Advanced Mode » button

Advanced-Mode Control Panel [untitled]

File CPcalculator Documentation Help

zPCR V.9.1

Advanced-Mode Capacity Planning Control Panel

Study ID: []

Double click on a tree branch below to access the relevant windows

Reference-CPU

REF 2094-701 @ 593,00 MIPS

LSPR Multi-Image Processor Table

z Systems General Purpose CPs

z Systems IFL CPs

LinuxONE CPs

LPAR Configuration

#1 Configuration #1

Manage Compare Copy & Move Partitions QuickStart Guide

No LPAR configurations are defined

Define an LPAR configuration ...
+Drag & drop a zPCR study file, EDF, or RMF file onto the LPAR configuration icon
+Double-click the LPAR configuration icon for manual definition windows

Create additional LPAR configurations ...
+Click the "Add(+)" toolbar icon and define the LPAR configuration as described above
+Select a defined LPAR configuration icon and click the "Clone(=)" toolbar icon

Rename LPAR configurations ...
+Left-click to select the LPAR configuration icon
+Right-click LPAR configuration icon for pop-up menu and click "Rename Configuration"
+Enter new name and press ENTER

Delete LPAR configurations ...
+Select LPAR configuration icon and click the "Delete(X)" toolbar icon

Check the Reference-CPU : 2094-701 @ 593.00 MIPS

Drag & Drop on the « Configuration #1 » row the zPCR study file previously generated thanks to LPAR Design



Capacity Sizing – Configuration results

Advanced-Mode Control Panel [C:\Study Server B1 v1r0.zPCR]

File CPCalculator Documentation Help

zPCR V.9.1

Advanced-Mode Capacity Planning Control Panel

Study ID: BPCE-IT - Server B1 - z13 to z14

Double click on a tree branch below to access the relevant windows

Reference-CPU
REF 2094-701 @ 593,00 MIPS

LSPR Multi-Image Processor Table

LSPR z Systems General Purpose CPs

LSPR z Systems IFL CPs

LSPR LinuxONE CPs

#1 Server B1 - z13 737

Rename the Configuration name before double-clicking on it

Manage Compare Copy & Move Partitions QuickStart Guide

#1 Server B1 - z13 737

z13/700 LPAR Host: 2964-N63/700

Pool CP Type	#1 GP	#2 zAAP	#3 zIIP	#4 IFL	#5 ICF	CPC Total
RCPs	37	0	8	0	0	45
Partitions	36	0	19	0	0	55
LCPs	72	0	21	0	0	93
Capacity	39 399	n/a	11 738	n/a	n/a	51 137

Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

LPAR Host and Partition Configuration

zPCR V.9.1

LPAR Configuration Capacity Planning

Based on LSPR Data for IBM z Systems Processors

Study ID: BPCE-IT - Server B1 - z13 to z14

#1 Server B1 - z13 737

Description: Enter description here

LPAR Host Processor

Processor	Brand	z Systems
Processor	Family	z13
Processor	Model	2964-N63
Speed	Class	700
Drawers	Configured	2
Drawers	Unused	None
Maximum	CPs	63

Logical Partition Configuration

CP Pool	Partition Mode	No. of Real CPs	No. of Logical Partitions		LCP:RCP Ratio
			Partitions	CPs	
GP	Dedicated	0	0	0	n/a
GP	Shared	37	36	72	1,946
zAAP	Dedicated	0	0	0	n/a
zAAP	Shared	0	0	0	0,000
zIIP	Dedicated	0	0	0	n/a
zIIP	Shared	8	19	21	2,625
IFL	Dedicated	0	0	0	n/a
IFL	Shared	0	0	0	0,000
ICF	Dedicated	0	0	0	n/a
ICF	Shared	0	0	0	0,000
Totals		45	55	93	

Define LPAR Host Processor

Specify Host

Create Host and Partitions From

EDF RMF

Define Partitions

GP / zIIP IFL ICF

Copy Partitions From

EDF RMF zPCR Study

Capacity Reports

Host Summary Partition Detail Partition Utilized Capacity



Capacity Sizing – Host Summary

LPAR Host and Partition Configuration

LPAR Configuration Capacity Planning

Based on LSPR Data for IBM z Systems Processors
Study ID: BPCE-IT - Server B1 - z13 to z14

#1 Server B1 - z13 737

Description: Enter description here

LPAR Host Processor		
Processor	Brand	z Systems
Processor Family		z13
Processor Model	2964N63	700
Speed Class		700
Drawers Configured		2
Drawers Unused		None
Maximum CPs		63
CP Type	Assigned	Unused
GP	37	0
zAAP		
zIIP		
IFL		
ICF		
Total	45	55

CP Pool	Partition Mode	No. of Real CPs	No. of Logical		LCP:RCP Ratio
			Partitions	CPs	
GP	Dedicated	0	0	0	n/a
	Shared	37	36	72	1,946
zAAP	Dedicated	0	0	0	n/a
	Shared	0	0	0	0,000
zIIP	Dedicated	0	0	0	n/a
	Shared	8	19	21	2,625
IFL	Dedicated	0	0	0	n/a
	Shared	0	0	0	0,000
	Dedicated	0	0	0	n/a
	Shared	0	0	0	0,000

Define LPAR Host Processor

Specify Host

Create Host and Partitions From

EDF RMF

Capacity Reports

Host Summary Partition Detail Partition Utilized Capacity



LPAR Host [C:\...\Study Server B1 v1r0.zPCR]

LPAR Host Processor

Study ID: BPCE-IT - Server B1 - z13 to z14

#1 Server B1 - z13 737

Select Brand

z Systems Processors LinuxONE Processors

Family: z13 Speed Class: z13/700 Model: 2964N63/700

Power Mode

Full Saving

Configure Real CP Types

GP	zIIP	IFL	ICF
37	8	0	0

To define a z13 configuration without GP CPs, the z13/400 Speed Class must be selected

Click on the
« Specify Host »
button

Adjust if necessary for ICF
processors (Not currently taken
into account by Lpar Design)





IBM

Capacity Sizing – Partition Detail

LPAR Host and Partition Configuration zPCR V9.1

LPAR Configuration Capacity Planning

Based on LSPR Data for IBM z Systems Processors
Study ID: BPCE-IT - Server B1 - z13 to z14

#1 ! Server B1 - z13 737

Description: Enter description here

LPAR Host Processor		
Processor	Brand	z Systems
Processor Family	z13	
Processor Model	2964-N63	
Speed Class	700	
Drawers Configured	2	
Drawers Unused	None	
Maximum CPs	63	
CP Type	Assigned	Unused
GP	37	0
zAAP	n/s	0
zIIP	8	0
IFL	0	0
ICF	0	0
Totals	45	55
		93

Logical Partition Configuration				
CP Pool	Partition Mode	No. of Real CPs	No. of Logical	LCP:RCP
			Partitions	CPs
GP	Dedicated	0	0	0
GP	Shared	37	36	72, 1,946
zAAP	Dedicated	0	0	n/a
zAAP	Shared	0	0	0,000
zIIP	Dedicated	0	0	n/a
zIIP	Shared	8	19	21, 2,625
IFL	Dedicated	0	0	n/a
IFL	Shared	0	0	0,000
ICF	Dedicated	0	0	n/a
ICF	Shared	0	0	0,000
Totals		45	55	93

Define LPAR Host Processor

Specify Host

Create Host and Partitions From

EDF RMF

Define Partitions

GP / zIIP

Copy Partitions From

EDF RMF

Capacity Reports

Host Summary Partition Detail Partition Utilized Capacity

Click on the « Partition Detail » button

Partition Detail Report
Edit Graph Documentation

! #1 Server B1 - z13 737

Partition Detail Report
Based on LSPR Data for IBM z Systems Processors
Study ID: BPCE-IT - Server B1 - z13 to z14

**z13 Host = 2964-N63/700 with 45 CPs; GP=37 zIIP=8
55 Active Partitions; GP=36 zIIP=19**

Capacity basic: 2094-701 @ 593,00 MPPS for a shared single-partition configuration
Capacity for z/OS on z10 and later processors is represented with HyperDispatch turned ON

