Usage Of zPCR Both In Performance Management And Capacity Planning Studies – Customer Experience

Meral Temel
Garanti Technology

2/3/2011
8532

Agenda

- Who is GT
- GT Mainframe Configuration
- What Is zPCR ?
- LSPR Terms
- Step-By-Step z196 Upgrade zPCR Study
- z196 Upgrade Choosing Model Using zPCR
- Checking Results : z10 To z196 Upgrade IBM Analiz
- Moving From 3 LPAR To 5 LPAR Studies Using zPCR

WHO IS GT ?

Who is GT ?

GARANTI TECHNOLOGY

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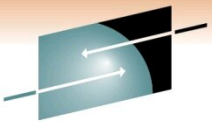
- A wholly-owned subsidiary of Garanti Bank, the second largest private bank in Turkey owned by Doğuş Group and BBVA.
- One of the largest private internal IT service providers in Turkey
- Most up-to-date IT infrastructure
- Tightly integrated and fully in-house developed, custom-fit IT solutions
- Uninterrupted transaction capability and infrastructure security
- Well-reputed as a company of “firsts”
- Visionary and continuous investment in technology since 90’s

Garanti

- Fast decision making and strong communication from top to down
- Centralized management reporting systems, enable management to take timely actions
- Advanced CRM applications
- Paperless banking

Who is GT ?



Garanti

Garanti Bank International N.V.

Garanti Emeklilik

Garanti Leasing

Garanti Factoring

Garanti Yatırım

Garanti Portföy

Garanti Ödeme Sistemleri

Garanti Filo Yönetimi

Doğuş Otomotiv

DOĞUŞ OTO

DOD
İkinci elde güven

vdf

LeasePlan

TÜV TURK

antur turizm a.ş.

GARANTİ TURİZM - YATIRIM VE İŞLETME A.Ş.

Datmar Turizm A.Ş.

GÖKTRANS
Turizm ve Ticaret A.Ş.

VOYAGER

ARENA
Giyim Sanayi Turizm ve Ticaret A.Ş.

D-MARİN
TURGUTREİS MARİNA

NTV
www.ntvmsnbc.com

CNBC-e

doğuş
İNŞAAT VE TİCARET A.Ş.

DOĞUŞ Gayrimenkul

DOĞUŞ GE GYO

EUREKO SİGORTA

dask

DOĞUŞ GRUBU

Şekerbank

Who is GT ?

Branch Network

- 795 Branches
- Presence in 72 Cities:
- 89% Geographic Coverage

Internet Banking

- ~1.3 MM Internet Bank Active Customers
- Recognized As Turkey's Best Internet Bank

Credit Cards

- >7,9 mn credit cards
- >355,000 POS devices
- Loyalty program for 9 banks

ATM

- 2,766 ATMs
- Cardless Transactions
- Coin Dispenser

Mobilebank

- 1st in the World to Allow Money Transfer Via SMS
- wap.garanti.com.tr --1st internet bank access via mobile in TR w/o application downloads or activations

Contact Center

- >3.4 mn Calls/mo
- 2009 Sales >2,7 mn Products
- CTI & Workforce Man.
- World's 1st to receive
- "EFQM Award"

ccf EUROPEAN CALL CENTRE AWARDS 2008 winner

SHARE in Anaheim 2011

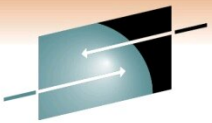
GT Is A Member Of …

- SHARE

- CMG

- GDPS Design Council
- zBLC

GT – Mainframe Configuration



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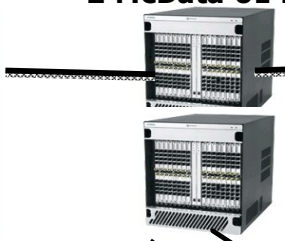
GAR2
IBM System z196 2817-717

1816 MSU
17 GCP 1 zIIP
2 ICF
165 GB Memory
32 Ficon Exp8
Crypto Express3
6 Infiniband
5p OSAE3 GbE SR
3 p OSAE3 1000Base T
4 p OSAE3 GbE SX
4 ISC-3 link

2 McDataa 6140



GAR1
IBM System z196 2817-717

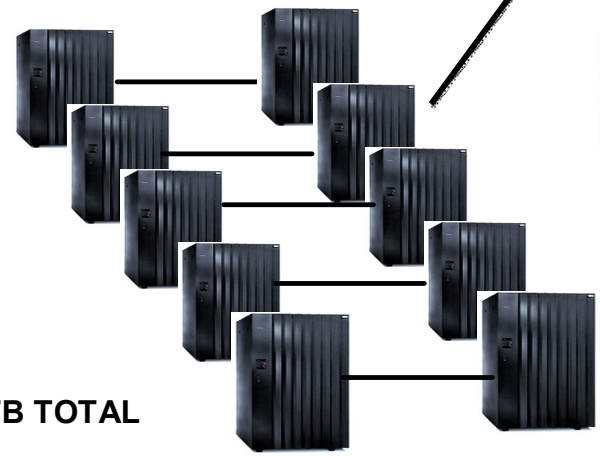
1816 MSU
17 GCP 2 zIIP
2 ICF
165 GB Memory
32 Ficon Exp8
Crypto Express3
6 Infiniband
5p OSAE3 GbE SR
3 p OSAE3 1000Base T
4 p OSAE3 GbE SX
4 ISC-3 link

z/OS 1.10
CICS TS 3.2
DB2 V9

IRD

HiperDispatch

GCL



134 TB TOTAL

6 INFO4100 Printer

IBM TS7740 Virtual Tapes

TS7740 Grid

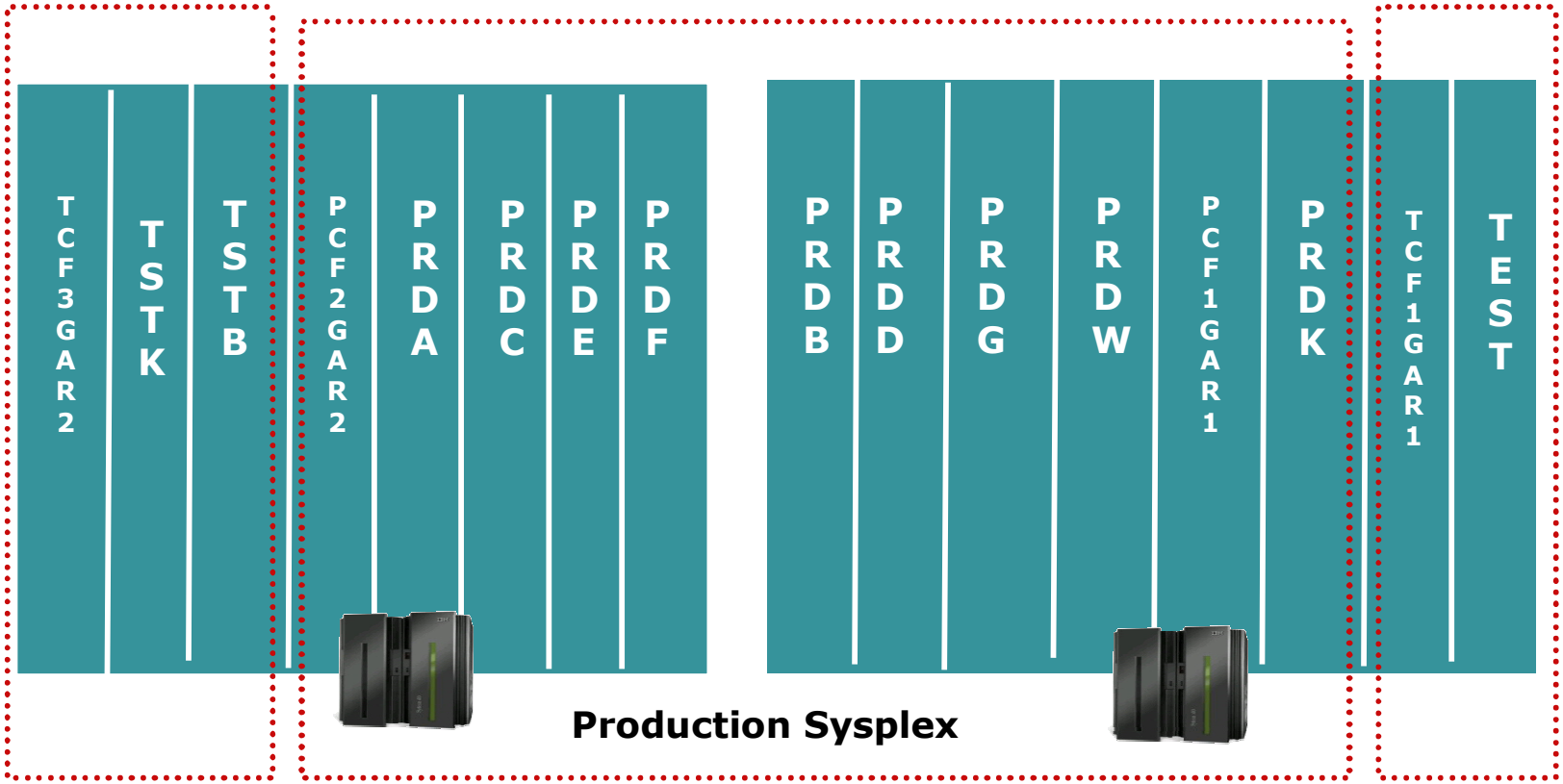
IBM TS3500 Tape Libraries

DS8700 & DS8300 Turbo
PPRC & XRC Primary

GDPS PPRC
Hyperswap Manager

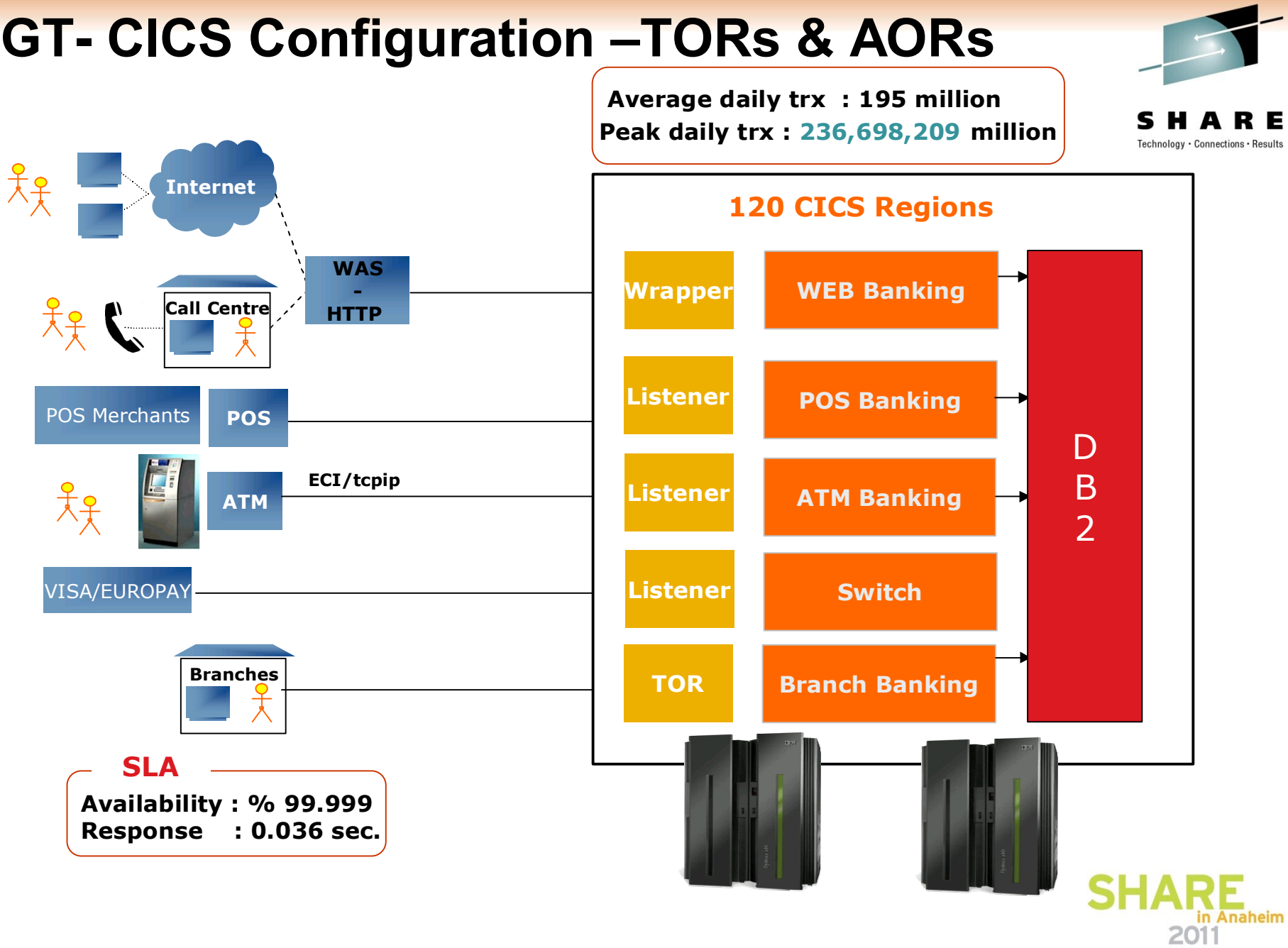
DS8700 & DS8300 Turbo
PPRC & XRC Primary

GT- z/OS Configuration



z/OS 1.10
DB2 V9
CICS TS 3.2

GT- CICS Configuration –TORs & AORs



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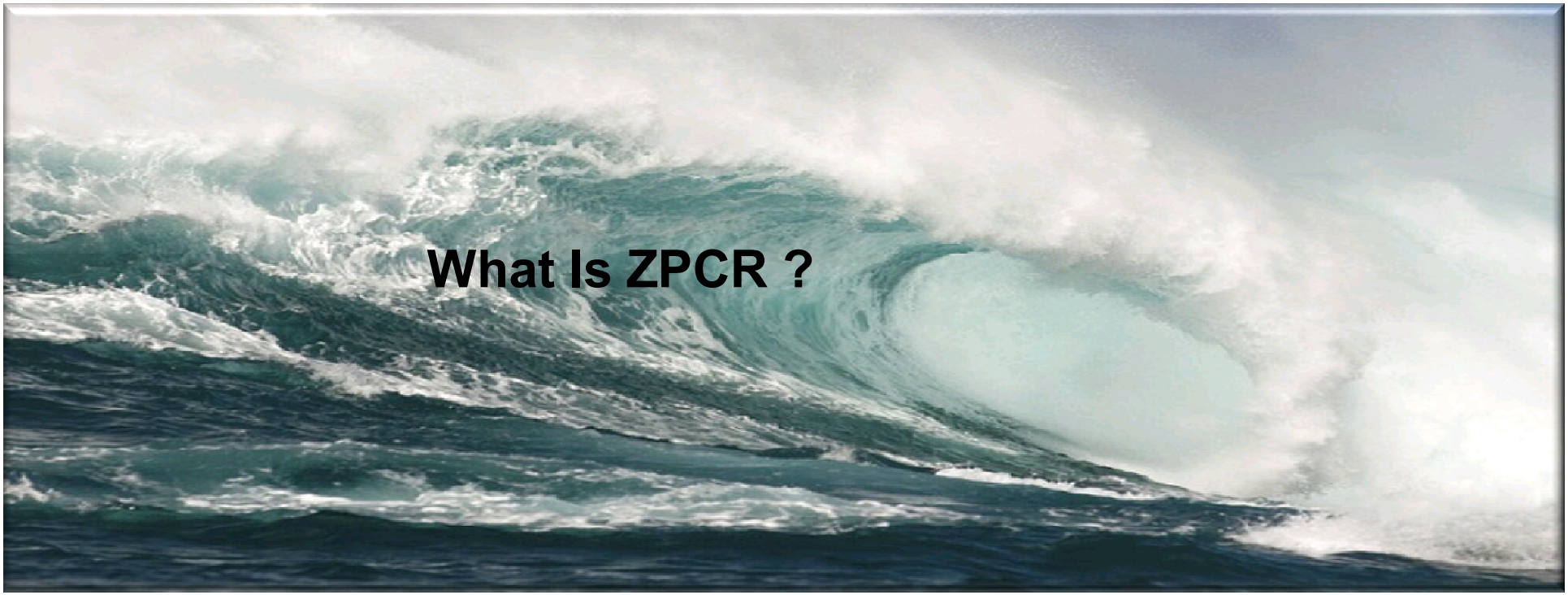
ZPCR



What Is ZPCR ?