Partition Identification

Include	No.	Type	Name	SCP	Assigned Workload	Mode	LCPs	Weight	Weight Percent	Capping	SHT	Capacity
<input checked="" type="checkbox"/>	1	GP	LA01	z/OS-2.1*	High	SHR	2	15	0,42 %	<input type="checkbox"/>	<input type="checkbox"/>	148 1884
<input checked="" type="checkbox"/>	2	GP	LA02	z/OS-2.1*	Average	SHR	3	219	6,19 %	<input type="checkbox"/>	<input type="checkbox"/>	2 550 3 339
<input checked="" type="checkbox"/>	3	zIIP	LA02	z/OS-2.1*	Average	SHR	1	16	3,29 %	<input type="checkbox"/>	<input type="checkbox"/>	565 1 457
<input checked="" type="checkbox"/>	3	GP	LA03	z/OS-2.1*	Average	SHR	4	291	8,23 %	<input type="checkbox"/>	<input type="checkbox"/>	5 255 5 494
<input checked="" type="checkbox"/>	4	GP	LA04	z/OS-2.1*	Average	SHR	5	457	12,92 %	<input type="checkbox"/>	<input type="checkbox"/>	846 1 469
<input checked="" type="checkbox"/>	5	GP	LA05	z/OS-2.1*	High	SHR	2	35	7,76 %	<input type="checkbox"/>	<input type="checkbox"/>	266 1 884
<input checked="" type="checkbox"/>	6	GP	LA06	z/OS-2.1*	High	SHR	2	28	0,79 %	<input type="checkbox"/>	<input type="checkbox"/>	276 1 884
<input checked="" type="checkbox"/>	7	GP	LA07	z/OS-2.1*	High	SHR	1	5	0,14 %	<input type="checkbox"/>	<input type="checkbox"/>	49 942
<input checked="" type="checkbox"/>	8	GP	LB01	z/OS-2.1*	Low	SHR	1	10	0,28 %	<input type="checkbox"/>	<input type="checkbox"/>	138 1 317
<input checked="" type="checkbox"/>	9	GP	LB02	z/OS-2.1*	High	SHR	1	2	0,06 %	<input type="checkbox"/>	<input type="checkbox"/>	19 914
<input checked="" type="checkbox"/>	10	zIIP	LB02	z/OS-2.1*	High	SHR	1	1	0,21 %	<input type="checkbox"/>	<input type="checkbox"/>	21 1 287
<input checked="" type="checkbox"/>	10	GP	LB03	z/OS-2.1*	High	SHR	1	2	0,06 %	<input type="checkbox"/>	<input type="checkbox"/>	20 942
<input checked="" type="checkbox"/>	11	GP	LB04	z/OS-2.1*	High	SHR	1	5	0,14 %	<input type="checkbox"/>	<input type="checkbox"/>	49 942
<input checked="" type="checkbox"/>	12	GP	LB05	z/OS-2.1*	Average	SHR	2	16	0,45 %	<input type="checkbox"/>	<input type="checkbox"/>	186 2 218
<input checked="" type="checkbox"/>	13	zIIP	LB05	z/OS-2.1*	Average	SHR	1	53	10,91 %	<input type="checkbox"/>	<input type="checkbox"/>	1 344 1 540
<input checked="" type="checkbox"/>	13	GP	LB06	z/OS-2.1*	Average	SHR	9	796	22,51 %	<input type="checkbox"/>	<input type="checkbox"/>	8 663 9 360
<input checked="" type="checkbox"/>	13	zIIP	LB06	z/OS-2.1*	Average	SHR	2	98	20,16 %	<input type="checkbox"/>	<input type="checkbox"/>	est. 25,0 % 2 306 2 859

Table View Controls

Display zAAP/zIIP/IFL Partitions
 With Associated GP Separate by Pool

Show GP Pool Specialty Pools
 zAAP zIIP
 All Partitions GP IFL ICF
 Includes Only

Capacity Summary by Pool

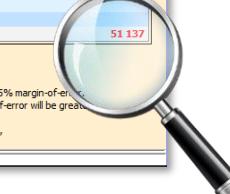
CP Pool	Real CPs	Lps	DED LCPs	LCPs	SHR	Sum of Weights	SMT Benefit	Capacity Totals
GP	37	36	72	1,946	3 536			39 399
ZIIP	8	19	21	2,625	486	est. 25 %		51 137
IFL								
ICF								
Totals	45	55	0	93				

Host Summary SMT Benefit LCP Alternatives zAAP/zIIP Loading Calibrate Capacity

For significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin-of-error.
When the default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10% For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty, expressed or implied. You are responsible for the results obtained from your use of this tool.

Input fields have white background; Single-click a "selection field" for drop-down list; Double click a "key-in field" to open.





Capacity Sizing – Results

CP Pool	Real CPs	LPs	DED LCPs	SHR		Sum of Weights	SMT Benefit	Capacity Totals
				LCPs	LCP:RCP			
GP	37	36		72	1,946	3 536		39 399
zIIP	8	19		21	2,625	486	est. 25 %	11 738
IFL								
ICF								
Totals	45	55	0	93				51 137

- This is the Capacity Summary by pool for our current configuration i.e.
« **the z13 one** »
- B1 server with a **z13 2964-737 Configuration** is valued by this zPCR study
as having about **39 399 Mips** of usable capacity for it's GCP Pool...





IBM

Select a final z14 configuration





We have to select an appropriate z14 Model
in which current Partitions and Workloads could fit...

Proposed Method

1. ***Adjust LPAR Workload characterization to z14 target***
2. ***Select a z14 7xx starting model thanks to zPCR***
3. ***From the z13 configuration previously defined in LPAR Design make the z14 7xx model configuration***
 - *Adjust LPAR Workload characterization*
 - *Optimize HiperDispatch configuration*
 - *Export as a new zPCR study*
4. ***Make a zPCR comparison study between the z13 configuration and the z14 7xx model one***
 - *If the z14 Model doesn't give at least the same projected Capacity than the z13 configuration (Minus the zPCR recommended 5% margin-of-error), repeat the process from step 3 with the next upper z14 7xx model*



Workload Characterization adjustments for z14 architecture

Currently there's no available projection method to evaluate the Workload Characterization hint of an existing configuration on a new architecture...



Conservative approach

Proposition

Thanks to the **SMF113 Reporting Tool** data extraction we could apply the z14 RNI formula onto the current configuration measured cache % data

System	Relative Nest Intensity (RNI)
z13	$2.3 \times (0.4 \times \#L3P + 1.6 \times \#L4LP + 3.5 \times \#L4RP + 7.5 \times \#MEMP) / 100$
z14	$2.4 \times (0.4 \times \#L3P + 1.5 \times \#L4LP + 3.2 \times \#L4RP + 7.0 \times \#MEMP) / 100$

As a result we potentially get for each LPAR a **new Workload Characterization** that we could use for the next steps of the final configuration CPU Sizing...

No significative variations between z13 and z14 Workload characterization for our configuration



We have to select an appropriate z14 Model
in which current Partitions and Workloads could fit...

Proposed Method

1. *Adjust LPAR Workload characterization to z14 target*
2. ***Select a z14 7xx starting model thanks to zPCR***
3. *From the z13 configuration previously defined in LPAR Design make the z14 7xx model configuration*
 - *Adjust LPAR Workload characterization*
 - *Optimize HiperDispatch configuration*
 - *Export as a new zPCR study*
4. *Make a zPCR comparison study between the z13 configuration and the z14 7xx model one*
 - *If the z14 Model doesn't give at least the same projected Capacity than the z13 configuration (Minus the zPCR recommended 5% margin-of-error), repeat the process from step 3 with the next upper z14 7xx model*



z14 Starting Model - Selection

Select « z Systems General Purpose CPs »

File Ccalculator Documentation Help
Advanced-Mode Capacity Planning Control Panel
Study ID: BPCE-IT - Server B1 - z13 to z14
Double click on a tree branch below to access the relevant windows
Reference-CPU
REF 2094-701 @ 593,00 MIPS
LSPR Multi-Image Capacity Ratios
z Systems General Purpose CPs (selected)
LSPR
LinuxONE CPs
LPAR Configurations
#1 Server B1 - z13 737

Manage Compare Copy & Move Partitions QuickStart Guide

#1	Server B1 - z13 737 z13/700 LPAR Host: 2964-N63/700					
Pool CP Type	#1 GP	#2 zAAP	#3 zIIP	#4 IFL	#5 ICF	CPC Total
RCPs	37	0	8	0	0	45
Partitions	36	0	19	0	0	55
LCPs	72	0	21	0	0	93
Capacity	39 399	n/a	11 738	n/a	n/a	51 137

Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

In the z/OS-2.2 Multi-Image LSPR Capacity Ratios table select the first z14 3906-7xx Model which give at least our Capacity request of 39 399 Mips using the Average Workload



Check only z14 family

LSPR Table Control
Settings Help
Processors Displayed
○ All Families
● Selected Families
○ Similar CPCs
○ Favorites
Selected Families
□ z9 EC □ z9 BC
□ z10 EC □ z10 BC
□ z196 □ z196 BC
□ zEC12 □ zEC12 BC
□ z13 □ z13s
□ z14

LSPR Capacity Ratio Table
Workload Graph Help
z/OS-2.2 LSPR Data (07/17/2017)

LSPR Multi-Image Capacity Ratios
z Systems General Purpose CPs

Values are applicable for z/OS; representative of z/VM, KVM, and Linux
Capacity basis: 2094-701 @ 559,792 MIPS for a typical multi-partition configuration
Capacity for z/OS on z10 and later processors is represented with HyperDispatch turned ON

Processor	Features	Flag	MSU	LSPR Workload Category				
				Low	Low-Avg	Average	Avg-High	High
3906-730	30W	=	4 249	43 401	39 496	36 236	33 542	31 221
3906-731	31W	=	4 368	44 664	40 629	37 262	34 488	32 001
3906-732	32W	=	4 488	45 922	41 758	38 286	35 437	32 770
3906-733	33W	=	4 608	47 173	42 883	39 308	36 536	34 229
3906-734	34W	=	4 727	48 420	44 003	40 324	37 447	35 168
3906-735	35W	=	4 845	49 661	45 117	41 343	38 566	36 299
3906-736	36W	=	4 963	46 225	42 340	39 169	36 088	34 007
3906-737	37W	=	5 081	43 338	40 089	37 293	34 809	32 770
3906-738	38W	=	5 199	44 331	41 004	38 142	35 725	33 637
3906-739	39W	=	5 317	45 318	41 914	38 985	36 642	34 550
3906-740	40W	=	46 300	42 818	39 823	37 729	35 550	33 457

LSPR reference table for z14

Workload Average

Select the z14 Model which give at least our Capacity request

z14 3906-734 with an estimate of 40 324 Mips for Average Workload



We have to select an appropriate z14 Model
in which current Partitions and Workloads could fit...