PROVIDES CAPACITY RELATIONSHIPS FOR SYSTEM z PROCESSORS

BASED ON IBM LARGE SYSTEMS PERFORMANCE REFERENCE (LSPR)

IBM TOOL TO PROPERLY SIZE MAINFRAME UPGRADES

Expected accuracy of ±5%

PC BASED TOOL WRITTEN IN JAVA FOR WINDOWS

MUST BE USED IN EACH UPGRADE PLANNING !!!

FREE !!!

AVAILABLE TO CUSTOMERS SINCE 10/2005!!!

When Do We Use zPCR ?

- Using zPCR Since It is Available To Customers
- In Every System z Upgrade We Have Done
- Using It In LPAR Configuration Change Planning Processes
  - Moving From 2 To 4/5 LPAR Configuration
  - Moving From 4 To 8 LPAR Configuration
- To Learn zIIPs Capacity In Terms Of MIPS
- How am I effected If I Deactivate Less Used Test LPARs During Peak Days ?

How To Get zPCR ?

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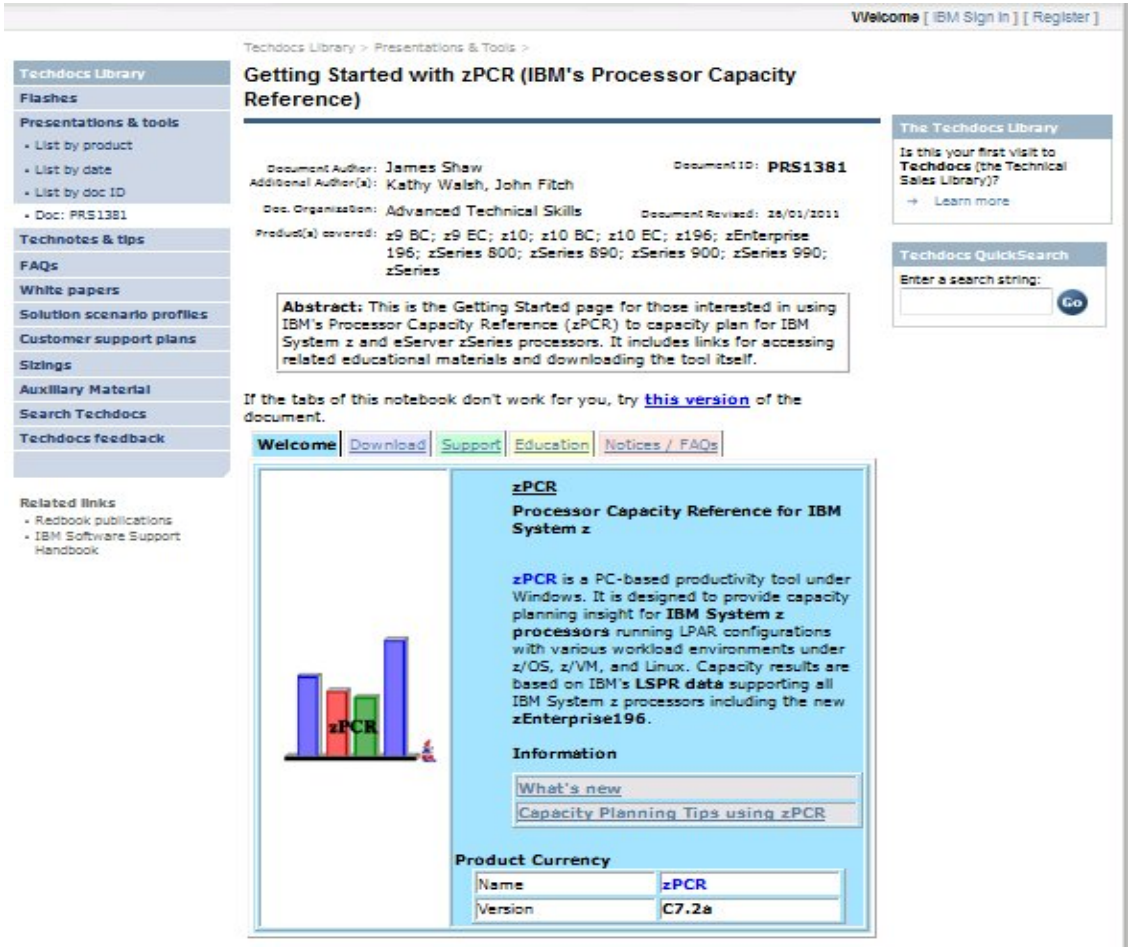
Download zPCR From IBM Tech Docs Website
http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS1381



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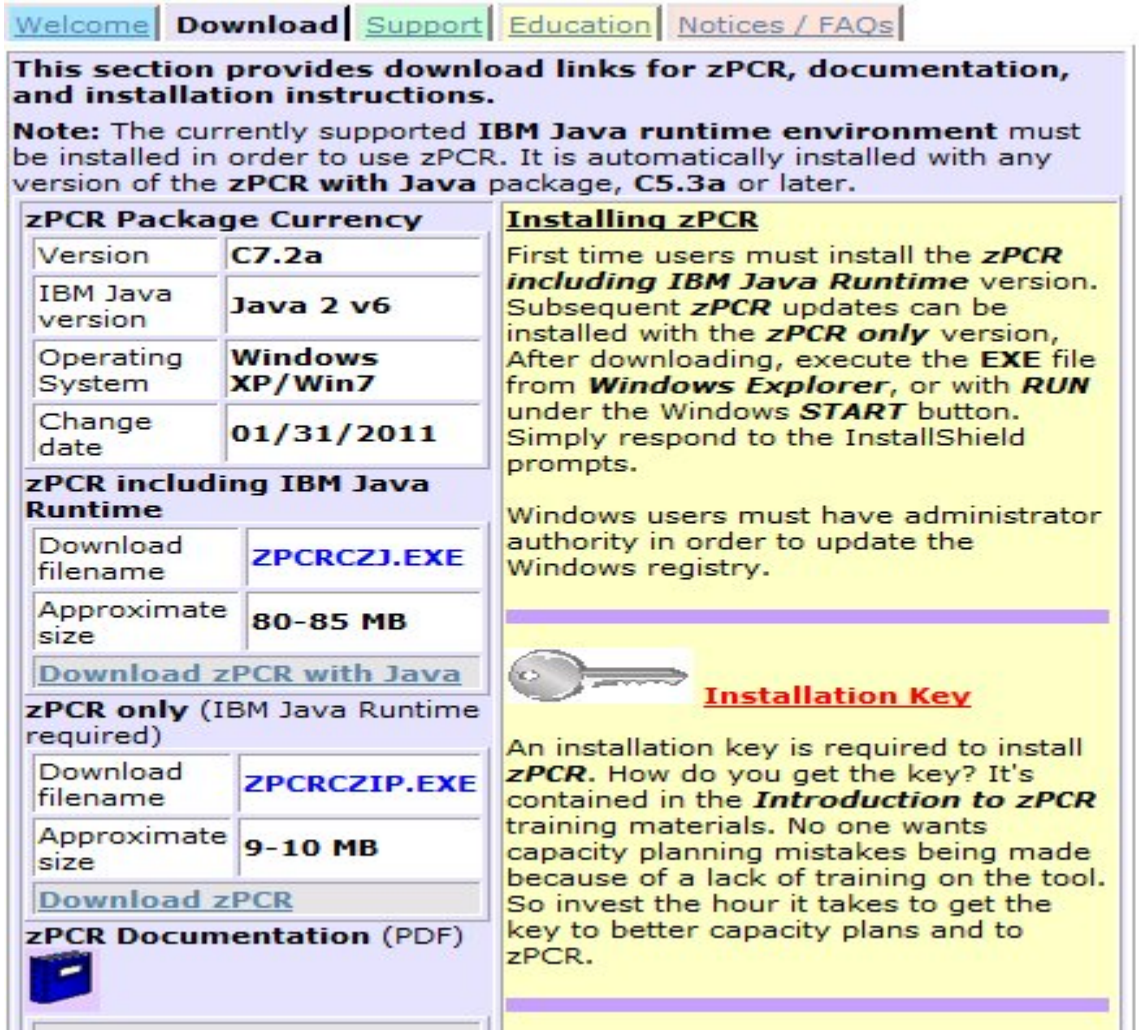
How To Get zPCR ?



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

This section provides download links for zPCR, documentation, and installation instructions.

Note: The currently supported **IBM Java runtime environment** must be installed in order to use zPCR. It is automatically installed with any version of the **zPCR with Java** package, **C5.3a** or later.

zPCR Package Currency

Version	**C7.2a**
IBM Java version	**Java 2 v6**
Operating System	**Windows XP/Win7**
Change date	**01/31/2011**

zPCR including IBM Java Runtime

Download filename	**ZPCRCZJ.EXE**
Approximate size	**80-85 MB**

Download zPCR with Java

zPCR only (IBM Java Runtime required)

Download filename	**ZPCRCZIP.EXE**
Approximate size	**9-10 MB**

Download zPCR

zPCR Documentation (PDF)

Installing zPCR

First time users must install the ***zPCR including IBM Java Runtime*** version. Subsequent ***zPCR*** updates can be installed with the ***zPCR only*** version, After downloading, execute the **EXE** file from ***Windows Explorer***, or with ***RUN*** under the Windows ***START*** button. Simply respond to the InstallShield prompts.

Windows users must have administrator authority in order to update the Windows registry.

Installation Key

An installation key is required to install ***zPCR***. How do you get the key? It's contained in the ***Introduction to zPCR*** training materials. No one wants capacity planning mistakes being made because of a lack of training on the tool. So invest the hour it takes to get the key to better capacity plans and to zPCR.


LSPR TERMS

LSPR Workload Categories

Please Send Your Data To IBM WSC. It will help everybody !!!

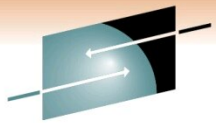
Knowledge Gain Is Still Evolving!

LSPR Workload Categories

Introduction

Historically, LSPR workload capacity curves (primitives and mixes) have had application names or been identified by a software characteristic. For example, past workload names have included CICS, IMS, OLTP-T, CB-L, LoIO-mix and TI-mix. However, capacity performance has always been more closely associated with how a workload uses and interacts with a particular processor hardware design. With the availability of CPU MF (SMF 113) data on z10, the ability to gain insight into the interaction of workload and hardware design in production workloads has arrived. The knowledge gained is still evolving, but the first step in the process is to produce LSPR workload capacity curves based on the underlying hardware sensitivities. Thus the LSPR introduces three new workload capacity categories which replace all prior primitives and mixes.

WORKLOAD CAPACITY PERFORMANCE IS SENSITIVE TO

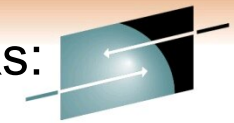


Instruction Path Length For A Transaction Or Job

Instruction Complexity(Microprocessor Design)

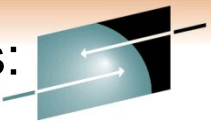
Memory Hierarchy Or Nest

Workload Capacity Performance is sensitive to 3 MAJOR FACTORs:



1. Instruction Path Length for a transaction or job
   - Application dependent, of course
   - Generally invariant across processor designs
   - But can be sensitive to Nway (due to MP effects such as locking, work queue searches, etc)
2. Instruction Complexity (Micro processor design)
   - Many design alternatives
     - Cycle time (GHz), instruction architecture, pipeline, superscalar, Out-Of-Order, branch prediction and more
   - Workload effect
     - May be different with each processor design
     - But once established for a workload on a processor, does not change very much

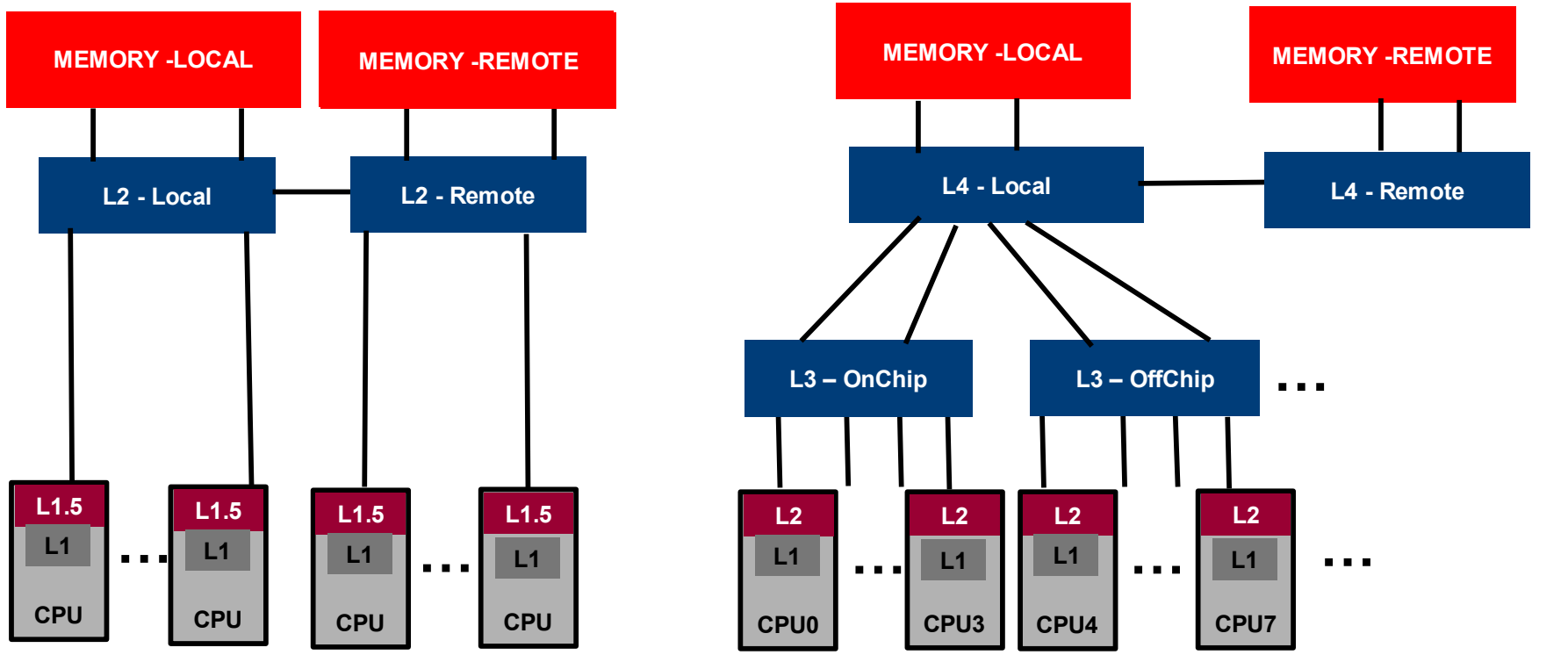
Workload Capacity Performance is sensitive to 3 MAJOR FACTORs:



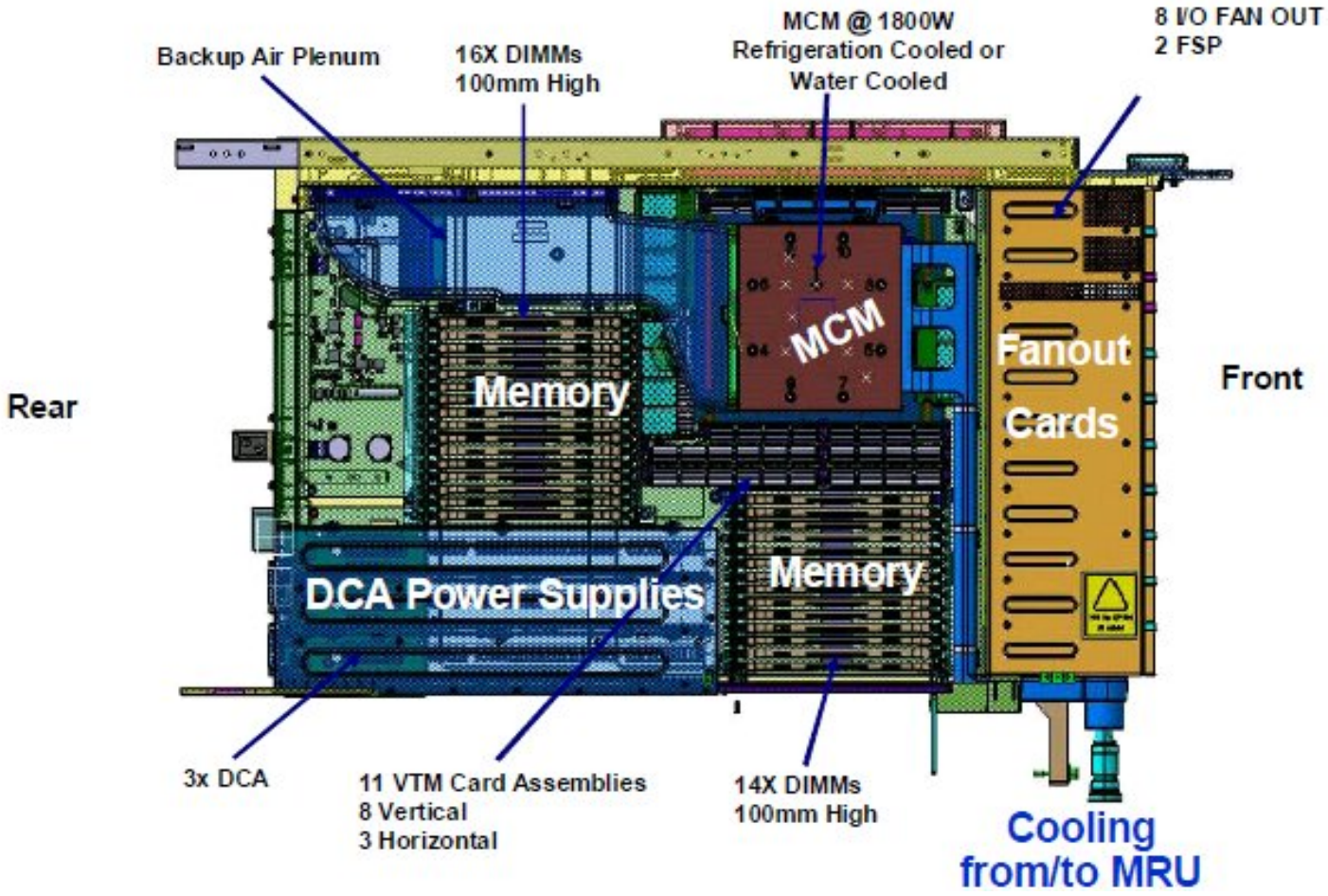
3

- Memory Hierarchy or "nest"
  - Many design alternatives
    - cache (levels, size, private, shared, latency, MESI protocol), controller, data buses
  - Workload effect
    - Quite variable
    - Sensitive to many factors: locality of reference, dispatch rate, IO rate, competition with other applications and/or LPARs, and more
  - Relative Nest Intensity
    - Activity beyond private-on-chip cache(s) is the most sensitive area
    - Reflects activity distribution and latency to shared caches and memory
    - Level 1 cache miss percentage also important
    - Data for cacluation available from CPU MF (SMF 113) starting with z10

What Is RNI ?

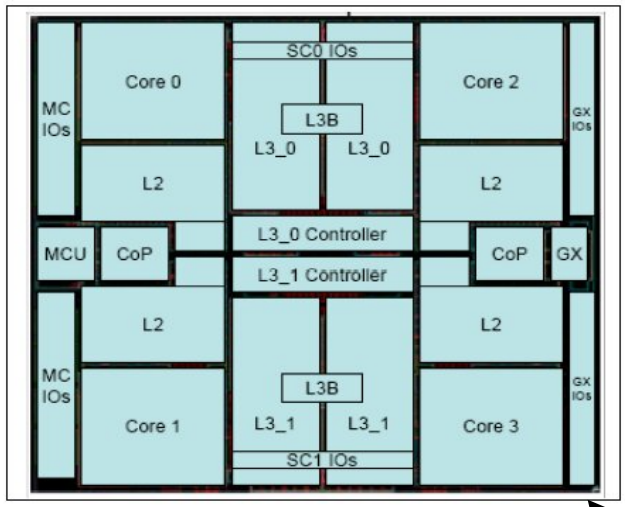


What Is RNI ? – z196 Book



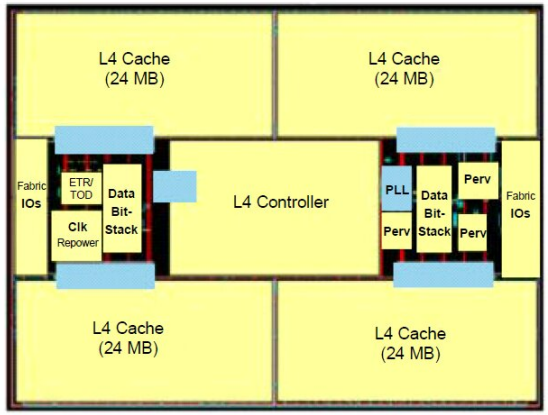
What Is RNI ? - z196 Book – Top To Down Approach

Z196 Quad Core PU Chip



In each PU chip
4 PCPs

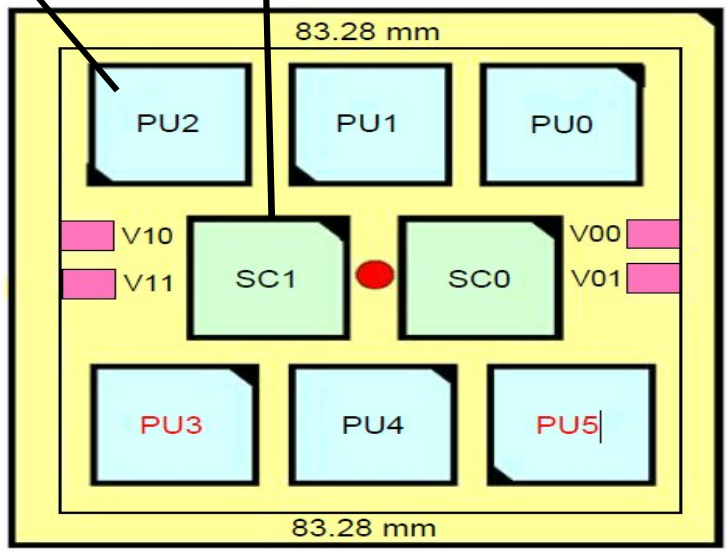
Z196 SC(Storage Controller) Chip – 96 MB



In each MCM 2 SC Chips

Book

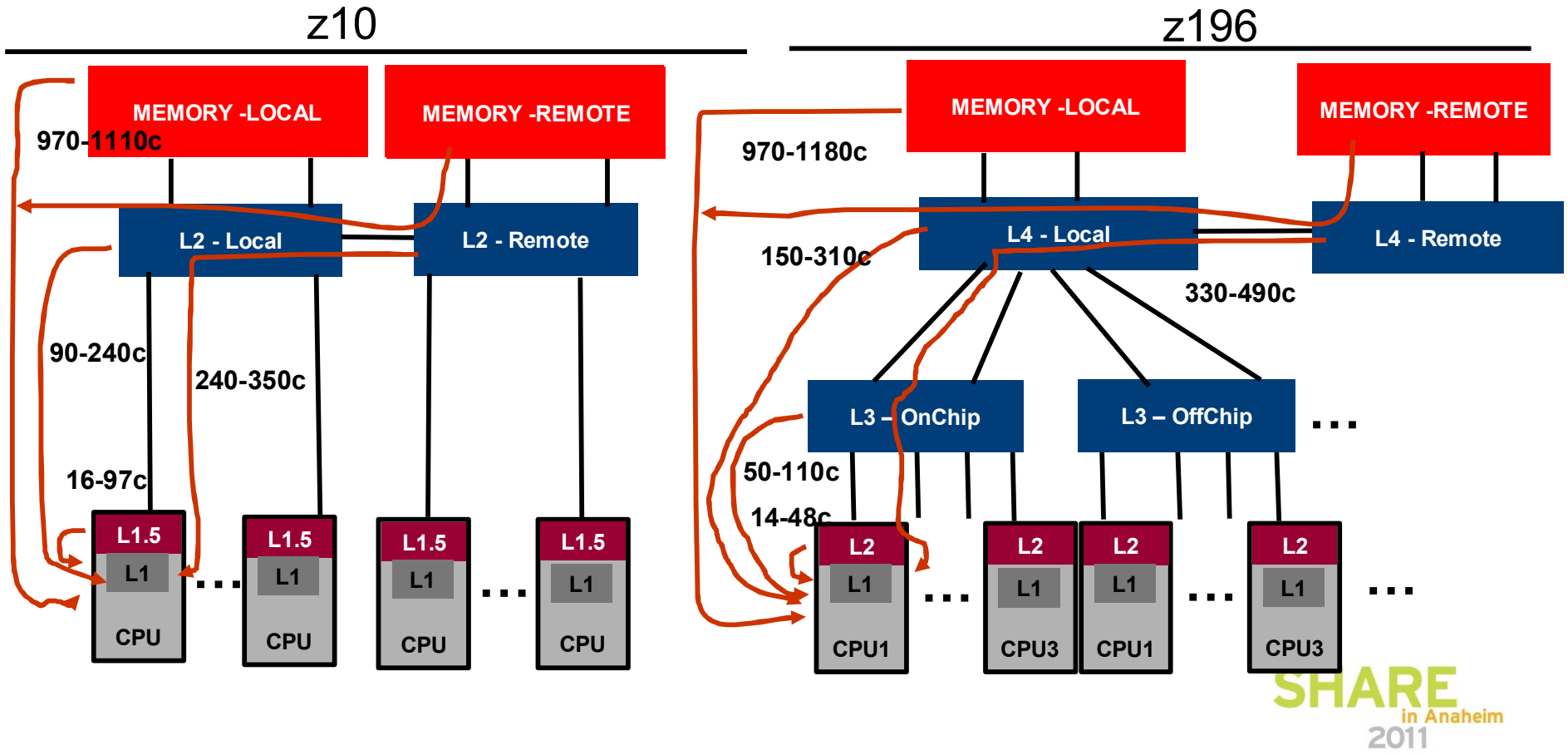
Z196 MCM



One Book
6 PU Chips

z10 & z196 Cache Distance - CPU Cycles & CPU Time

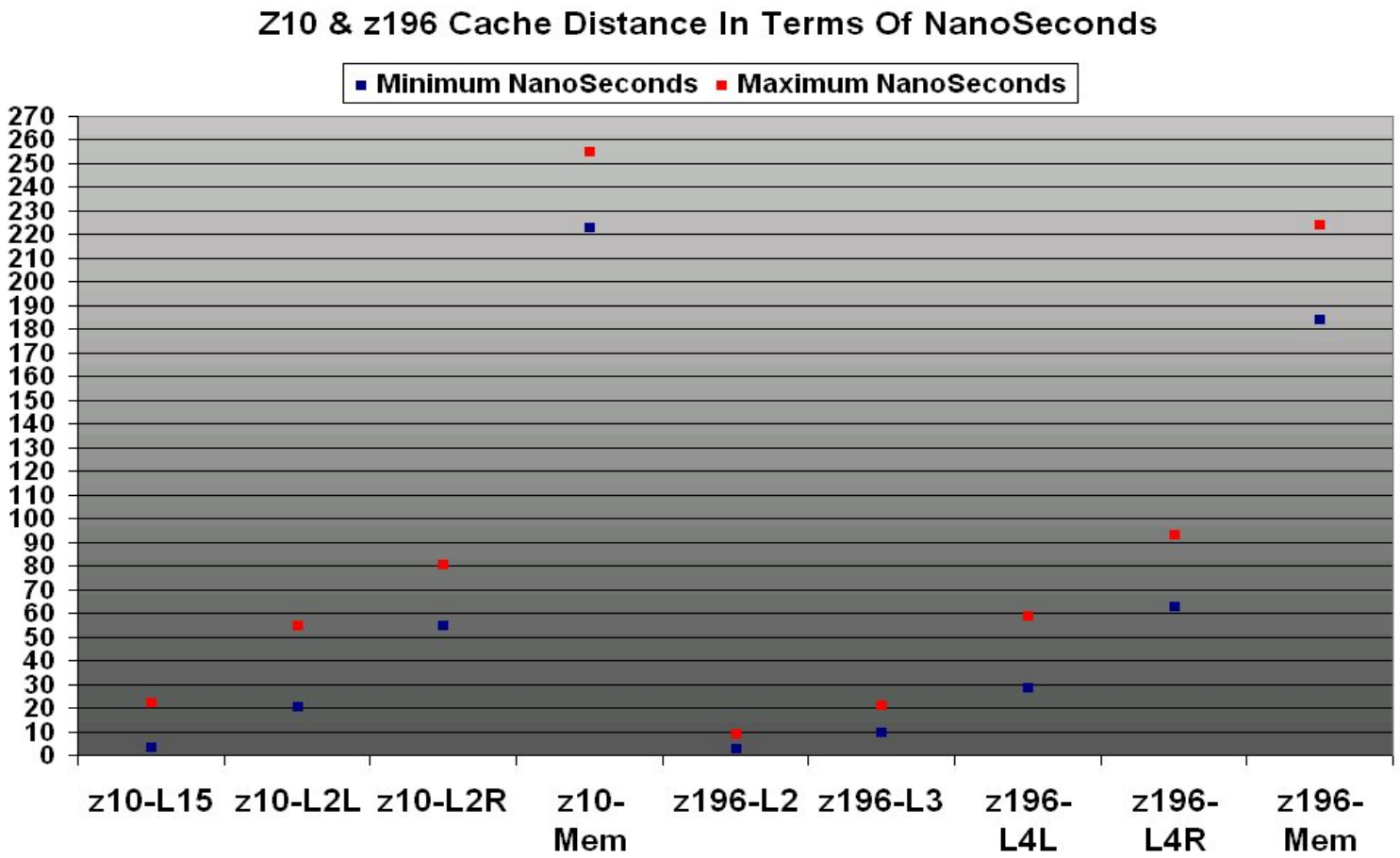
Z10 Caches & Memory Latency	zG Caches & Memory Latency
L1 (CPU, 64K I/128K D)	L1 (CPU 64K I/ 64K-128K D)
L1.5 (CPU, 3M, 16-97c)	L2 (CPU, 1.5M, 14-48c)
----------N / A----------	L3 (Chip, 24M, 50-110c)
Local L2 (Book, 48M, 90-240c)	Local L4 (Book, 192M, 150-310c)
Remote L2 (Book, 240-350c)	Remote L4 (Book, 330-490c)
Memory (970-1110c)	Memory (970-1180c)