Proposed Method

1. *Adjust LPAR Workload characterization to z14 target*
2. *Select a z14 7xx starting model thanks to zPCR*
3. ***From the z13 configuration previously defined in LPAR Design make the z14 7xx model configuration***
 - Adjust LPAR Workload characterization***
 - Optimize HiperDispatch configuration***
 - Export as a new zPCR study***
4. *Make a zPCR comparison study between the z13 configuration and the z14 7xx model one*
 - If the z14 Model doesn't give at least the same projected Capacity than the z13 configuration (Minus the zPCR recommended 5% margin-of-error), repeat the process from step 3 with the next upper z14 7xx model*



z14 Starting Model – Configuration for z14 734

Select the retained z14 Model

2 - Change Configuration	
Machine-Type	3906-734
#zIIP	0
#IFL	0

→

ID=BPCE.IT - LPARDesign-HD-V9-T01 Current zPCR Version-9.1 - SpecCfa=YES								
CFG-LP-VALID?	NO							
Machine-type	3906-734							
MSU	4 727							
Total Weight	3 536							
Max LPAR	85							
#PhyProc	34	ψMachine Shared-Pool						
#LPs (non-ICF, non-DED)	81	Ded-Pool						
Ratio LP/PP (base)	2,38							
LSPR-AVG-V2R2-MI	40 324							
#LPARS	36							
LPARNAME	WEIGHT	#LP	%SHARE (By Pool)	RESERVED	Guaranteed #PP	Wkld LSPR	MinReq#LP	Check#LP
LA01	15	2				High		
LA02	219	5				Average		
LA03	291	5				Average		
LA04	457	7				Average		
LA05	27	2				High		
LA06	28	2				High		
LA07	5	1				High		
LB01	10	1				Low		
LB02	2	1				High		
LB03	2	1				High		
LB04	5	1				High		
LB05	15	2				Average		

Adjust LPAR Workload characterization

New HiperDispatch z14 3906 Rule could apply to some LPAR

ID=IBM Corp. - LPARDesign-HD-V9-T02 Current zPCR Version-9.1 - SpecCfg=YES LPAR DEFINITION (CP)														
CFG-LP-VALID?	YES													
Machine-type	3906-734													
MSU	4 727													
Total Weight	3 536													
Max LPAR	85													
#PhyProc	34	ψMachine Shared-Pool												
#LPs (non-ICF, non-DED)	80	Ded-Pool												
Ratio LP/PP (base)	2,35													
LSPR-AVG-V2R2-MI	40 324													
#LPARS	36													
LPARNAME	WEIGHT	#LP	%SHARE (By Pool)	RESERVED	Guaranteed #PP	Wkld LSPR	MinReq#LP	Check#LP	HD-HIGH#	HD-MED#	HD-MED%	HD-LOW#	#Active LPs	#Report LPs
LA01	15	2	0,4%		0,14	High	1	OK	0	1	14,4%	1	2	1
LA02	219	5	6,2%		2,11	Average	3	OK	1	2	55,3%	2	3	3
LA03	291	5	8,2%		2,80	Average	3	OK	2	1	79,6%	2	3	3
LA04	457	7	12,9%		4,39	Average	5	OK	3	2	69,7%	2	5	5
LA05	27	2	0,8%		0,26	High	1	OK	0	1	26,0%	1	2	1
LA06	28	2	0,8%		0,27	High	1	OK	0	1	26,9%	1	2	1
LA07	5	1	0,1%		0,05	High	1	OK	0	1	4,8%	0	1	1
LB01	10	1	0,3%		0,10	Low	1	OK	0	1	9,6%	0	1	1
LB02	2	1	0,1%		0,02	High	1	OK	0	1	1,9%	0	1	1
LB03	2	1	0,1%		0,02	High	1	OK	0	1	1,9%	0	1	1
LB04	5	1	0,1%		0,05	High	1	OK	0	1	4,8%	0	1	1
LB05	15	2	0,5%		0,15	Average	1	OK	0	1	15,4%	1	2	1

Validate new z14 configuration

LparDesign

- Minimize/Maximize
- Go To Start
- CFG
- zIIP
- IFL
- Go To MSU
- Go To Dashboard
- Go To Expert
- zPCR Menu
- Print
- Configuration
- Model 2964-737
- zIIP 8
- IFL 0



Remarks - z14 and HiperDispatch

New HiperDispatch rule on z14...



- *To get a better colocation of Vertical High and Vertical Medium Logical Processors on z14, the following rule has been reactivated for z14 :
 - From 1.5 to 1.99 guaranteed CP we get 1 Vertical High and 1 Vertical Medium
 - On z13 and z13s machines we had 2 Vertical Medium*





Remarks – Recommendations for Defining Logical Processors

New Best Practices for defining Logical Processors...

- New best practices document for defining logical CPs and zIIPs to an LPAR
 - <https://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TD106388>
- Define 1 or 2 more logicals than needed to meet CPs by weight
- Reasons :
 - Work runs most efficiently if you run with defined weight using Vertical High and Vertical Medium
 - LPAR Busy value displayed on online monitors is relative to number of logicals
 - LPAR time slice is sensitive to number of logicals → Fewer logicals leads to longer timeslice
 - Reduce the impact of a CPU loop → Fewer logicals limits potential impact
 - z/OS operations like Quiesce need to be done even for parked logicals
 - Additional system resources utilized for each logical processors



Don't over allocate the number of Logical Processor !

LPAR Design Tool generates an exception if the number of Vertical Low engines exceeds this recommendation



z14 Starting Model – Expert notes for GCP

ID=IBM Corp. - LPARDesign-HD-V9-T02 Current zPCR Version-9.1 - SpecCfg=YES EXPERT

Click for EXPERT NOTES - GCP Click for EXPERT NOTES - zIIP Click for EXPERT NOTES - IFL

LPAR	Suggested Improvement Notes - GCP - Machine Type = 3906
LA01	(R5-GCP) - Due to the "at least 2 LP rule", the first VL will be always Unparked Your current Guaranteed#PP is 0,14 - you will have 2-VM with an entitlement of 7,2% and so 2 Active LP [+]NOTE - You have 1VM and 1VL When ALL Vls will be UnParked, each VM and VL will have an entitlement of 7,2%
LA02	No special Comment or Advice for this LPAR [+]NOTE - You have 2VM and 2VL When ALL Vls will be UnParked, each VM and VL will have an entitlement of 13,8%
LA03	No special Comment or Advice for this LPAR [+]NOTE - You have 1VM and 2VL When ALL Vls will be UnParked, each VM and VL will have an entitlement of 26,0%
LA04	No special Comment or Advice for this LPAR [+]NOTE - You have 2VM and 2VL When ALL Vls will be UnParked, each VM and VL will have an entitlement of 17,43%
LA05	(R5-GCP) - Due to the "at least 2 LP rule", the first VL will be always Unparked Your current Guaranteed#PP is 0,26 - you will have 2-VM with an entitlement of 13% and so 2 Active LP

Example of a LPAR suggested improvement

LB08 (circled in red)

(R3-GCP) - You have 1-VM with an entitlement of 99%
Your current Guaranteed#PP is 0,99 - raising the Weight and removing 1-LP would give you 1-VH but with less flexibility
The New Weight should be : 104 - The current Weight is : 103 - So you must decrease another Lpar Weight by : 1 to keep Total Weight(3536) constant

ID=IBM Corp. - LPARDesign-HD-V9-T02 Current zPCR Version-9.1 - Spe... X

===== EXPERT Review GCP =====

10 LPAR(s) have Suggested Improvement

===== End Of EXPERT Review =====

Several HiperDispatch improvements suggested

Display Expert Notes for GCP

LparDesign X

Minimize/Maximize

Go To Start

GCP	✓	i	?	Search
zIIP	✓	i	?	Search
IFL	✓	i	?	Search

Go To MSU

Go To Dashboard

Go To Expert

zPCR Menu

Print

Configuration

Model 2964-737

zIIP	8
IFL	0



z14 Starting Model – HiperDispatch adjustment

LPAR	Suggested Improvement Notes - GCP - Machine Type = 3906										
	(R3-GCP) - You have 1-VM with an entitlement of 99%"										
LB08	Your current Guaranteed#PP is 0,99 - raising the Weight and removing 1-LP would give you 1-VH but with less flexibility" The New Weight should be : 104 - The current Weight is : 103 - So you must decrease another Lpar Weight by : 1 to keep Total Weight(3536) constant										



LPARNAME	WEIGHT	#LP	%SHARE (By Pool)	RESERVED	Guaranteed #PP	Wkld LSPR	MinReq#LP	Check#LP	HD-HIGH#	HD-MED#	HD-MED%	HD-LOW#
LB08	103	2	2,9%		0,99	Average	1	OK	0	1	99,0%	1

Implement suggestion



LPAR Name	% Share	Guarant #PP	LP0	LP1	LP2
LB08	2,9%	0,99	99,0%		

Get new HiperDispatch configuration

LPARNAME	WEIGHT	#LP	%SHARE (By Pool)	RESERVED	Guaranteed #PP	Wkld LSPR	MinReq#LP	Check#LP	HD-HIGH#	HD-MED#	HD-MED%	HD-LOW#
LB08	104	1	2,9%		1,00	Average	1	OK	1	0	N/A	0

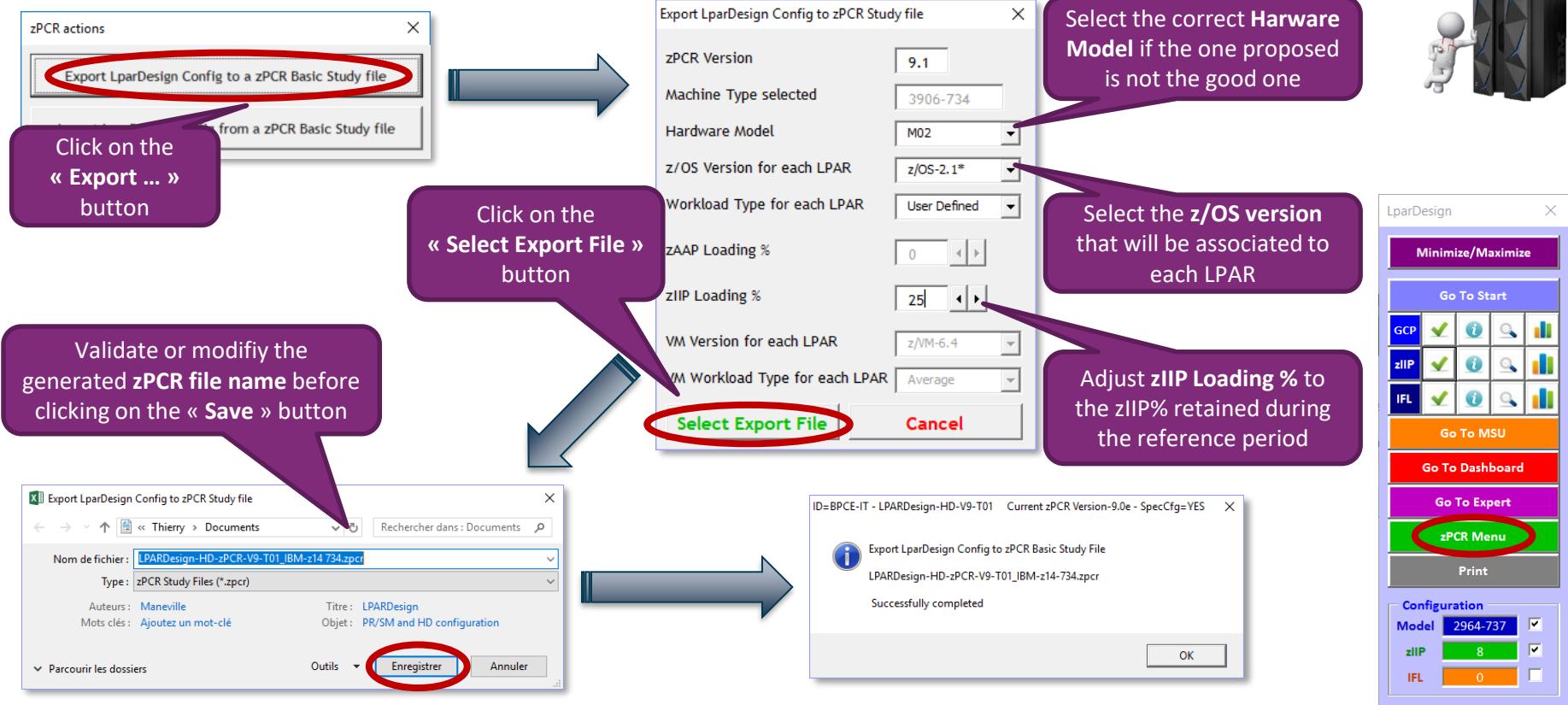


LPAR Name	% Share	Guarant #PP	LP0	LP1	LP2
LB08	2,9%	1,00	Green Bar		

Legend : LP High x% LP Medium with a Share of x%



z14 Starting Model – Export to zPCR





We have to select an appropriate z14 Model
in which current Partitions and Workloads could fit...

Proposed Method

1. *Adjust LPAR Workload characterization to z14 target*
2. *Select a z14 7xx starting model thanks to zPCR*
3. *From the z13 configuration previously defined in LPAR Design make the z14 7xx model configuration*
 - *Adjust LPAR Workload characterization*
 - *Optimize HiperDispatch configuration*
 - *Export as a new zPCR study*
4. ***Make a zPCR comparison study between the z13 configuration and the z14 7xx model one***
 - *If the z14 Model doesn't give at least the same projected Capacity than the z13 configuration (Minus the zPCR recommended 5% margin-of-error), repeat the process from step 3 with the next upper z14 7xx model*



IBM

zPCR Comparison Study – z13 737 vs. z14 734

Advanced-Mode Control Panel [C:\...Study Server B1 v1r0.zPCR]

File CPcalculator Documentation Help

Advanced-Mode Capacity Planning Control Panel

Study ID: BPCE-IT - Server B1 - z13 to z14

Double click on a tree branch below to access the relevant windows

Reference-CPU
REF 2094-701 @ 593,00 MIPS

LSPR Multi-Image Processor Table
LSPR z Systems General Purpose CPs

LSPR z Systems IFL CPs

LSPR LinuxONE CPs

LPAR Configurations
#1 Server B1 - z13 737

Click on the « Add New LPAR Configuration » button

Manage Compare Copy & Move Partitions QuickStart Guide

#1 A Server B1 - z13 737 z13/700 LPAR Host: 2964.N63/700

Pool CP Type	#1 GP	#2 zAAP	#3 zIIP	#4 IFL	#5 ICF	CPC Total
RCPs	37	0	8	0	0	45
Partitions	36	0	19	0	0	55
LCPs	72	0	21	0	0	93
Capacity	39 399	n/a	11 738	n/a	n/a	51 137

Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

Advanced-Mode Control Panel [C:\...Study Server B1 v1r0.zPCR]

File CPcalculator Documentation Help

Advanced-Mode Capacity Planning Control Panel

Study ID: BPCE-IT - Server B1 - z13 to z14

Double click on a tree branch below to access the relevant windows

Reference-CPU
REF 2094-701 @ 593,00 MIPS

LSPR Multi-Image Processor Table
LSPR z Systems General Purpose CPs

LSPR z Systems IFL CPs

LSPR LinuxONE CPs

LPAR Configurations
#1 Server B1 - z13 737

Rename Configuration Name

#2 Configuration #2

An LPAR configuration summary can be displayed by selecting its icon

Define an LPAR configuration ...
+Drag & drop a zPCR study file, EDF, or RMF file onto the LPAR configuration icon
+Double-click the LPAR configuration icon for manual definition windows

Create additional LPAR configurations ...
+Click the "Add(+)" toolbar icon and define the LPAR configuration as described above
+Select a defined LPAR configuration icon and click the "Clone(=)" toolbar icon

Rename LPAR configurations ...
+Left-click to select the LPAR configuration icon
+Right-click LPAR configuration icon for pop-up menu and click "Rename Configuration"
+Enter new name and press ENTER

Delete LPAR configurations ...

Advanced-Mode Control Panel [C:\...Study Server B1 v1r1.zPCR]

File CPcalculator Documentation Help

Advanced-Mode Capacity Planning Control Panel

Study ID: BPCE-IT - Server B1 - z13 to z14

Double click on a tree branch below to access the relevant windows

Reference-CPU
REF 2094-701 @ 593,00 MIPS

LSPR Multi-Image Processor Table
LSPR z Systems General Purpose CPs

LSPR z Systems IFL CPs

LSPR LinuxONE CPs

LPAR Configurations
#1 Server B1 - z13 737

#2 Server B1 - z14 734

Drag & Drop on the new row the corresponding zPCR study file previously generated thanks to LPAR Design

An LPAR configuration summary can be displayed by selecting its icon

Define an LPAR configuration ...
+Drag & drop a zPCR study file, EDF, or RMF file onto the LPAR configuration icon
+Double-click the LPAR configuration icon for manual definition windows

Create additional LPAR configurations ...
+Click the "Add(+)" toolbar icon and define the LPAR configuration as described above
+Select a defined LPAR configuration icon and click the "Clone(=)" toolbar icon

Rename LPAR configurations ...
+Left-click to select the LPAR configuration icon
+Right-click LPAR configuration icon for pop-up menu and click "Rename Configuration"
+Enter new name and press ENTER

Delete LPAR configurations ...



IBM

zPCR Comparison Study - z13 737 vs. z14 734

Advanced-Mode Control Panel [C:\...Study Server B1 v1r1.zPCR] File Ccalculator Documentation Help Advanced-Mode Capacity Planning Control Panel Study ID: BPCE-IT - Server B1 - z13 to z14 Double click on a tree branch below to access the relevant windows Reference-CPU 2094-701 @ 593,00 MIPS LSPR Multi-Image Processor Table z Systems General Purpose CPs z Systems IFL CPs LinuxONE CPs LPAR Configurations #1 Server B1 - z13 737 #2 Server B1 - z14 734 Select the configurations to compare

Click on the « Compare » button

Manage Com Copy & Move Partitions QuickStart Guide

S C

#1 Server B1 - z13 737 z13/700 LPAR Host: 2964.NE3/700

Pool CP Type	#1 GP	#2 zAAP	#3 zIIP	#4 IFL	#5 ICF	CPC Total
RCPs	37	0	8	0	0	45
Partitions	36	0	19	0	0	55
LCPs	72	0	21	0	0	93
Capacity	39 399	n/a	11 738	n/a	n/a	51 137

Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

Host Capacity Comparison LPAR Host Capacity Comparison Report Capacity by Partition Type Study ID: BPCE-IT Capacity basis: 2094-701 @ 593,00 MIPS for a shared single-partition configuration Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

Partition Type	#1 Server B1 - z13 737 2964.NE3/700; GP=37 zIIP=8					#2 Server B1 - z14 734 3906.M02/700; GP=34 zIIP=8					Capacity Net Change	
	# of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	# of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	MIPS	% Delta
GP*	36	37	72	1,946	39 399	36	34	70	2,059	39 306	-93	-0,2 %
zAAP	0	0	0			0	0	0				
zIIP	19	8	21	2,625	11 738	19	8	21	2,625	13 066	+1 328	+11,3 %
IFL	0	0	0			0	0	0				
ICF	0	0	0			0	0	0				
Total	55	45	93		51 137	55	42	91		52 372	+1 235	+2,4 %

Comparison Report by Partition Show capacity as Minimum Capacity Maximum Capacity Full CPC Single-CP Consider Margin-of-Error

For significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin-of-error. When the default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10%; For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty, expressed or implied. You are responsible for the results obtained from your use of this tool.

GP capacity values in brown indicate that "zAAP/zIIP Utilization" is set below the default 100% for one or more partitions in the LPAR configuration. For GP partitions with associated zAAP/zIIP logical CPUs, these settings result in slightly improved GP capacity.