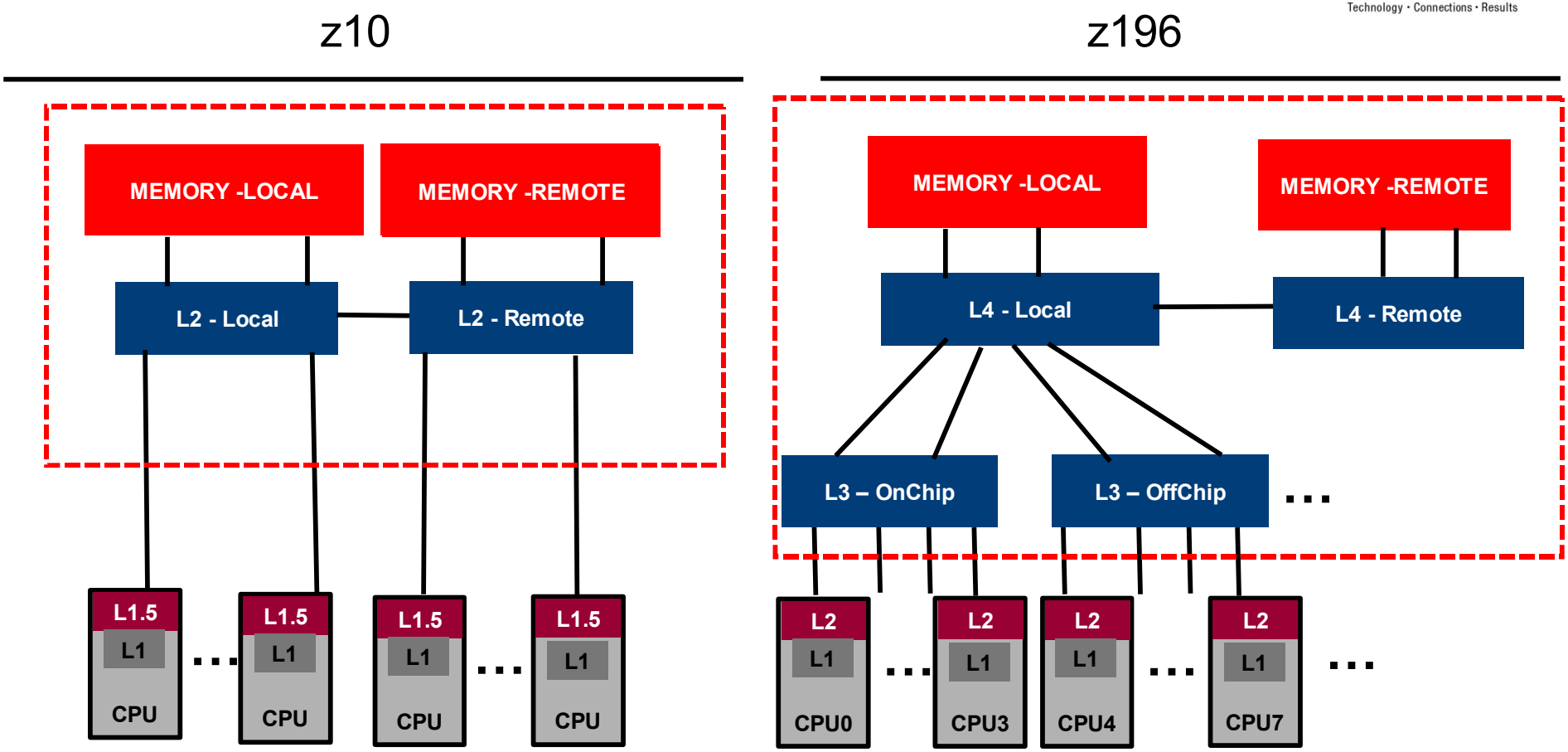
z10 & z196 Cache Distance - CPU Cycles & CPU Time

Z10 4.4 GHz 0.23 ns → 18 % → Z196 5.2 GHz 0.19 ns

Increase In Cycle Speed



z10 & z196 NEST



Relative Nest Intensity (RNI)

Indicates the level of activity to shared caches and memory

Calculating Relative Nest Intensity

The RNI of a workload may be calculated using CPU MF data. For z10, three factors are used:

- L2LP: percentage of L1 misses sourced from the local book L2 cache
- L2RP: percentage of L1 misses sourced from a remote book L2 cache
- MEMP: percentage of L1 misses sourced from memory.

These percentages are multiplied by weighting factors and the result divided by 100. The formula for z10 is:

z10 RNI=(1.0xL2LP+2.4xL2RP+7.5xMEMP)/100.

Tools available from IBM (zPCR) and several vendors can extract these factors from CPU MF data. For z196 the CPU MF factors needed are:

- L3P* percentage of L1 misses sourced from the shared chip-level L3 cache
- L4LP: percentage of L1 misses sourced from the local book L4 cache
- L4RP* percentage of L1 misses sourced from a remote book L4 cache
- MEMP: percentage of L1 misses sourced from memory

The formula for z196 is:

z196 RNI=1.6x(0.4xL3P+1.0xL4LP+2.4xL4RP+7.5xMEMP)/100

Note these formulas may change in the future.

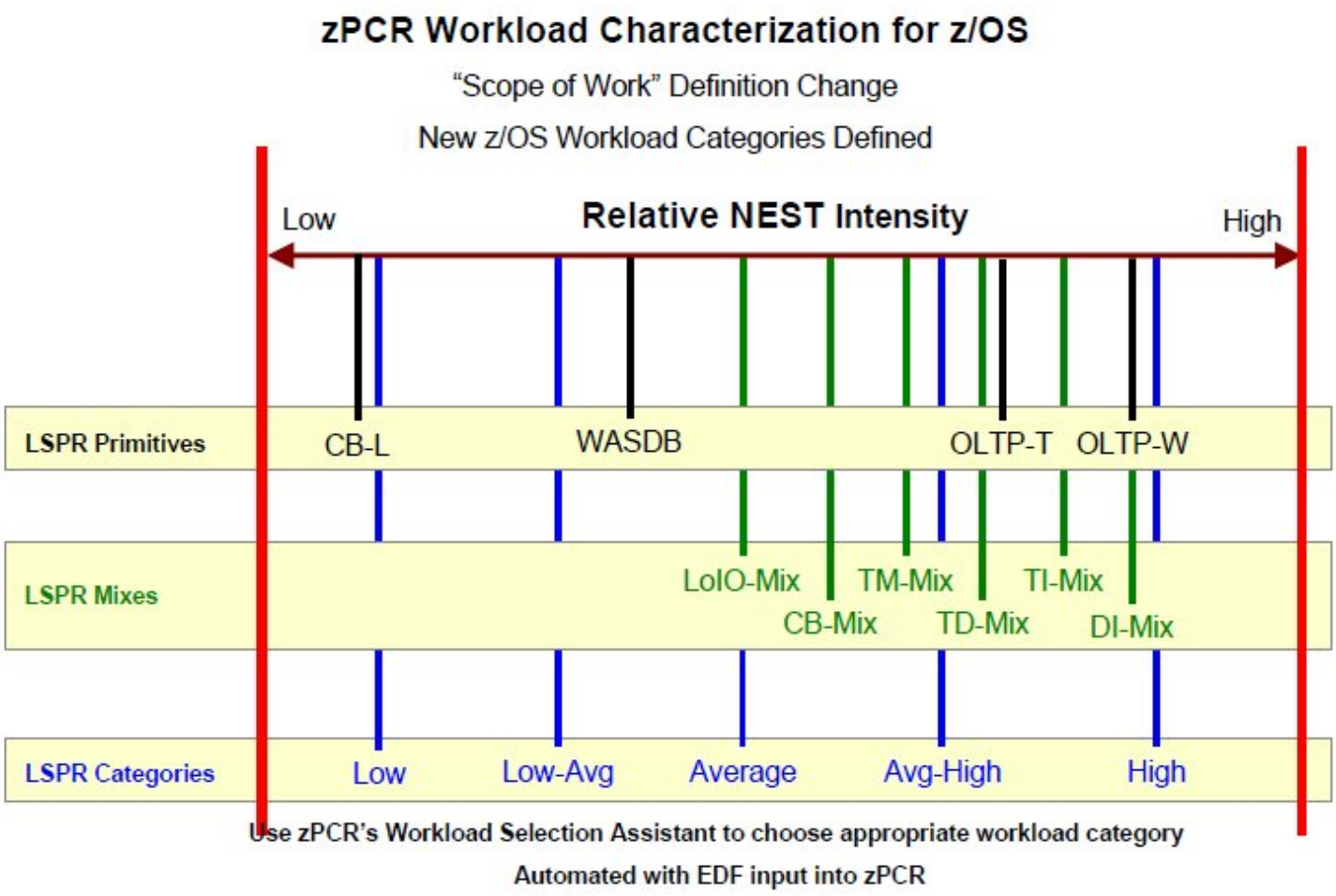
Relating Production Workloads to LSPR Workloads

For z10 and newer processors, the CPU MF data may be used to provide an additional "hint" as to workload selection. When available, this data allows the RNI for a production workload to be calculated. Using the RNI and another value from CPU MF, the L1 cache miss percentage, a workload may be classified as LOW, AVERAGE or HIGH RNI. This classification and resulting "hint" is automated in the zPCR tool. It is highly recommended to use zPCR for capacity sizing. For those wanting to create the "hint" by hand, the following table may be used for z10:

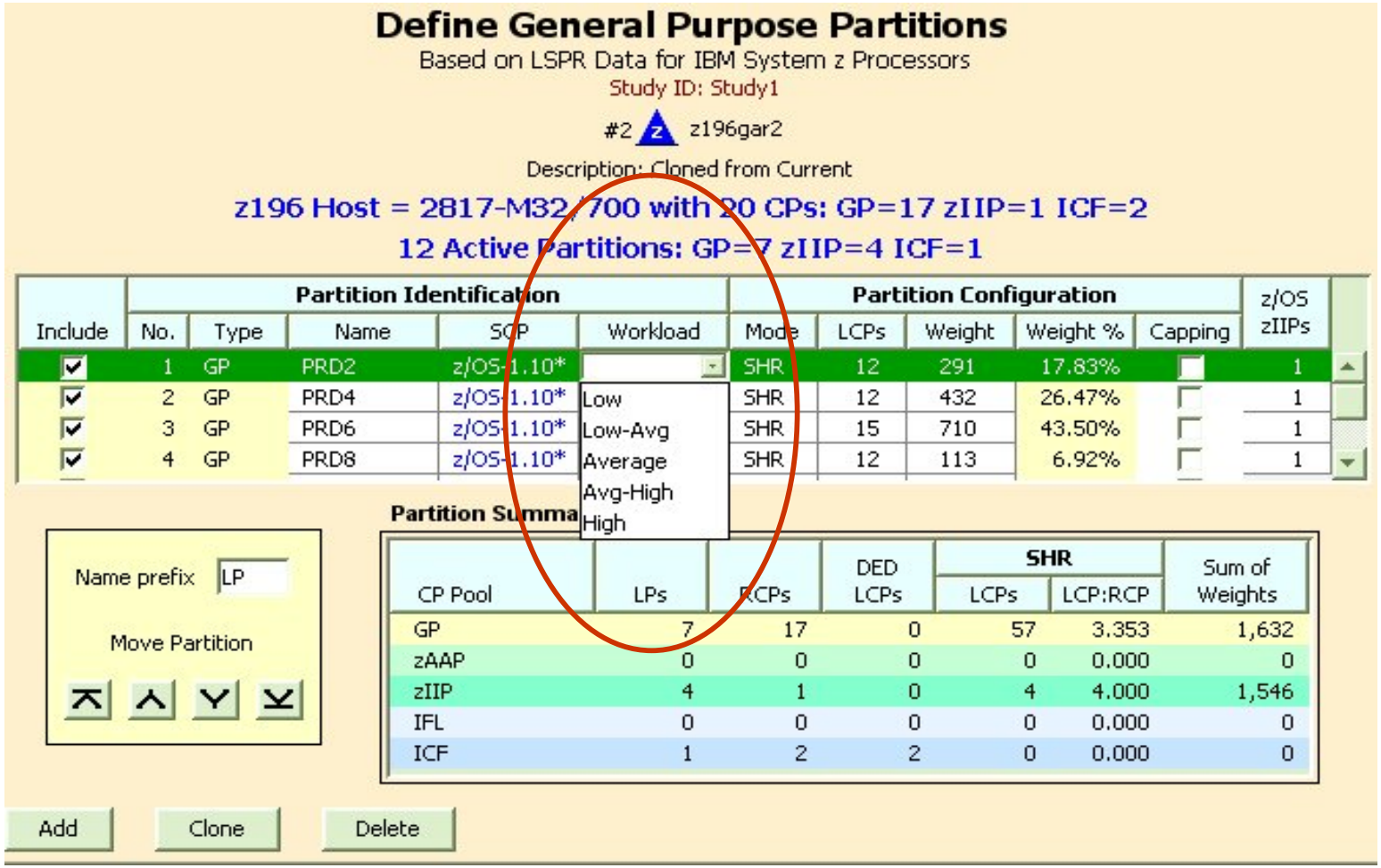
L1MP	RNI	Workload Hint
<3%	>= 0.75 < 0.75	AVERAGE LOW
3% to 6%	>1.0 0.6 to 1.0 < 0.6	HIGH AVERAGE LOW
>6%	>= 0.75 < 0.75	HIGH AVERAGE

Note this table may change in the future.

zPCR Workload Characterization



zPCR Workload Characterization



Define General Purpose Partitions

Based on LSPR Data for IBM System z Processors

Study ID: Study1

#2 z196gar2

Description: Cloned from Current

z196 Host = 2817-M32, 700 with 20 CPs: GP=17 zIIP=1 ICF=2

12 Active Partitions: GP=7 zIIP=4 ICF=1

Include	Partition Identification					Partition Configuration					z/OS zIIPs
	No.	Type	Name	SCP	Workload	Mode	LCPs	Weight	Weight %	Capping	
☑	1	GP	PRD2	z/OS 1.10*		SHR	12	291	17.83%	☐	1
☑	2	GP	PRD4	z/OS 1.10*	Low	SHR	12	432	26.47%	☐	1
☑	3	GP	PRD6	z/OS 1.10*	Low-Avg	SHR	15	710	43.50%	☐	1
☑	4	GP	PRD8	z/OS 1.10*	Average	SHR	12	113	6.92%	☐	1
					Avg-High						
					High						

Name prefix LP

Move Partition

Partition Summa

CP Pool	LPs	RCPs	DED LCPs	SHR LCPs	SHR LCP:RCP	Sum of Weights
GP	7	17	0	57	3.353	1,632
zAAP	0	0	0	0	0.000	0
zIIP	4	1	0	4	4.000	1,546
IFL	0	0	0	0	0.000	0
ICF	1	2	2	0	0.000	0

Add Clone Delete

Choosing Interval For zPCR

- ❑ Choose Your Peak Day
- ❑ Choose Peak Interval Of Peak Day
- ❑ If During Your Peak Days ,Hot Intervals Like 1400-1800, You Have One Or Two Intervals With High RNI, you are High RNI
- ❑ Choose High Utilized Intervals

IBM Use > 90 In Previous LPSRs ,but with new LSPR >95 Is Being Used

See Step-8 How To Choose Interval For zPCR

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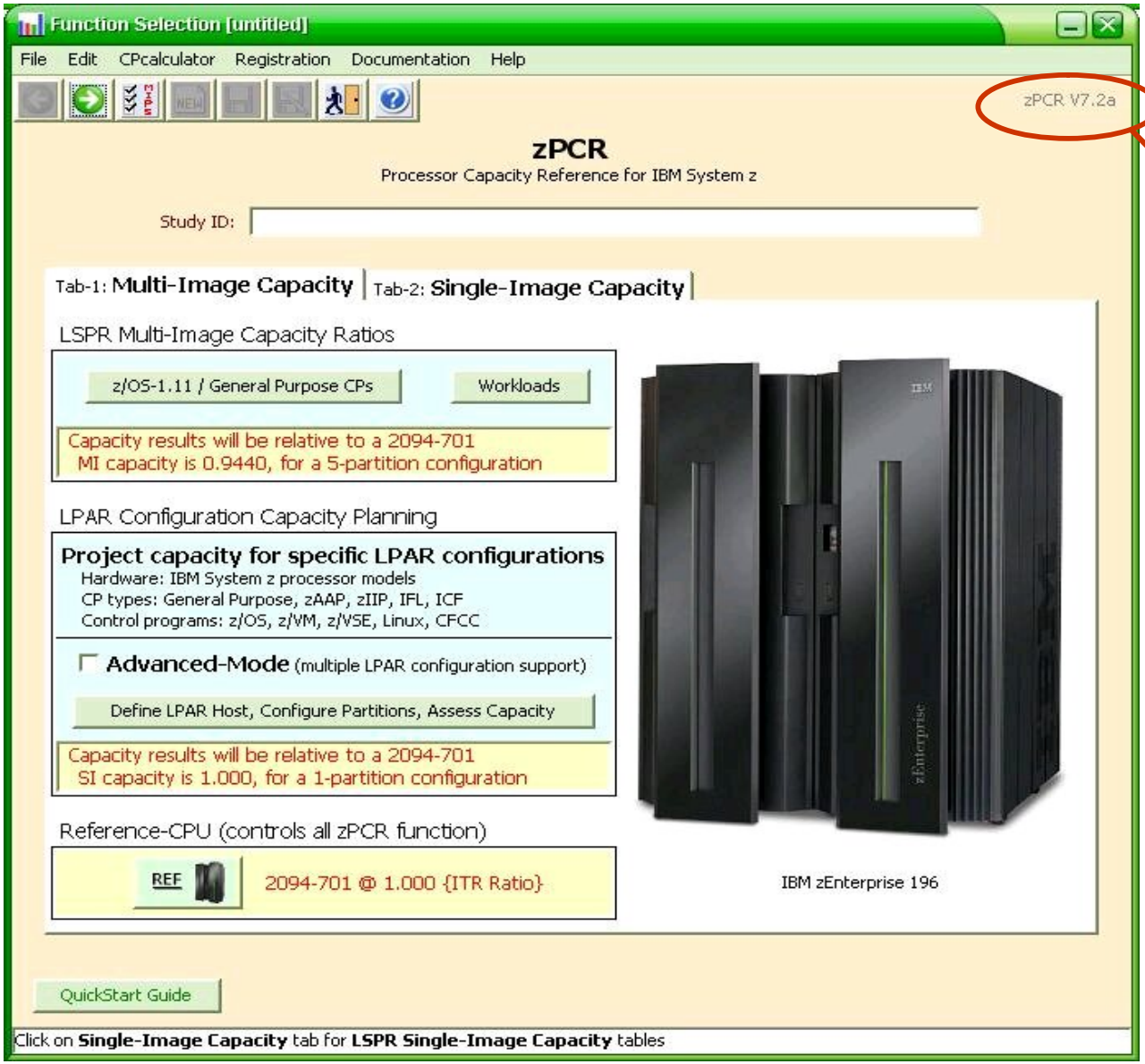
Step-By-Step z196 Upgrade zPCR Study

1



Latest Version 7.2a

Step-By-Step z196 Upgrade zPCR Study

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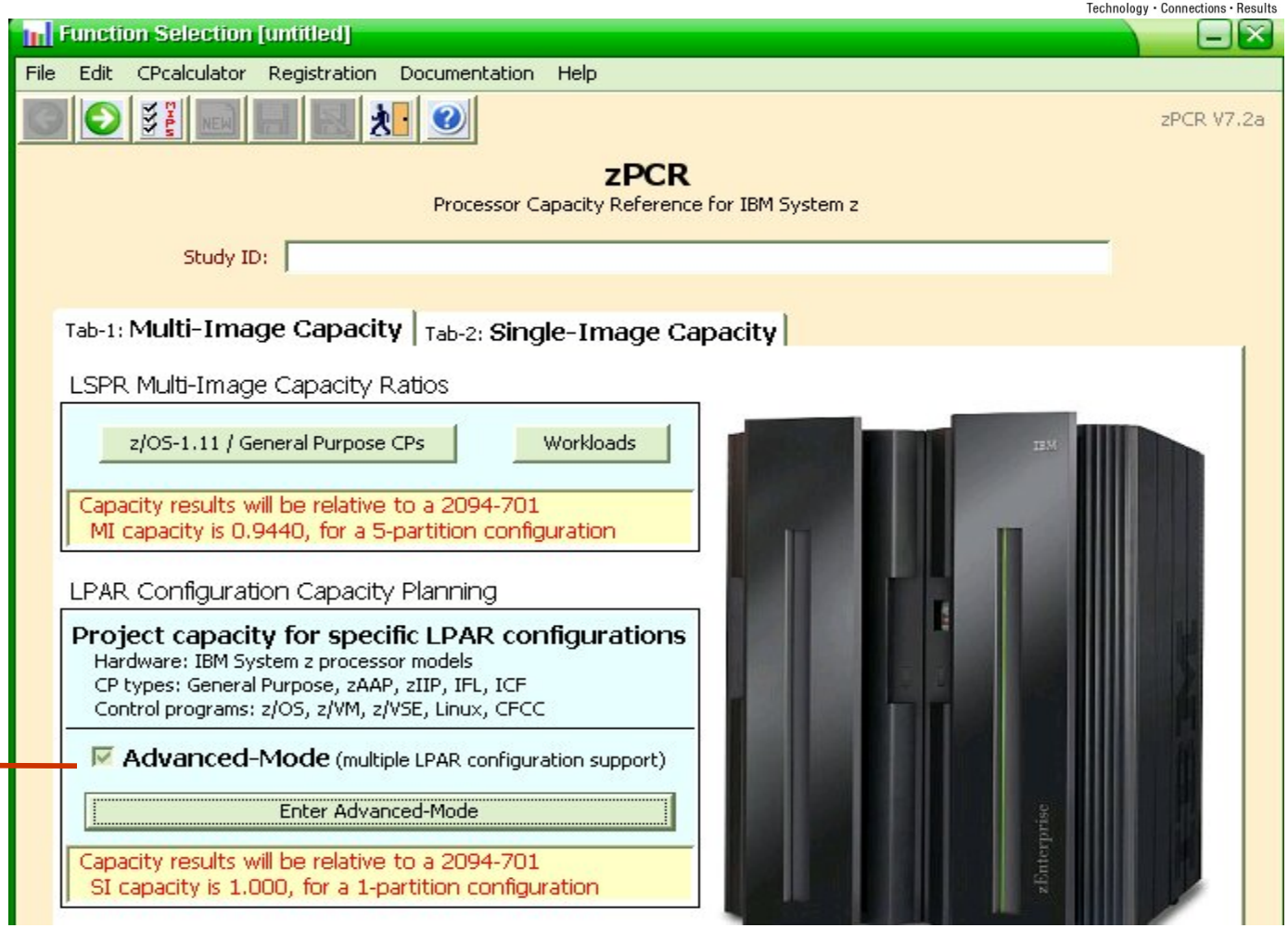
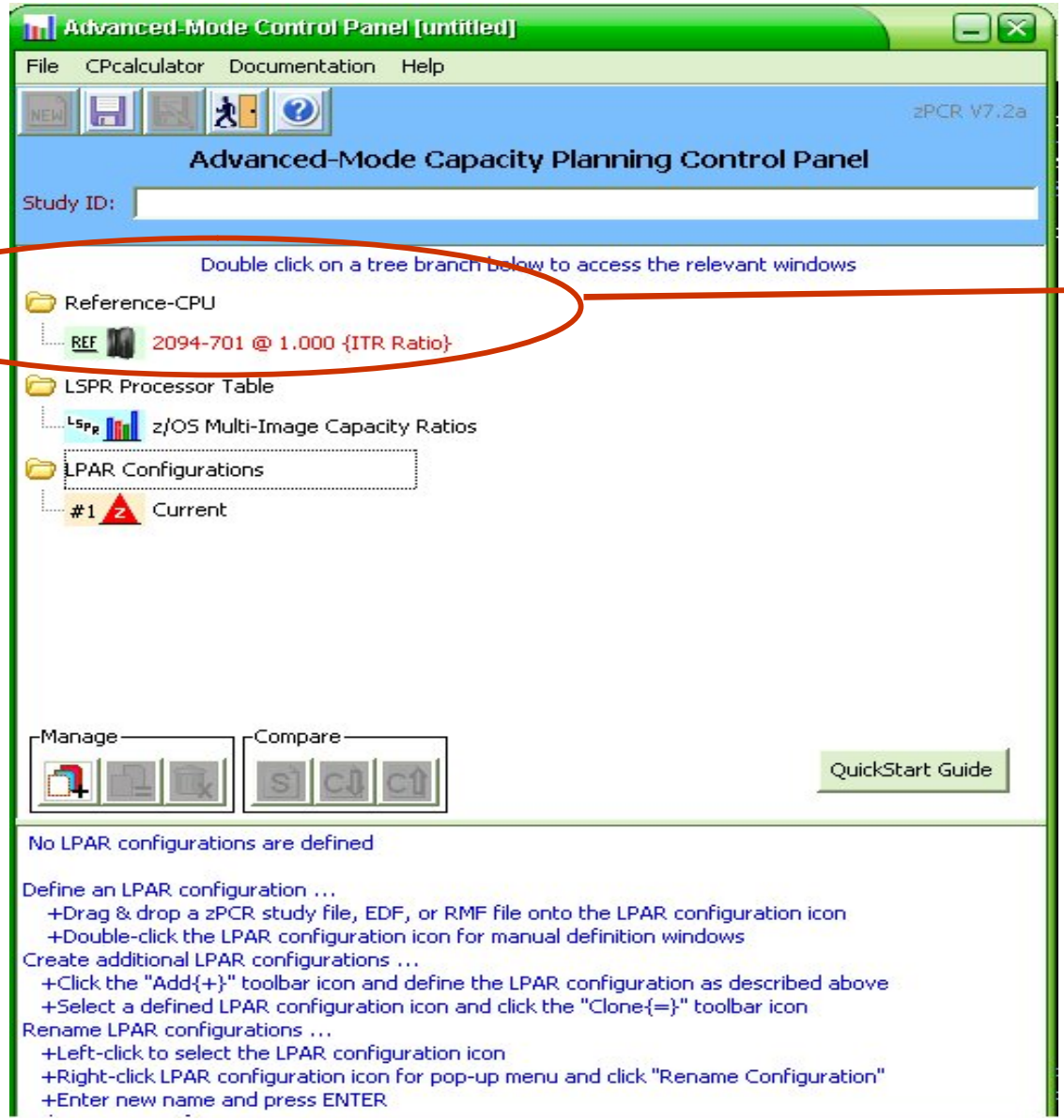
2

Click On
Advanced-Mode



Step-By-Step z196 Upgrade zPCR Study

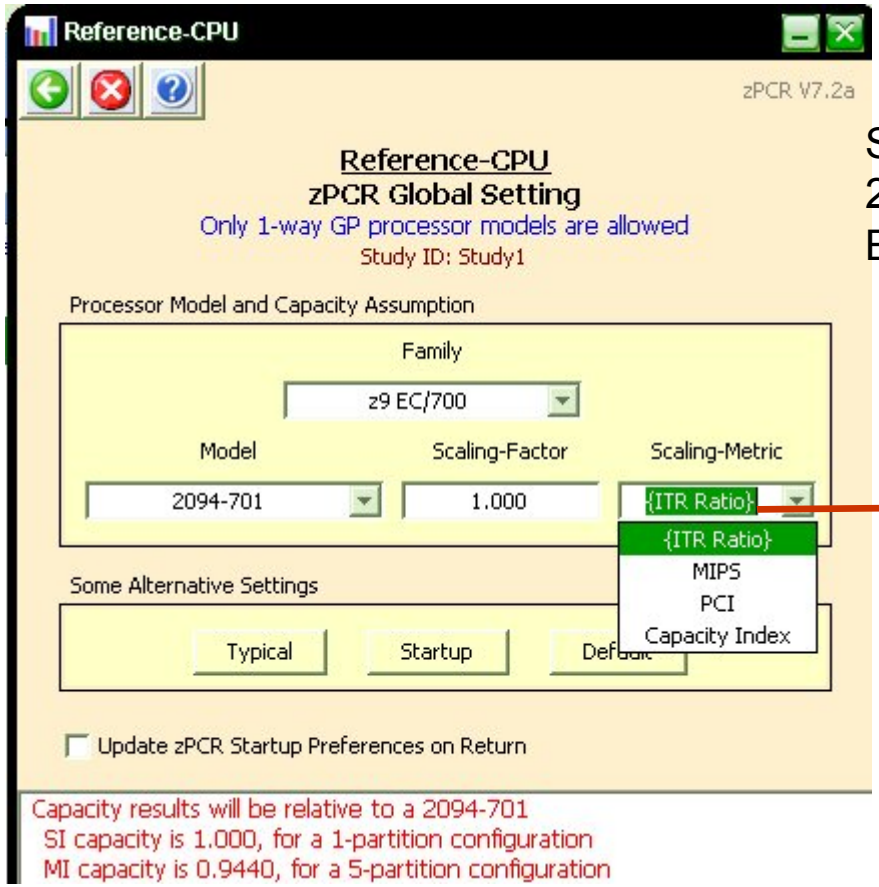
3



Click On Reference-CPU

Step-By-Step z196 Upgrade zPCR Study

4



Starting With zPCR 7.0 ,the default value for 2094-701 Reference CPU scaling factor has Been changed from 602 MIPS To **593 MIPS**