Server B1 - z13 737 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions
Server B1 - z14 734 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions





zPCR Comparison Study - z13 737 vs. z14 734

Host Capacity Comparison

LPAR Host Capacity Comparison Report
Capacity by Partition Type
Study ID: BPCE-IT

Capacity basis: 2094-701 @ 593,00 MIPS for a shared single-partition configuration
Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

Partition Type	#1 Server B1 - z13 737				#2 Server B1 - z14 734				Capacity Net Change		
	# of LPs	Usable RCPs	LCPs	SHR LCP:RCP	# of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	MIPS	% Delta
GP*	36	37	72	1.946	39 399	36	34	70	2.059	39 306	-93 -0,2 %
zAAP	0	0	0								
zIIP	19	8	21							13 066	+1 328 +11,3 %
IFL	0	0	0								
ICF	0	0	0								
Total	55	45	93							52 372	+1 235 +2,4 %

Comparison Report by Partition

Show capacity as
 Full CPC Single-CP

For significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin-of-error.
When the default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10%; For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty, expressed or implied. You are responsible for the results obtained from your use of this tool.

*GP** capacity values in brown indicate that "zAAP/zIIP Utilization" is set below the default 100% for one or more partitions in the LPAR configuration.
For GP partitions with associated zAAP/zIIP logical CPs, these settings result in slightly improved GP capacity.

Click on the
« Consider Margin-of-Error »
button

% Delta of Minimum Capacity with Margin-of-Error Consideration between the z13 737 and the z14 734 configurations is -5,2% for GP processors : The z14 734 Model doesn't give us enough capacity...



Host Margin-of-Error

Margin-of-Error Consideration LPAR Host Capacity
Study ID: BPCE-IT

Capacity basis: 2094-701 @ 593,00 MIPS for a shared single-partition configuration
Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

Partition Type	#1 Server B1 - z13 737		#2 Server B1 - z14 734		Projected minus 5%	
	Projected Capacity	Projected Capacity	% Delta	Projected Capacity	% Delta	
GP*	39 399	39 306	-0,2 %	37 341	-5,2 %	
zAAP						
zIIP	11 738	13 066	+11,3 %	12 413	+5,8 %	
IFL						
ICF						
Total	51 137	52 372	+2,4 %	49 754	-2,7 %	

For significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin-of-error.
When the default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10%; For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty, expressed or implied. You are responsible for the results obtained from your use of this tool.

*GP** capacity values in brown indicate that "zAAP/zIIP Utilization" is set below the default 100% for one or more partitions in the LPAR configuration.
For GP partitions with associated zAAP/zIIP logical CPs, these settings result in slightly improved GP capacity.

Server B1 - z13 737 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions
Server B1 - z14 734 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions



We have to select an appropriate z14 Model
in which current Partitions and Workloads could fit...

Proposed Method

1. *Adjust LPAR Workload characterization to z14 target*
2. *Select a z14 7xx starting model thanks to zPCR*
3. *From the z13 configuration previously defined in LPAR Design make the z14 7xx model configuration*
 - *Adjust LPAR Workload characterization*
 - *Optimize HiperDispatch configuration*
 - *Export as a new zPCR study*
4. *Make a zPCR comparison study between the z13 configuration and the z14 7xx model one*
 - ***If the z14 Model doesn't give at least the same projected Capacity than the z13 configuration (Minus the zPCR recommended 5% margin-of-error), repeat the process from step 3 with the next upper z14 7xx model***



zPCR Comparison Study - z13 737 vs. z14 735

Host Capacity Comparison

LPAR Host Capacity Comparison Report
Capacity by Partition Type
Study ID: BPCE-IT

Capacity basis: 2094-701 @ 593,00 MIPS for a shared single-partition configuration
Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

Partition Type	#1 A Server B1 - z13 737				#3 Z Server B1 - z14 735				Capacity Net Change			
	# of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	# of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	MIPS	% Delta
GP*	36	37	72	1.946	39 399	36	35	70	2.000	40 516	+1 117	+2,8 %
zAAP	0	0	0									
zIIP	19	8	21							13 062	+1 324	+11,3 %
IFL	0	0	0									
ICF	0	0	0									
Total	55	45	93							53 578	+2 441	+4,8 %

Comparison Report by Partition

Show capacity as Full CPC Single-CP Consider Margin-of-Error

For significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin-of-error. When the default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10%; For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty, expressed or implied. You are responsible for the results obtained from your use of this tool.

*GP** capacity values in brown indicate that "zAAP/zIIP Utilization" is set below the default 100% for one or more partitions in the LPAR configuration. For GP partitions with associated zAAP/zIIP logical CPs, these settings result in slightly improved GP capacity.

Server B1 - z13 737 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

Server B1 - z14 735 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

% Delta of Minimum Capacity with Margin-of-Error Consideration between the z13 737 and the z14 735 configurations is -2,3% for GP processors : The z14 735 Model doesn't give us enough capacity...

Host Margin-of-Error

Margin-of-Error Consideration LPAR Host Capacity
Study ID: BPCE-IT

Capacity basis: 2094-701 @ 593,00 MIPS for a shared single-partition configuration
Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

Partition Type	#1 A Server B1 - z13 737		#3 Z Server B1 - z14 735	
	Projected Capacity	Projected Capacity	Projected minus 5% Capacity	% Delta
GP*	39 399	40 516	38 490	-2,3%
zAAP				
zIIP	11 738	13 062	12 409	+5,7%
IFL				
ICF				
Total	51 137	53 578	50 900	-0,5%

For significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin-of-error. When the default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10%; For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty, expressed or implied. You are responsible for the results obtained from your use of this tool.

*GP** capacity values in brown indicate that "zAAP/zIIP Utilization" is set below the default 100% for one or more partitions in the LPAR configuration. For GP partitions with associated zAAP/zIIP logical CPs, these settings result in slightly improved GP capacity.

Server B1 - z13 737 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

Server B1 - z14 735 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions



zPCR Comparison Study - z13 737 vs. z14 736

Host Capacity Comparison

LPAR Host Capacity Comparison Report
Capacity by Partition Type
Study ID: BPCE-IT

Capacity basis: 2094-701 @ 593,00 MIPS for a shared single-partition configuration
Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

Partition Type	#1 A Server B1 - z13 737				#4 Z Server B1 - z14 736				Capacity Net Change		
	# of LPs	Usable RCPs	LCPs	SHR LCP:RCP	# of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	MIPS	% Delta
GP*	36	37	72	1.946	39 399	36	36	71	1.972	42 364	+2 965 +7,5 %
zAAP	0	0	0								
zIIP	19	8	21							13 022 +1 284 +10,9 %	
IPL	0	0	0								
ICF	0	0	0								
Total	55	45	93							55 386 +4 249 +8,3 %	

Comparison Report by Partition

Show capacity as
 Full CPC Single-CP

For significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin-of-error.
When the default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10%; For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty, expressed or implied. You are responsible for the results obtained from your use of this tool.

*GP** capacity values in brown indicate that "zAAP/zIIP Utilization" is set below the default 100% for one or more partitions in the LPAR configuration.
For GP partitions with associated zAAP/zIIP logical CPs, these settings result in slightly improved GP capacity.

Server B1 - z13 737 Capacity Values include SMT Benefit for one or more zIIP and/or IPL partitions

Server B1 - z14 736 Capacity Values include SMT Benefit for one or more zIIP and/or IPL partitions

% Delta of Minimum Capacity with Margin-of-Error Consideration between the z13 737 and the z14 736 configurations is +2,1% for GP processors : The z14 736 Model give us enough capacity !

Host Margin-of-Error

Margin-of-Error Consideration LPAR Host Capacity
Study ID: BPCE-IT

Capacity basis: 2094-701 @ 593,00 MIPS for a shared single-partition configuration
Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

Partition Type	#1 A Server B1 - z13 737		#4 Z Server B1 - z14 736		Projected minus 5%	
	Projected Capacity	Projected Capacity	% Delta	Projected Capacity	% Delta	
GP*	39 399	42 364	+7,5 %	40 245	+2,1 %	
zAAP						
zIIP	11 738	13 022	+10,9 %	12 371	+5,4 %	
IPL						
ICF						
Total	51 137	55 386	+8,3 %	52 617	+2,9 %	

For significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin-of-error.
When the default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10%; For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty, expressed or implied. You are responsible for the results obtained from your use of this tool.

*GP** capacity values in brown indicate that "zAAP/zIIP Utilization" is set below the default 100% for one or more partitions in the LPAR configuration.
For GP partitions with associated zAAP/zIIP logical CPs, these settings result in slightly improved GP capacity.

Server B1 - z13 737 Capacity Values include SMT Benefit for one or more zIIP and/or IPL partitions

Server B1 - z14 736 Capacity Values include SMT Benefit for one or more zIIP and/or IPL partitions



zPCR Comparison Study - z13 737 vs. z14 736

Host Capacity Comparison

LPAR Host Capacity Comparison Report
Capacity by Partition Type
Study ID: BPCE-IT

Capacity basis: 2094-701 @ 593,00 MIPS for a shared single-partition configuration
Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

Partition Type	#1 Server B1 - z13 737					#4 Server B1 - z14 736					Capacity Net Change	
	# of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	# of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	MIPS	% Delta
GP*	36	37	72	1,946	39 399	36	36	71	1,972	42 364	+2 965	+7,5 %
zAAP	0	0										
zIIP	19	8										
IFL	0	0										
ICF	0	0										
Total	55	45								55 386	+4 249	+8,3 %

Comparison Report by Partition

Show capacity as
 Full CPC Single-CP Consider Margin-of-Error

For significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin-of-error. When the default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10%; For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty, expressed or implied. You are responsible for the results obtained from your use of this tool.

*GP** capacity values in brown indicate that "zAAP/zIIP Utilization" is set below the default 100% for one or more partitions in the LPAR configuration.
For GP partitions with associated zAAP/zIIP logical CPs, these settings result in slightly improved GP capacity.

Server B1 - z13 737 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions
Server B1 - z14 736 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

Click on the « Minimum Capacity » button

Partition Capacity Comparison

Partition Capacity Comparison Report
Based on Partition Minimum Capacity
Study ID: BPCE-IT

Capacity basis: 2094-701 @ 593,00 MIPS for a shared single-partition configuration
Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

Type	Name	SCP	Workload	#1 Server B1 - z13 737				#4 Server B1 - z14 736				Capacity Net Change		
				LP#	Mode	LCPs	Weight%	LP#	Mode	LCPs	Weight%	MIPS	% Delta	
GP	LA01	z/OS-2.1*	High	1	SHR	2	0,42 %	148	1	SHR	2	15	0,42 %	162 +14 +9.5 %
GP*	LA02	z/OS-2.1*	Average	2	SHR	3	6,19 %	2 550	2	SHR	3	219	6,19 %	2 730 +180 +7.1 %
ZIIP	LA02	z/OS-2.1*	Average	SHR	1	3,29 %	400	SHR	1	16	3,29 %	442 +42 +10.5 %		
GP*	LA03	z/OS-2.1*	Average	3	SHR	4	8,23 %	3 393	3	SHR	3	291	8,23 %	3 627 +234 +6.9 %
ZIIP	LA03	z/OS-2.1*	Average	SHR	1	4,73 %	565	SHR	1	23	4,73 %	636 +71 +12.6 %		
GP*	LA04	z/OS-2.1*	Average	4	SHR	5	12,92 %	5 255	4	SHR	5	457	12,92 %	5 633 +378 +7.2 %
ZIIP	LA04	z/OS-2.1*	Average	SHR	1	7,20 %	846	SHR	1	35	7,20 %	939 +93 +11.0 %		
GP	LA05	z/OS-2.1*	High	5	SHR	2	0,76 %	266	5	SHR	2	27	0,76 %	291 +25 +9.4 %
GP	LA06	z/OS-2.1*	High	6	SHR	2	0,79 %	276	6	SHR	2	28	0,79 %	301 +25 +9.1 %
GP	LA07	z/OS-2.1*	High	7	SHR	1	0,14 %	49	7	SHR	1	5	0,14 %	54 +5 +10.2 %
GP	LB01	z/OS-2.1*	Low	8	SHR	1	0,28 %	138	8	SHR	1	10	0,28 %	143 +5 +3.6 %
GP	LB02	z/OS-2.1*	High	9	SHR	1	0,06 %	19	9	SHR	1	2	0,06 %	21 +2 +10.5 %
ZIIP	LB02	z/OS-2.1*	High	SHR	1	0,21 %	21	SHR	1	1	0,21 %	24 +3 +14.3 %		
GP	LB03	z/OS-2.1*	High	10	SHR	1	0,06 %	20	10	SHR	1	2	0,06 %	22 +2 +10.0 %
GP	LB04	z/OS-2.1*	High	11	SHR	1	0,14 %	49	11	SHR	1	5	0,14 %	54 +5 +10.2 %
ZIIP	LB05	z/OS-2.1*	Average	12	SHR	2	0,45 %	186	12	SHR	2	16	0,45 %	199 +13 +7.0 %
GP*	LB06	z/OS-2.1*	Average	SHR	1	10,91 %	1 344	SHR	1	53	10,91 %	1 484 +140 +10.4 %		
ZIIP	LB06	z/OS-2.1*	Average	SHR	9	22,51 %	8 663	13	SHR	9	795	22,51 %	9 340 +677 +7.8 %	
GP*	LB06	z/OS-2.1*	Average	SHR	2	20,16 %	2 306	SHR	2	98	20,16 %	2 564 +258 +11.2 %		

Change Controls

Commit Changes Undo Changes Optimize SHR LCPs

For significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin of error. When the default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10%; For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty, expressed or implied. You are responsible for the results obtained from your use of this tool.

Input fields have white background; Single-click a "selection field" for drop-down list; Double click a "key-in field" to open.

*GP** capacity values in brown indicate that "zAAP/zIIP Utilization" is set below the default 100% for one or more partitions in the LPAR configuration.
For GP partitions with associated zAAP/zIIP logical CPs, these settings result in slightly improved GP capacity.

Server B1 - z13 737 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions
Server B1 - z14 736 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions



zPCR Comparison Study - z13 737 vs. z14 736

Partition Capacity Comparison



Partition Capacity Comparison Report Based on Partition Minimum Capacity

Study ID: BPCE-IT

Capacity basis: 2094-701 @ 593,00 MIPS for a shared single-partition configuration
Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

Partition Identification				#1 Server B1 - z13 737					#4 Server B1 - z14 736					Capacity Net Change				
List of All Included Partitions With Unique ID Metrics				Partition Definition					Partition Definition					Capacity Net Change				
Type	Name	SCP	Workload	LP#	Mode	LCPs	Weight%	CAP	Minimum Capacity	LP#	Mode	LCPs	Weight	Weight%	CAP	Minimum Capacity	MIPS	% Delta
GP	LA01	z/OS-2.1*	High	1	SHR	2	0,42 %	148	1	SHR	2	15	0,42 %	162	+14	+9,5 %		
GP*	LA02	z/OS-2.1*	Average	2	SHR	3	6,19 %	2 550	2	SHR	3	219	6,19 %	2 730	+180	+7,1 %		
zIIP	LA02	z/OS-2.1*	Average	SHR	1	3,29 %	400	SHR	1	16	3,29 %	442	+42	+10,5 %				
GP*	LA03	z/OS-2.1*	Average	3	SHR	4	8,23 %	3 393	3	SHR	3	291	8,23 %	3 627	+234	+6,9 %		
zIIP	LA03	z/OS-2.1*	Average	SHR	1	4,73 %	565	SHR	1	23	4,73 %	636	+71	+12,6 %				
GP*	LA04	z/OS-2.1*	Average	4	SHR	5	12,92 %	5 255	4	SHR	5	457	12,92 %	5 633	+378	+7,2 %		
zIIP	LA04	z/OS-2.1*	Average	SHR	1	7,20 %	846	SHR	1	35	7,20 %	939	+93	+11,0 %				
GP	LA05	z/OS-2.1*	High	5	SHR	2	0,76 %	266	5	SHR	2	27	0,76 %	291	+25	+9,4 %		
GP	LA06	z/OS-2.1*	High	6	SHR	2	0,79 %	276	6	SHR	2	28	0,79 %	301	+25	+9,1 %		
GP	LA07	z/OS-2.1*	High	7	SHR	1	0,14 %	49	7	SHR	1	5	0,14 %	54	+5	+10,2 %		
GP	LB01	z/OS-2.1*	Low	8	SHR	1	0,28 %	138	8	SHR	1	10	0,28 %	143	+5	+3,6 %		
GP*	LB02	z/OS-2.1*	High	9	SHR	1	0,06 %	19	9	SHR	1	2	0,06 %	21	+2	+10,5 %		
zIIP	LB02	z/OS-2.1*	High	SHR	1	0,21 %	21	SHR	1	1	0,21 %	24	+3	+14,3 %				
GP	LB03	z/OS-2.1*	High	10	SHR	1	0,06 %				22	+2	+10,0 %					
GP	LB04	z/OS-2.1*	High	11	SHR	1	0,14 %				54	+5	+10,2 %					
GP*	LB05	z/OS-2.1*	Average	12	SHR	2	0,45 %				199	+13	+7,0 %					
zIIP	LB05	z/OS-2.1*	Average	SHR	1	10,91 %				1 484	+140	+10,4 %						
GP*	LB06	z/OS-2.1*	Average	13	SHR	9	22,51 %				9 340	+677	+7,8 %					
zIIP	LB06	z/OS-2.1*	Average	SHR	2	20,16 %				2 564	+258	+11,2 %						

Click on the
« Consider Margin-of-Error »
button

Consider Margin-of-Error

For significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin-of-error.
When the default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10%; For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty,
expressed or implied. You are responsible for the results obtained from your use of this tool.

Input fields have white background; Single-click a "selection field" for drop-down lists. Double click a "key-in" field to open.

"GP*" capacity values in brown indicate that "zAAP/zIIP Utilization" is set below the default 100% for one or more partitions in the LPAR configuration.

For GP partitions with associated zAAP/zIIP logical CPs, these settings result in slightly improved GP capacity.

Server B1 - z13 737 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

Server B1 - z14 736 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

Partition Margin-of-Error



Margin-of-Error Consideration Partition Minimum Capacity

Study ID: BPCE-IT

Capacity basis: 2094-701 @ 593,00 MIPS for a shared single-partition configuration
Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

#1 Server B1 - z13 737				#4 Server B1 - z14 736				
Partition Identification		Projected	Projected	Projected minus 5%		Projected minus 5%		
Type	Name	SCP	Workload	Capacity	% Delta	Capacity	% Delta	
GP	LA01	z/OS-2.1*	High	148	+162	+9,5 %	153	+3,4 %
GP*	LA02	z/OS-2.1*	Average	2 550	+2 730	+7,1 %	2 593	+1,7 %
zIIP	LA02	z/OS-2.1*	Average	400	+442	+10,5 %	420	+5,0 %
GP*	LA03	z/OS-2.1*	Average	3 393	+3 627	+6,9 %	3 446	+1,6 %
zIIP	LA03	z/OS-2.1*	Average	565	+636	+12,6 %	604	+6,9 %
GP*	LA04	z/OS-2.1*	Average	5 255	+5 633	+7,2 %	5 351	+1,8 %
zIIP	LA04	z/OS-2.1*	Average	846	939	+11,0 %	892	+5,4 %
GP	LA05	z/OS-2.1*	High	266	291	+9,4 %	276	+3,8 %
GP	LA06	z/OS-2.1*	High	276	301	+9,1 %	286	+3,6 %
GP	LA07	z/OS-2.1*	High	49	54	+10,2 %	51	+1,1 %
GP	LB01	z/OS-2.1*	Low	128	143	+3,6 %	136	-1,4 %
GP*	LB02	z/OS-2.1*	High	19	21	+10,5 %	20	+5,3 %
zIIP	LB02	z/OS-2.1*	High	21	24	+14,3 %	23	+9,5 %
GP	LB03	z/OS-2.1*	High	20	22	+10,0 %	20	0,0 %
GP	LB04	z/OS-2.1*	High	49	54	+10,2 %	51	+4,1 %
GP*	LB05	z/OS-2.1*	Average	186	199	+7,0 %	189	+1,6 %
zIIP	LB05	z/OS-2.1*	Average	1 344	1 484	+10,4 %	1 410	+4,9 %
GP*	LB06	z/OS-2.1*	Average	8 663	9 340	+7,8 %	8 873	+2,4 %
zIIP	LB06	z/OS-2.1*	Average	2 306	2 564	+11,2 %	2 436	+5,6 %

For significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin-of-error.
When the default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10%; For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty,
expressed or implied. You are responsible for the results obtained from your use of this tool.