Choose Which Scaling Metrics To Use

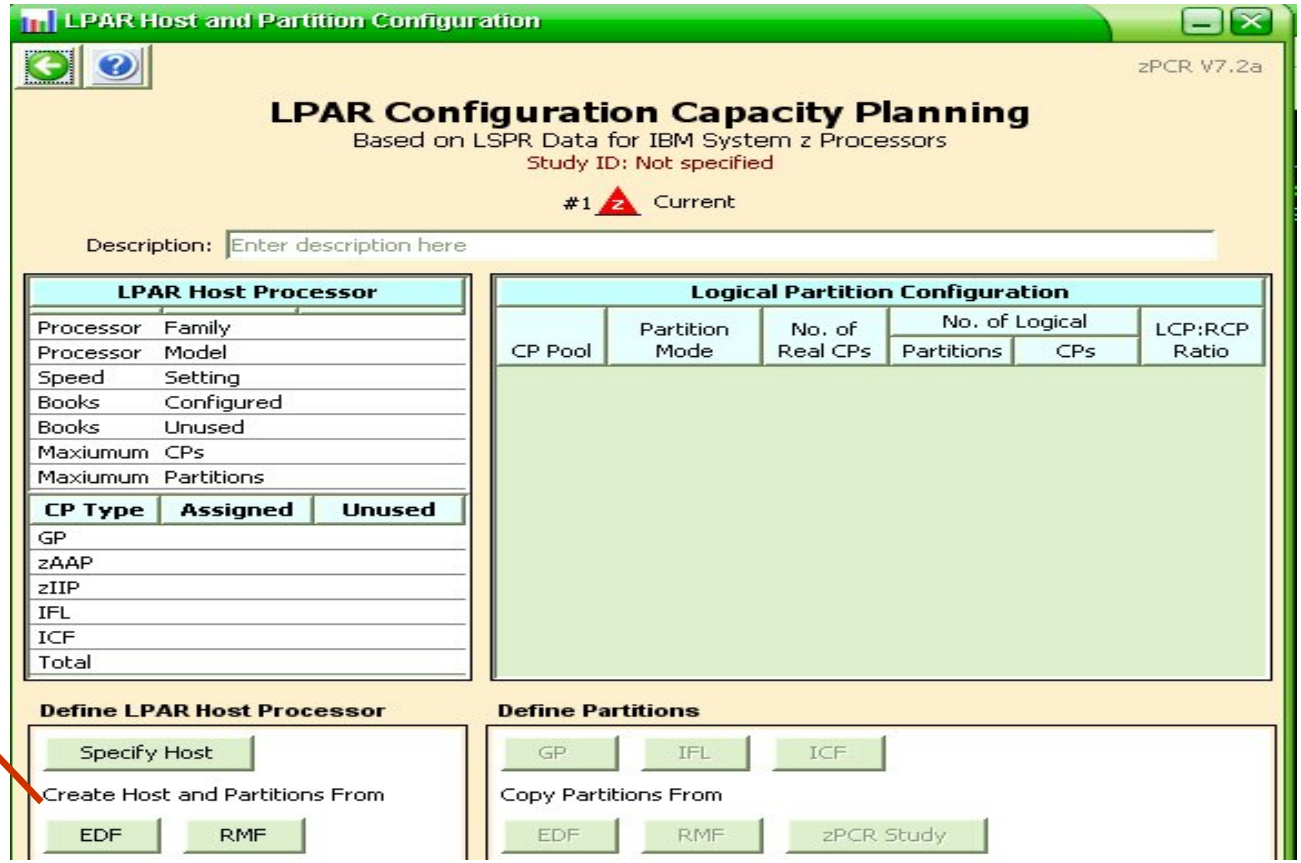
Recommend To Use ITR For
Upgrade Plans
LPAR Configuration Changes

Recommend To Use MIPS For
CP and zIIP/zAAP MIPS

Step-By-Step z196 Upgrade zPCR Study

5

Click On
EDF To LOAD
Edf File

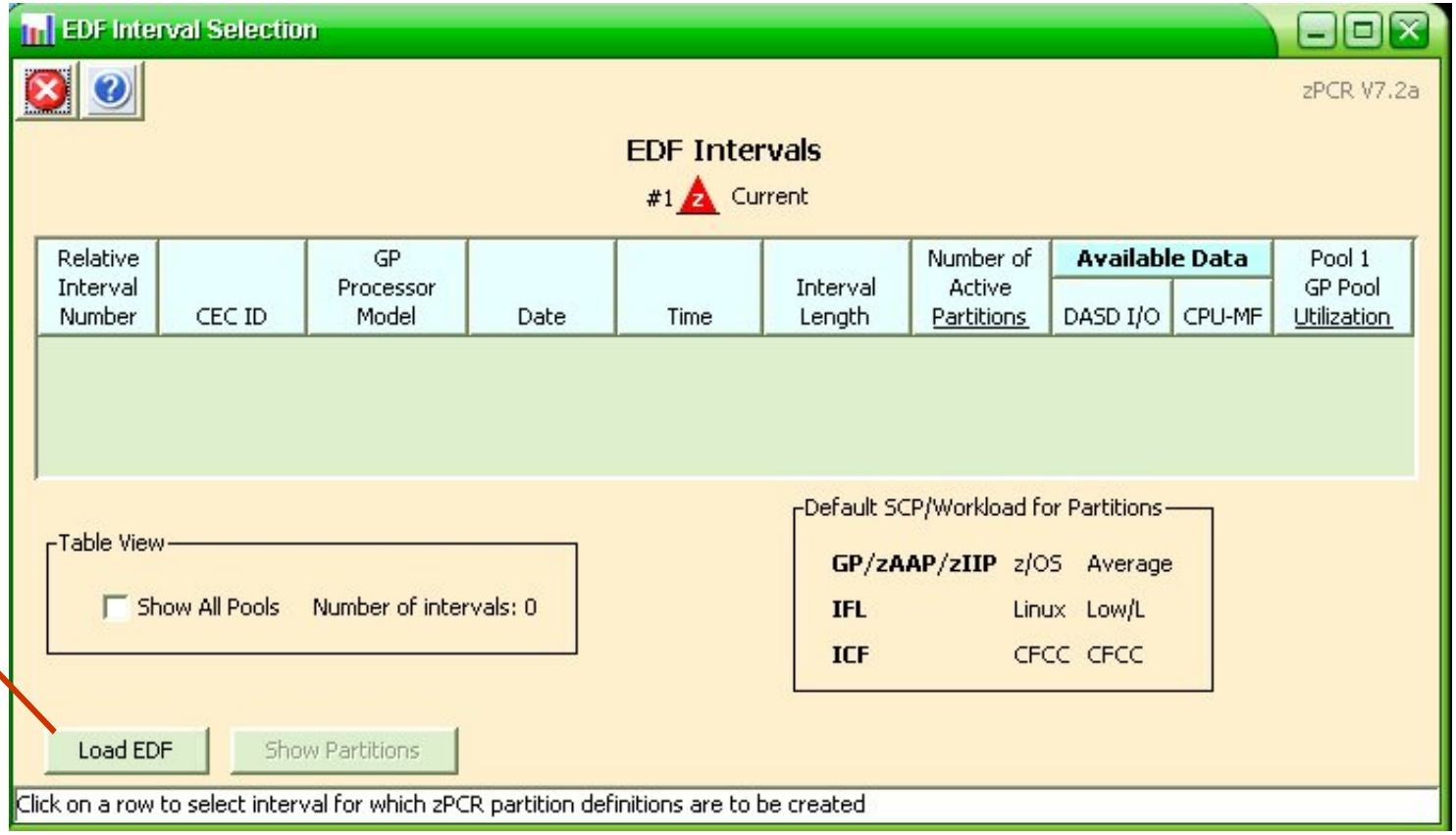


Creating EDF File On MVS Is Explained In Next Slides

Step-By-Step z196 Upgrade zPCR Study

6

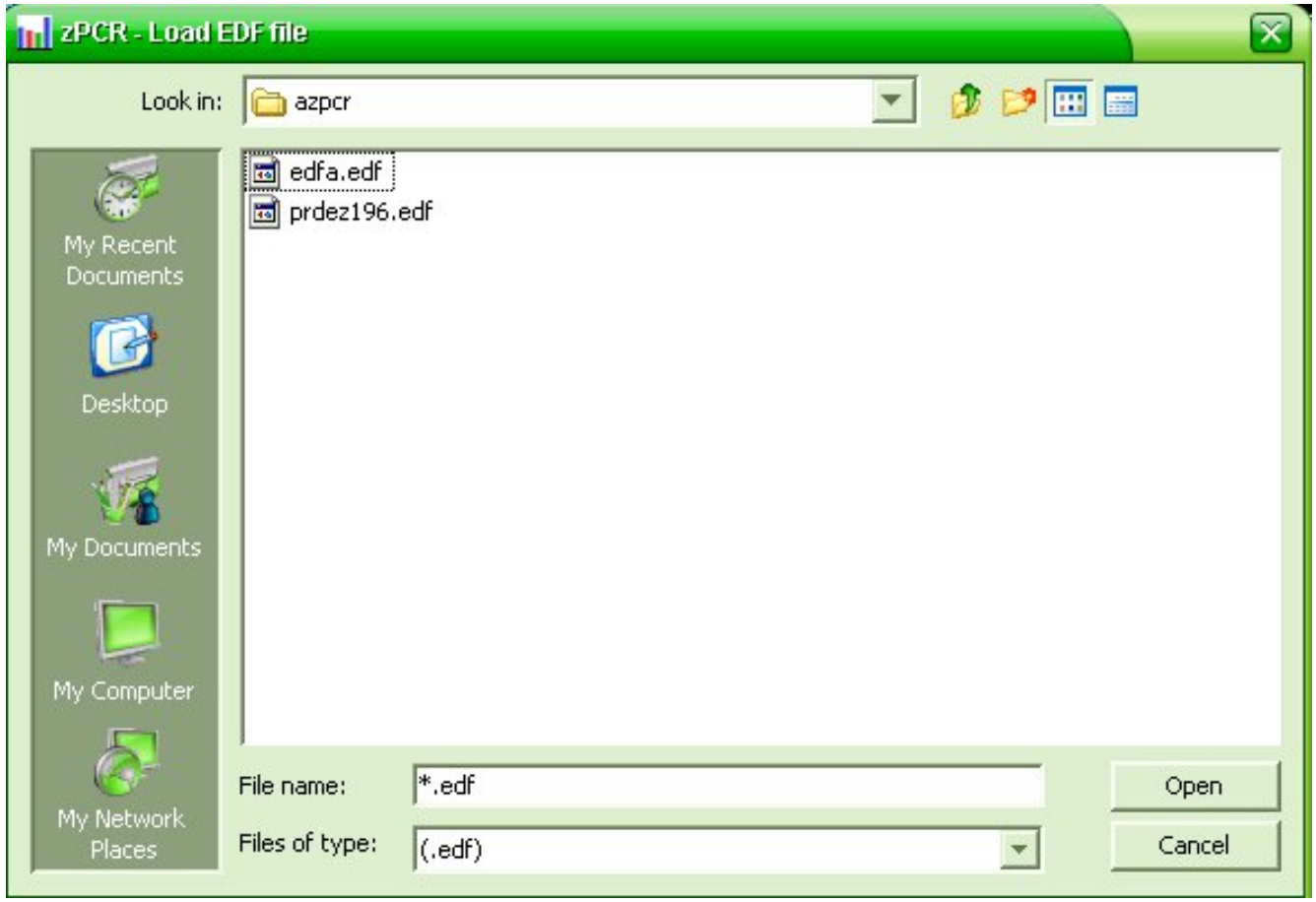
Click On
LOAD EDF



Step-By-Step z196 Upgrade zPCR Study

Select EDF File That You Have Downloaded From MVS

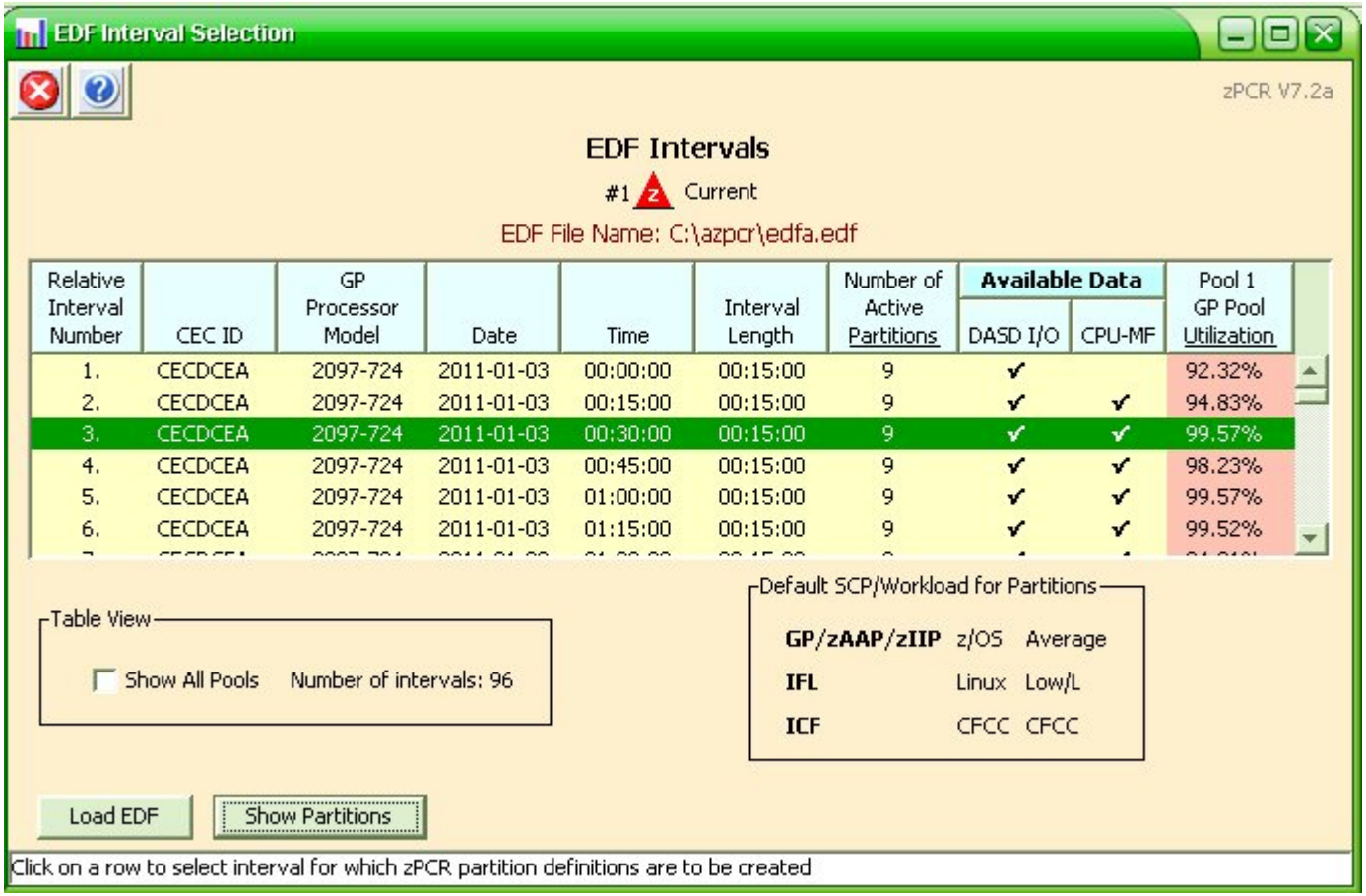
7



Step-By-Step z196 Upgrade zPCR Study

Choose Interval with CEC util > 95 Or The Most High Utilized Interval

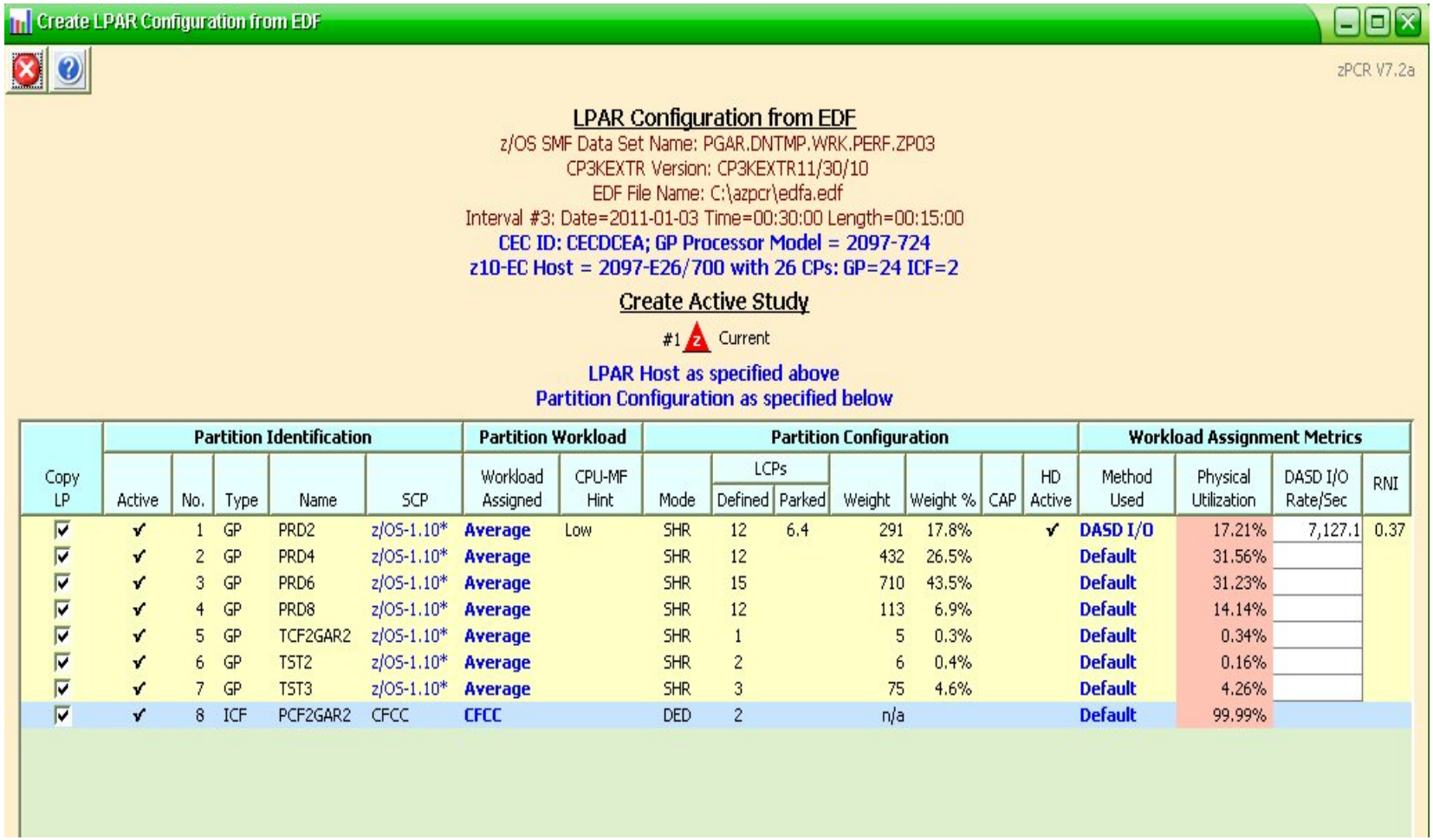
8



IBM Use > 90 In Previous LPSRs ,but with new LSPR >95 Is Being Used

Step-By-Step z196 Upgrade zPCR Study

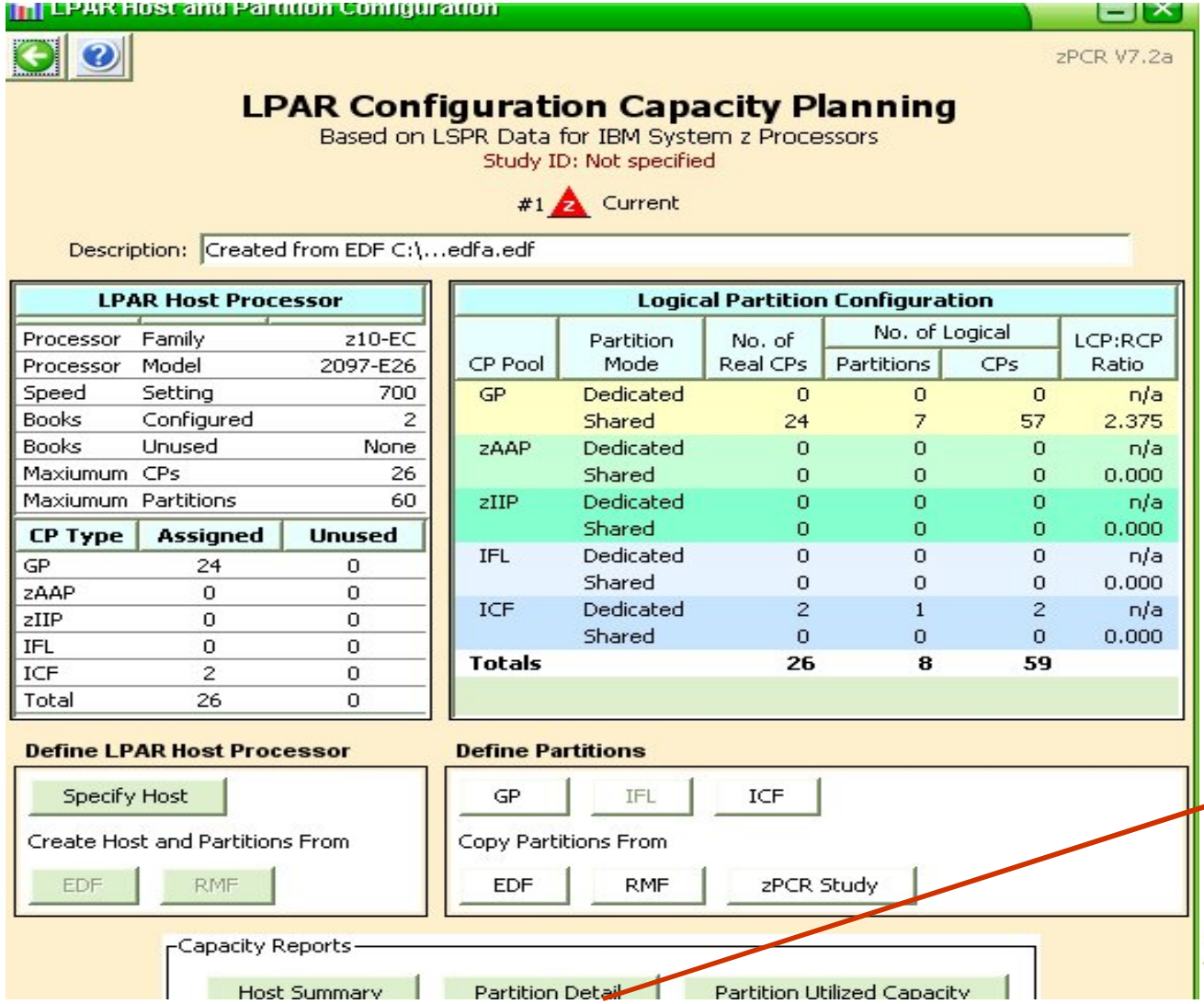
9



Copy LP	Partition Identification					Partition Workload		Partition Configuration							Workload Assignment Metrics			
	Active	No.	Type	Name	SCP	Workload Assigned	CPU-MF Hint	Mode	LCPs Defined	LCPs Parked	Weight	Weight %	CAP	HD Active	Method Used	Physical Utilization	DASD I/O Rate/Sec	RNI
☑	✓	1	GP	PRD2	z/OS-1.10*	Average	Low	SHR	12	6.4	291	17.8%		✓	DASD I/O	17.21%	7,127.1	0.37
☑	✓	2	GP	PRD4	z/OS-1.10*	Average		SHR	12		432	26.5%			Default	31.56%		
☑	✓	3	GP	PRD6	z/OS-1.10*	Average		SHR	15		710	43.5%			Default	31.23%		
☑	✓	4	GP	PRD8	z/OS-1.10*	Average		SHR	12		113	6.9%			Default	14.14%		
☑	✓	5	GP	TCF2GAR2	z/OS-1.10*	Average		SHR	1		5	0.3%			Default	0.34%		
☑	✓	6	GP	TST2	z/OS-1.10*	Average		SHR	2		6	0.4%			Default	0.16%		
☑	✓	7	GP	TST3	z/OS-1.10*	Average		SHR	3		75	4.6%			Default	4.26%		
☑	✓	8	ICF	PCF2GAR2	CFCC	CFCC		DED	2		n/a				Default	99.99%		

Step-By-Step z196 Upgrade zPCR Study

10



Click On Partition Detail

Step-By-Step z196 Upgrade zPCR Study

11

Partition Detail Report

Based on LSPR Data for IBM System z Processors

Study ID: Study1

#1 Current

Description: Created from EDF C:\...edfa.edf

z10-EC Host = 2097-E26/700 with 26 CPs: GP=24 ICF=2

8 Active Partitions: GP=7 ICF=1

Capacity basis: 2094-701 @ 1.000 for a single partition configuration

z196 and z10 processor capacity for z/OS is represented with HiperDispatch turned ON

Include	Partition Identification					Partition Configuration					Partition Capacity	
	No.	Type	Name	SCP	Workload	Mode	LCPs	Weight	Weight %	Capping	Minimum	Maximum
☑	1	GP	PRD2	z/OS-1.10*	Avg-High	SHR	12	291	17.83%	☐	4.224	11.845
☑	2	GP	PRD4	z/OS-1.10*	Avg-High	SHR	12	432	26.47%	☐	6.271	11.845
☑	3	GP	PRD6	z/OS-1.10*	Avg-High	SHR	15	710	43.50%	☐	10.088	14.493
☑	4	GP	PRD8	z/OS-1.10*	Avg-High	SHR	12	113	6.92%	☐	1.640	11.845
☑	5	GP	TCF2GAR2	CFCC	CFCC	SHR	1	5	0.31%	☐	0.070	0.949
☑	6	GP	TST2	z/OS-1.10*	Average	SHR	2	6	0.37%	☐	0.101	2.284
☑	7	GP	TST3	z/OS-1.10*	Average	SHR	3	75	4.60%	☐	1.260	3.428
☑	8	ICF	PCF2GAR2	CFCC	CFCC	DED	2	n/a		☐	2.199	2.199

Table View

Display	Pools	
◉ All Partitions	☑ GP	☐ IFL
○ Includes Only	☐ zAAP	☑ ICF
	☐ zIIP	

Capacity Summary by Pool

CP Pool	RCPs	Partitions	LCPs	Capacity
GP	24	7	57	23.655
zAAP	0	0	0	0.000
zIIP	0	0	0	0.000
IFL	0	0	0	0.000
ICF	2	1	2	2.199
Totals	26	8	59	25.853

Step-By-Step z196 Upgrade zPCR Study

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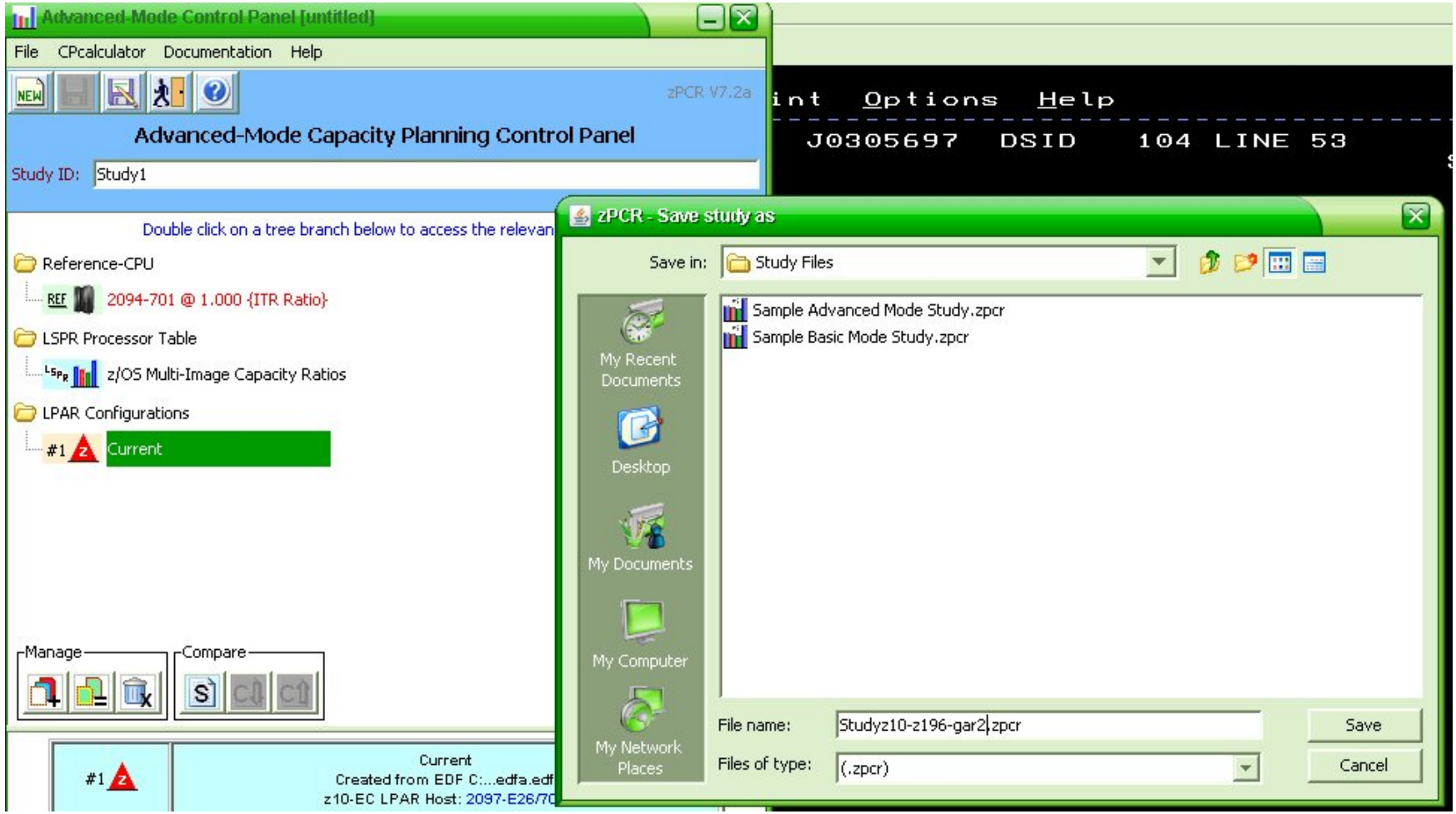
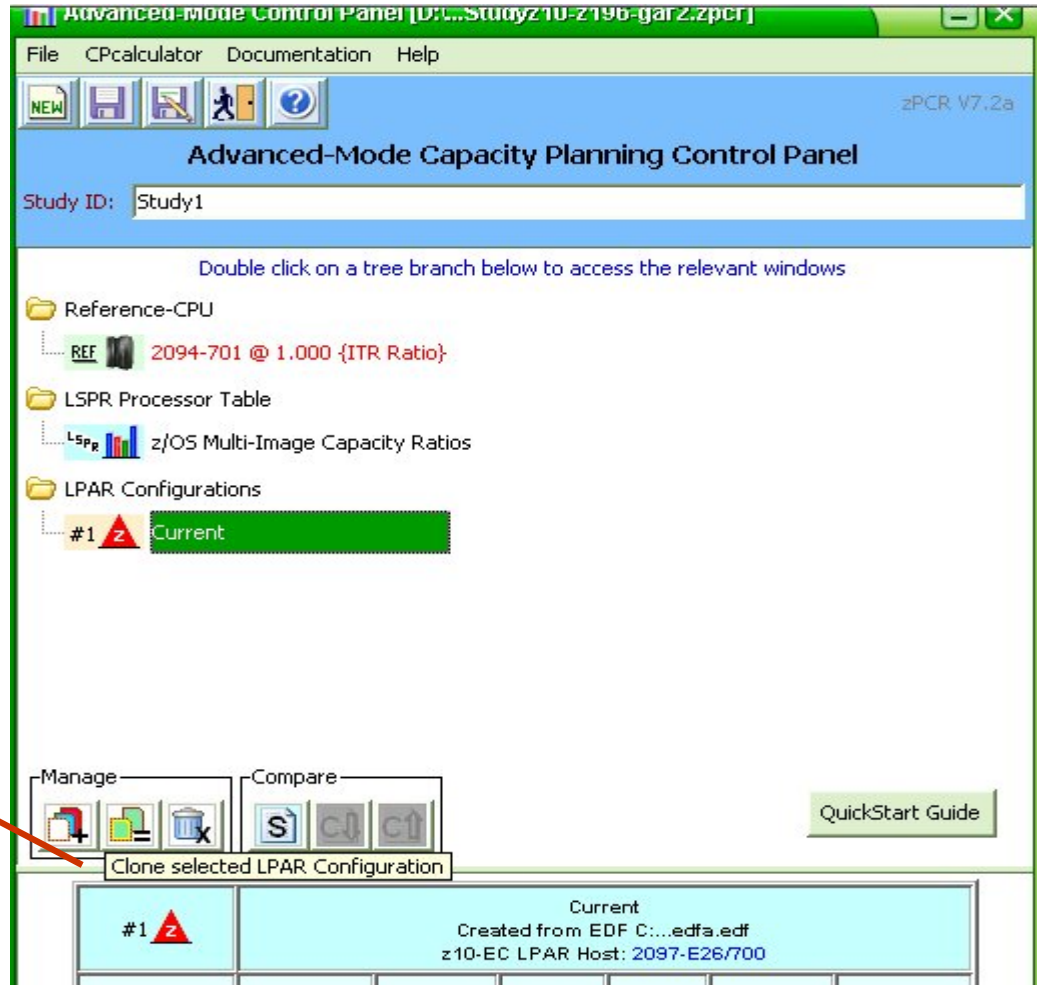