"GP*" capacity values in brown indicate that "zAAP/zIIP Utilization" is set below the default 100% for one or more partitions in the LPAR configuration.
For GP partitions with associated zAAP/zIIP logical CPs, these settings result in slightly improved GP capacity.

Server B1 - z13 737 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

Server B1 - z14 736 Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions



IBM

zPCR Comparison Study - Summary

The screenshot shows the zPCR interface. On the left, under 'LPAR Configurations', four configurations are listed: #1 Server B1 - z13 737, #2 Server B1 - z14 734, #3 Server B1 - z14 735, and #4 Server B1 - z14 736. A purple speech bubble points to this list with the text: 'Select the configurations to summarize by clicking with Ctrl'. At the bottom, a summary table for configuration #1 is shown:

#1	Server B1 - z13 737 z13/700 LPAR Host: 2964			
Pool CP Type	#1 GP	#2 zAAP	#3 zIIP	#4 IFL
RCPs	37	0	8	
Partitions	36	0	19	
LCPs	72	0	21	0
Capacity	39 399	n/a	11 738	n/a

A purple speech bubble points to the 'Summary' button in the toolbar at the bottom left with the text: 'Click on the « Summary » button'.

A purple speech bubble points to the 'Show Capacity Deltas' checkbox in the 'Content Control' section with the text: 'Check the « Show Capacity Deltas » box'.

The screenshot shows the 'Host Capacity Comparison Summary' tool. It displays an 'LPAR Host Capacity Comparison Report' for Study ID: BPCE-IT. The capacity basis is 2094-701 @ 593,00 MIPS for a shared single-partition configuration. The report includes a table of LPAR configurations and their capacities, along with a 'Content Control' section and a note about significant configuration changes.

LPAR Configuration

Identity	Hardware	SMT	GP*	zAAP	zIIP	IFL	ICF	Total
#1 A	Server B1 - z13 737 2964-N63/700: GP=37 zIIP=8	✓	39 399	n/s	11 738			51 137
#2 A	Server B1 - z14 734 3906-M02/700: GP=34 zIIP=8	✓	39 306	n/s	13 066			52 372
#3 Z	Percent Delta from "Server B1 ..."		-0,2 %		+11,3 %			+2,4 %
#3 Z	Server B1 - z14 735 3906-M02/700: GP=35 zIIP=8	✓	40 516	n/s	13 062			53 578
#3 Z	Percent Delta from "Server B1 ..."		+2,8 %		+11,3 %			+4,8 %
#4 Z	Server B1 - z14 736 3906-M02/700: GP=36 zIIP=8	✓	42 364	n/s	13 022			55 386
#4 Z	Percent Delta from "Server B1 ..."		+7,5 %		+10,9 %			+8,3 %

Content Control

Show Capacity Deltas Based on "Server B1 - z13 737" Incremental

Show capacity as

Full CPC Single-CP

significant configuration changes such as upgrading the processor family, consider capacity comparisons to have a +/-5% margin-of-error. The default estimated SMT Benefit is assigned to a partition, margin-of-error is +/-10%; For larger estimates, margin-of-error will be greater.

IBM does not guarantee the results from this tool. This information is provided "as is", without warranty, expressed or implied. You are responsible for the results obtained from your use of this tool.

Position mouse on LPAR configuration to display description

GP capacity values in brown indicate that "AAP/zIIP Utilization" is set below the default 100% for one or more partitions in the LPAR configuration. For GP partitions with associated zAAP/zIIP logical CPs, these settings result in slightly improved GP capacity.

Check in SMT column indicates Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions





PR/SM Configuration – HiperDispatch Synthesis – GCP Pool



HiperDispatch Effect - GCP		
	W/O HD	W/ HD
#LP (Shared Pool Only)	81	72
LP/PP ratio (Shared Pool Only)	2,19	1,95
Global Statistics		
LPAR Statistics		
#LPAR-TOTAL	26	
#LPAR w/HighShare LP (Total)	6	(circled)
#LPAR w/DED LP	0	
LP Statistics		
#HighShare LP (Total)	21	(circled)
#HighShare LP (DED)	0	
#MediumShare LP	42	
#LowShare LP	18	



HiperDispatch Effect - GCP		
	W/O HD	W/ HD
#LP (Shared Pool Only)	81	71
LP/PP ratio (Shared Pool Only)	2,25	1,97
Global Statistics		
LPAR Statistics		
#LPAR-TOTAL	26	
#LPAR w/HighShare LP (Total)	7	(circled)
#LPAR w/DED LP	0	
LP Statistics		
#HighShare LP (Total)	22	(circled)
#HighShare LP (DED)	0	
#MediumShare LP	40	
#LowShare LP	19	



Even with less Physical Processors, we got more High Share Logical Processors applied to more LPAR on the z14 736 Configuration, thanks to the new HiperDispatch 3906 Rule



Munich 2017 – Sessions in relation

- z016309 – “**Caches, PR/SM and HiperDispatch - What is new in z14**” by Alain Maneville
 - Tue 15:15-16:15 Sydney
 - Fri 11:00-12:00 Atlanta
- z016748 – “**What's new with IBM Z Capacity Planning tools?**” by Gérard Launay
 - Wed 10:15-11:15 Sydney
- z016480 – “**Capacity Planning considerations for the New IBM z14 and experiences from z13**” by Robert Vaupel
 - Thu 10:15-11:15 Sydney
 - Thu 15:15-16:15 Sydney



Session Reference Links

- « [Large Systems Performance Reference for IBM Z](#) » by IBM
- « [zPCR User's Guide](#) » by IBM
- « [System z13 – First Experiences and Capacity Planning Considerations](#) » at GSE UK 2015 by R.Vaupel
- « [The relatively New LSPR and the IBM z13 and z13s](#) » at Share Winter 2017 by Gary King
- « [2016 CPU MF Update](#) » at Share Summer 2016 by John Burg
- « [zPCR Capacity Sizing](#) » at Share Summer 2017 by Brad D.Snyder & John Burg
- « [The RNI-based LSPR and the Latest z Systems Processors](#) » at Share Summer 2017 by David Hutton
- « [z/OS Performance Hot Topics](#) » at Share Summer 2017 by Kathy Walsh



IBM

Question(s)





IBM

Dank u
Dutch

Merci
French

Спасибо
Russian

Mercés
Catalan

Gracias
Spanish

شُكْرًا
Arabic

감사합니다
Korean

Tack så mycket
Swedish

Obrigado
Brazilian
Portuguese

धन्यवाद
Hindi

תודה רבה
Hebrew

谢谢
Chinese

Dankon
Esperanto

Thank You

Tak
Danish

ありがとうございます
Japanese

Trugarez
Breton

Danke
German

Grazie
Italian

நன்றி
Tamil

ຂອບគុ

go raibh maith agat
Gaelic

děkuji
Czech

ณ
Thai



Backup Foils



z13 vs z14





SMF113 Reporting Tool

Reporting on CSV Lists created from SMF 113 data

Single Chart				Load New Report:	Report Description
Data Sheet	Name	CSVREP01	= CSV Report	CSVREP01	
DataRange	First Row	3	3		
	Last Row	97	2091		
X-Axis	Column Letter	Color	Which Y-Axis	Y-Axis Chart Type	
Y-Axis 1		12	1	1 LM	
Y-Axis 2		13	43	2	
Y-Axis 3		14	33	2	
Y-Axis 4		15	6	2	
Y-Axis 5		16	45	2	
Y-Axis 6		17	3	2	
Y-Axis 7		8	1		
Y-Axis 8		8	1		
Y-Axis 9		8	1		
Y-Axis 10		8	1		
Y-Axis 11		8	1		
Y-Axis 12		8	1		
Y-Axis 13		8	1		
Y-Axis 14		8	1		
Y-Axis 15		8	1		
Y-Axis 16		8	1		

Front->To

Colors

3	46
7	45
38	44
6	40
36	39
50	11
12	57
43	33
4	37
35	8
1	53
13	38
2	

Y-Axis Chart Type Values

LN	Line chart
LM	Line chart with Markers
COL	Column chart
CST	Stacked column chart
AST	Stacked Area chart

Create Columns

Prefix

A	TT.MM	Type
---	-------	------

First Column

Mid

B	HH MM	Type
---	-------	------

Second Column

Suffix

Result Column

New Column Name

Create Column

Description: This section allows to create new columns which either overwrite additional columns or which can be appended to the existing columns

Prefix, Mid, Suffix are character strings which are added to the content of the cells

First Column and Second Column are either the column letter or column numbers of the columns from which the new column is being created

Type describes the datatype of the column

Char The context is interpreted as a character string

TEXT function conversion types, see Excel help

e.g. TT.MM – german Day.Month (for date)
HH:MM – hour and minute of a time value
0 – a single digit number, etc ...

Steps to create a chart

- 1) Define first and last data row, available range shown to the right
- 2) Define X-Axis column
- 3) Define the Y-Axis Columns
- 4) Change the default colors, Y-Axis locations and Y-Axis Type

Color Use the number printed in the colors of the Color Reference table

Which Y-Axis Default is axis 1, specify 2 for columns to be printed on Y2-Axis

Y-Axis Chart Type Default is empty and the chart type is used

Possible Values see on the right

For Scatter Chart:

X-Axis, Which Y-Axis and Y-Axis Chart Type is ignored for Scatter chart

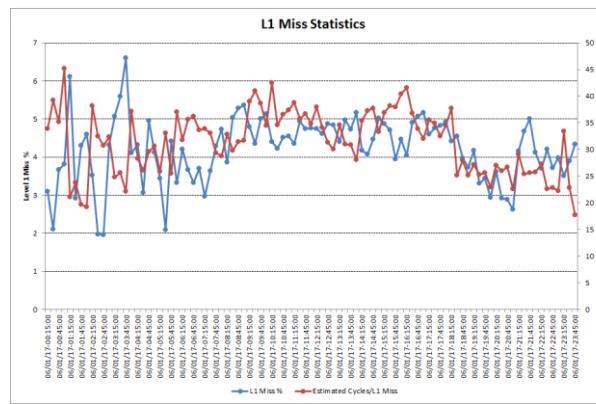
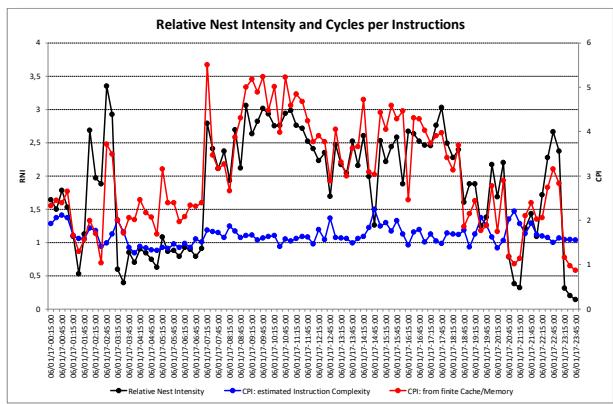
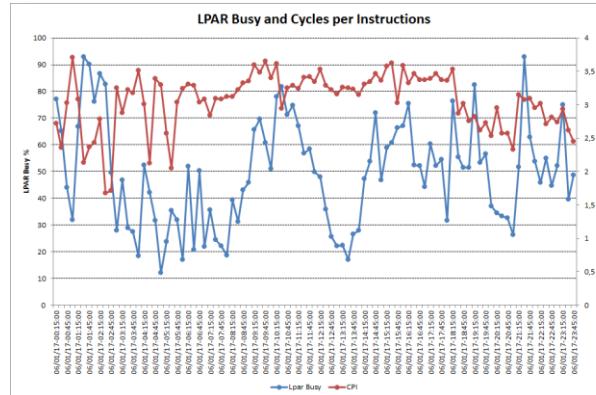
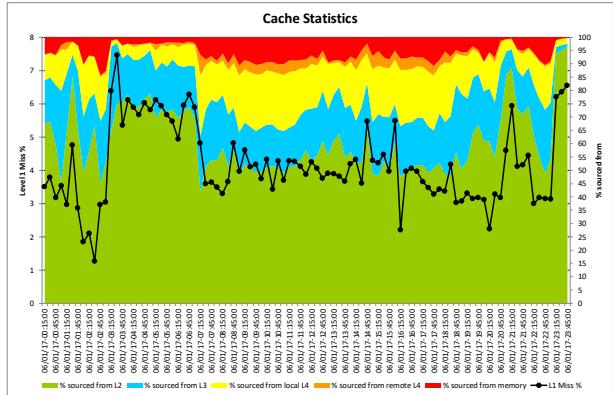
Y-Axis Title is used for X-Axis

Y2-Axis Title for Y-Axis





SMF113 Reporting Tool – Pre-defined SMF113 charts





PR/SM Configuration – LPAR Design – zIIP Configuration

ID=BPCE-IT - LPARDesign-HD-V9-T01 Current zPCR Version-9.1 - SpecCfg=YES LPAR DEFINITION (zIIP)

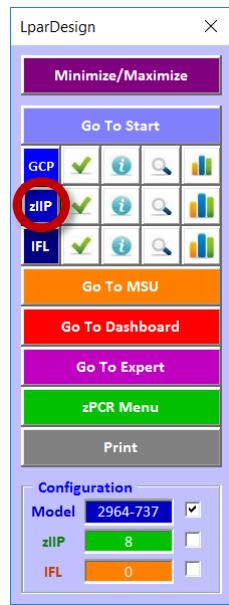
CFG-LP-VALID?	YES
Machine-type	2964-737
zIIP#Procs	8
zIIP-Shared-Pool	8
zIIP-DED-Pool	0
zIIP-Weight	486
zIIP-Valid?	NO

Configuration Validation

Go back to START to modify the zIIP#Procs

zIIP			%SHARE by pool	Guaranteed# PP	HD supported on 2964						
LPARNAME	WEIGHT	#LP			HD-HIGH#	HD-MED#	HD-MED%	HD-LOW#	#Act-LPs	Error	Information
LA01	0	0									
LA02	16	1									
LA03	23	1									
LA04	35	1									
LA05	0	0									
LA06	0	0									
LA07	0	0									
LB01	0	0									
LB02	1	1									
LB03	0	0									
LB04	0	0									
LB05	53	1									
LB06	98	2									
LB07	75	2									
LB08	17	1									
LB09	15	1									
LB10	18	1									
LB11	0	0									
LB12	27	1									
LB13	30	1									
LB14	16	1									
LB15	23	1									
LB16	5	1									
LC01	10	1									

For each LPAR using zIIP processor specify its Weight and zIIP LP count in the corresponding columns
(The Workload Characterization retained will be the corresponding one previously specified for this LPAR)





PR/SM Configuration – LPAR Design – zIIP Configuration

ID=BPCE-IT - LPARDesign-HD-V9-T01 Current zPCR Version-9.1 - SpecCfg=YES LPAR DEFINITION (zIIP)

CFG-LP-VALID?	YES
Machine-type	2964-737
zIIP#Procs	8
zIIP-Shared-Pool	8
zIIP-DED-Pool	0
zIIP-Weight	486
zIIP-Valid?	YES

Configuration Validation

Go back to START to modify the zIIP#Procs

zIIP

LPARNAME	WEIGHT	#LP	%SHARE by pool	Guaranteed# PP	HD-HIGH
LA01	0	0	0%	0,00	
LA02	16	1	3%	0,26	0
LA03	23	1	5%	0,38	0
LA04	35	1	7%	0,58	0
LA05	0	0	0%	0,00	
LA06	0	0	0%	0,00	
LA07	0				
LB01					
LB02					
LB03					
LB04					
LB05					
LB06					
LB07					
LB08					
LB09	15	1	3%	0,25	0
LB10	18	1	4%	0,30	0
LB11	0	0	0%	0,00	
LB12	27	1	6%	0,44	0
LB13	30	1	6%	0,49	0
LB14	16	1	3%	0,26	0
LB15	23	1	5%	0,38	0
LB16	5	1	1%	0,08	0
LC01	10	1	2%	0,16	0

HD supported on 2964

ID=BPCE-IT - LPARDesign-HD-V9-T01 Current zPCR Version-9.1 - Spec... X

IIP Processors Configuration Validation Comments :

Info ZIIP INITIAL Configuration Routine Ended : Successfully

Info ZIIP FINAL Configuration Routine Ended : Successfully

OK

Infos, Warnings & Errors after validation and HiperDispatch calculation of the zIIP LPARs

LparDesign

Minimize/Maximize

Go To Start

GCP	✓
zIIP	✓
IFL	✓

Go To MSU

Go To Dashboard

Go To Expert

zPCR Menu

Print

Configuration

Model	2964-737
zIIP	8
IFL	0



PR/SM Configuration – Export to zPCR - Remarks



About the generated zPCR Study...

- Only the **Active LP** of each LPAR are taken into account as LP count
 - From **zPCR User's Guide** :
 - "HyperDispatch can also improve z/OS performance by dynamically parking partition logical CPUs that it considers to be excessive for the workloads competing for the shared CP resource. This aspect of HyperDispatch is not included in the LSPR data or algorithms used by zPCR. To fairly represent capacity for these configurations, parked logical CPUs should not be considered when defining the number of shared LPs for a partition."
 - This is equivalent to the zPCR "**Minimal Shared LCP Count Optimization**" where the weight percent determines the exact number of LCPs to be assigned
- The proposed **Hardware Model** is established thanks to the count of processors
- The selected **z/OS version** will be associated to each LPAR
- The selected **zIIP Loading %** will be associated to each zIIP LPAR
 - It must be representative of the zIIP Processors % during the reference period (25% in our case)
- The generally recommended **Reference-CPU scaling factor/metric value** is integrated
 - 2094-701 rated at 593.00 MIPS**
 - In our case (LSPR Multi-Image Capacity Ratios table purposes), the scaling-factor will be internally adjusted by zPCR to represent the capacity of a typical shared 5-partition configuration on the 1-way Reference-CPU model.
- SMT capability** is enabled for zIIP & IFL processors on z13, z13s & z14 with the following retained capacity benefit :
 - +25% on zIIP processors for z13, z13s and z14**
 - +20% on IFL processors for z13 and z13s, +25% for z14**

These parameters could be modified in the zPCR tool





Your Opinion Matters!

Your feedback about this session is very important to us.

Submit a survey at:

ibmtechu.com



Continue the conversation

IBM Systems Technical Events LinkedIn community

Join today

bit.ly/IBMTechUconnect

view event
highlights

talk to tech
experts

connect with
attendees

read training
articles



Continue growing your IBM skills

ibm.com/training

provides a comprehensive portfolio of skills and career accelerators that are designed to meet all your training needs.

If you can't find the **training that is right for you** with our Global Training Providers, we can help.

Contact IBM Training at dpmc@us.ibm.com