Step-By-Step z196 Upgrade zPCR Study

13

Clone This configuration
To make model
z196



Step-By-Step z196 Upgrade zPCR Study

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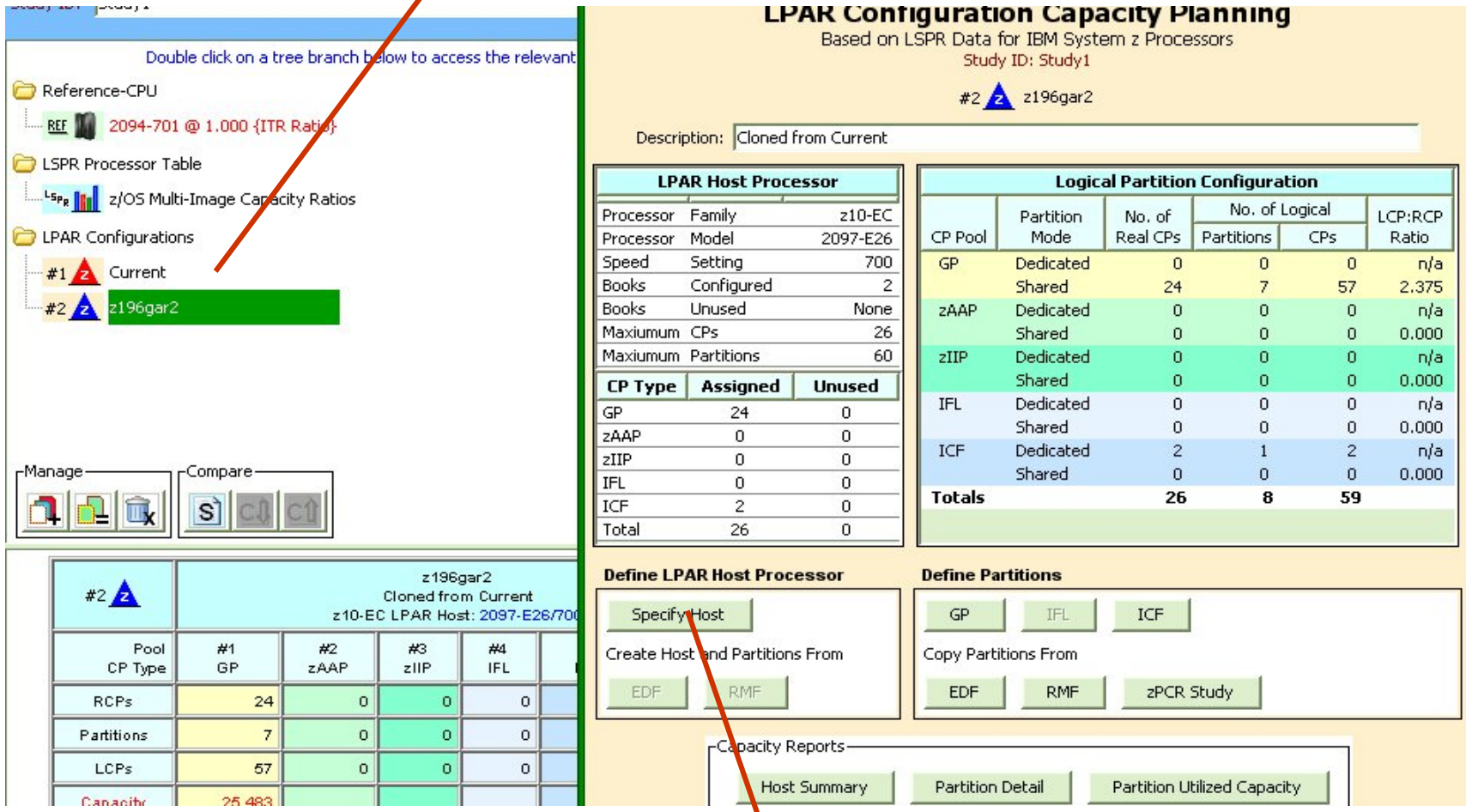
Rename And Double Click



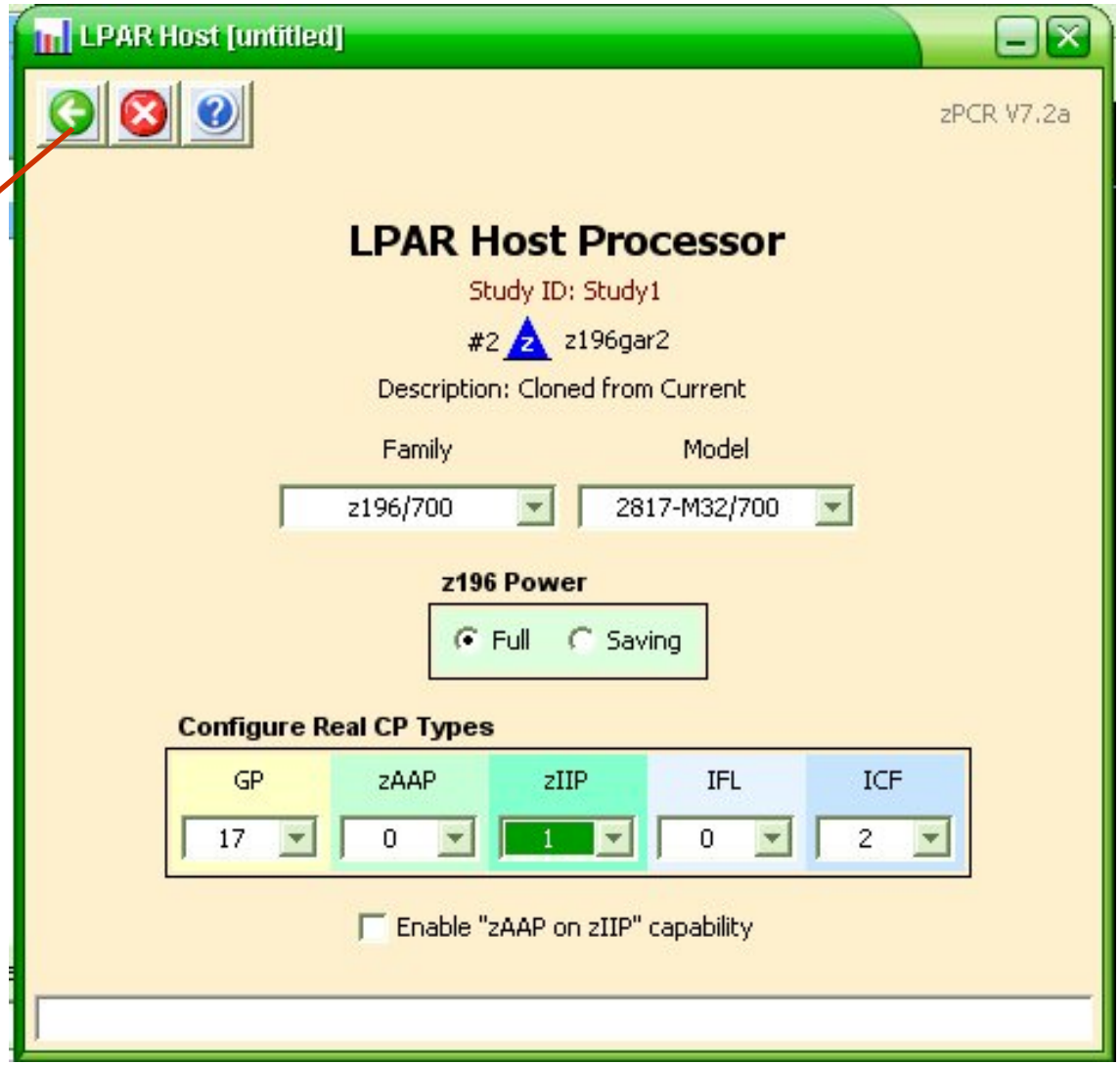
Select Specify Host

Step-By-Step z196 Upgrade zPCR Study

Select Model, CP numbers,...

15

Then Click Back Sign



Step-By-Step z196 Upgrade zPCR Study

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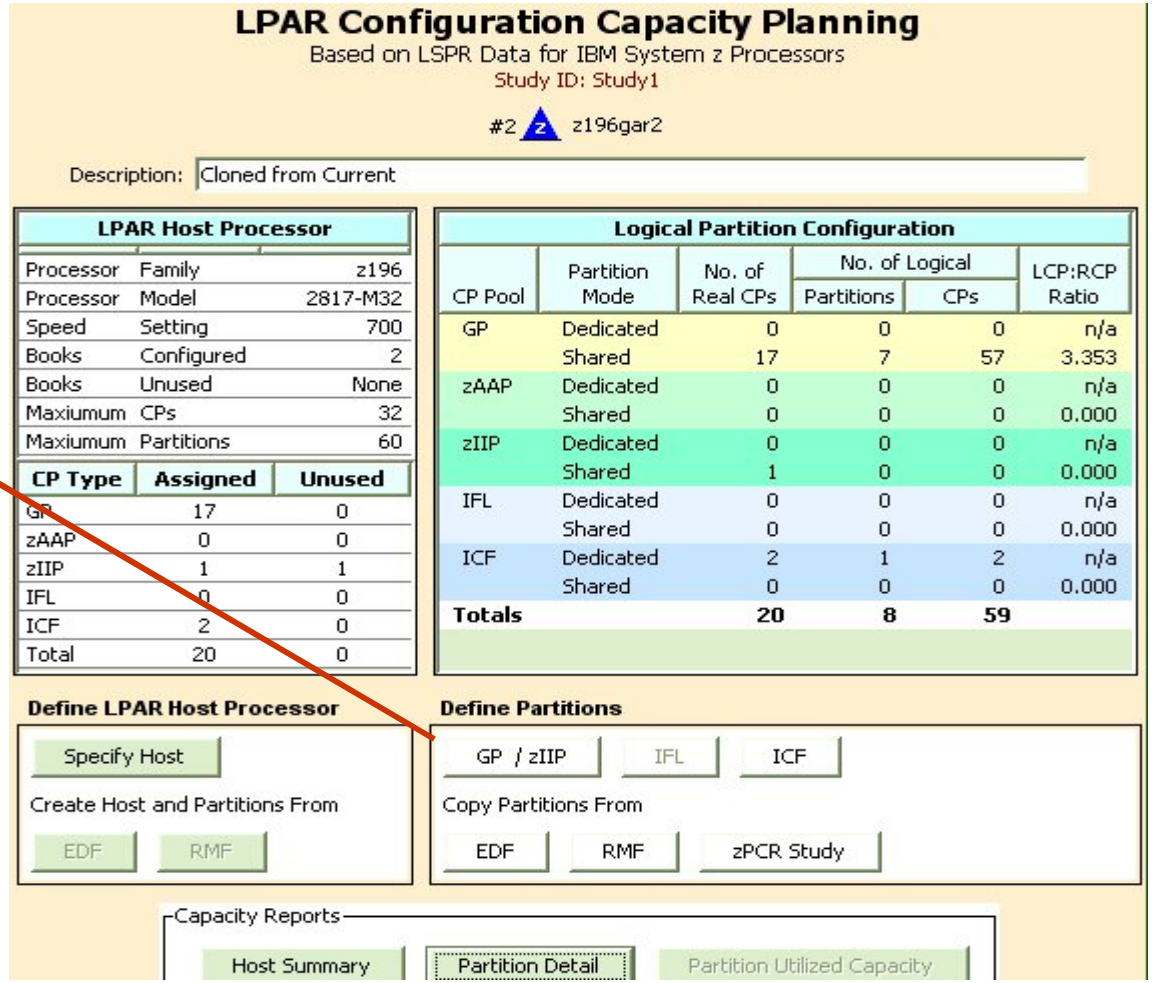
Click On
To Do Changes
Like Weigth,LCP,
Workload,Add zIIP



LPAR Configuration Capacity Planning

Based on LSPR Data for IBM System z Processors

Study ID: Study1

#2 z196gar2

Description: Cloned from Current

LPAR Host Processor

Processor	Family	z196
Processor	Model	2817-M32
Speed	Setting	700
Books	Configured	2
Books	Unused	None
Maxiumum	CPs	32
Maxiumum	Partitions	60

CP Type	Assigned	Unused
GP	17	0
zAAP	0	0
zIIP	1	1
IFL	0	0
ICF	2	0
Total	20	0

Logical Partition Configuration

CP Pool	Partition Mode	No. of Real CPs	No. of Logical Partitions	No. of Logical CPs	LCP:RCP Ratio
GP	Dedicated	0	0	0	n/a
	Shared	17	7	57	3.353
zAAP	Dedicated	0	0	0	n/a
	Shared	0	0	0	0.000
zIIP	Dedicated	0	0	0	n/a
	Shared	1	0	0	0.000
IFL	Dedicated	0	0	0	n/a
	Shared	0	0	0	0.000
ICF	Dedicated	2	1	2	n/a
	Shared	0	0	0	0.000
Totals		**20**	**8**	**59**	

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

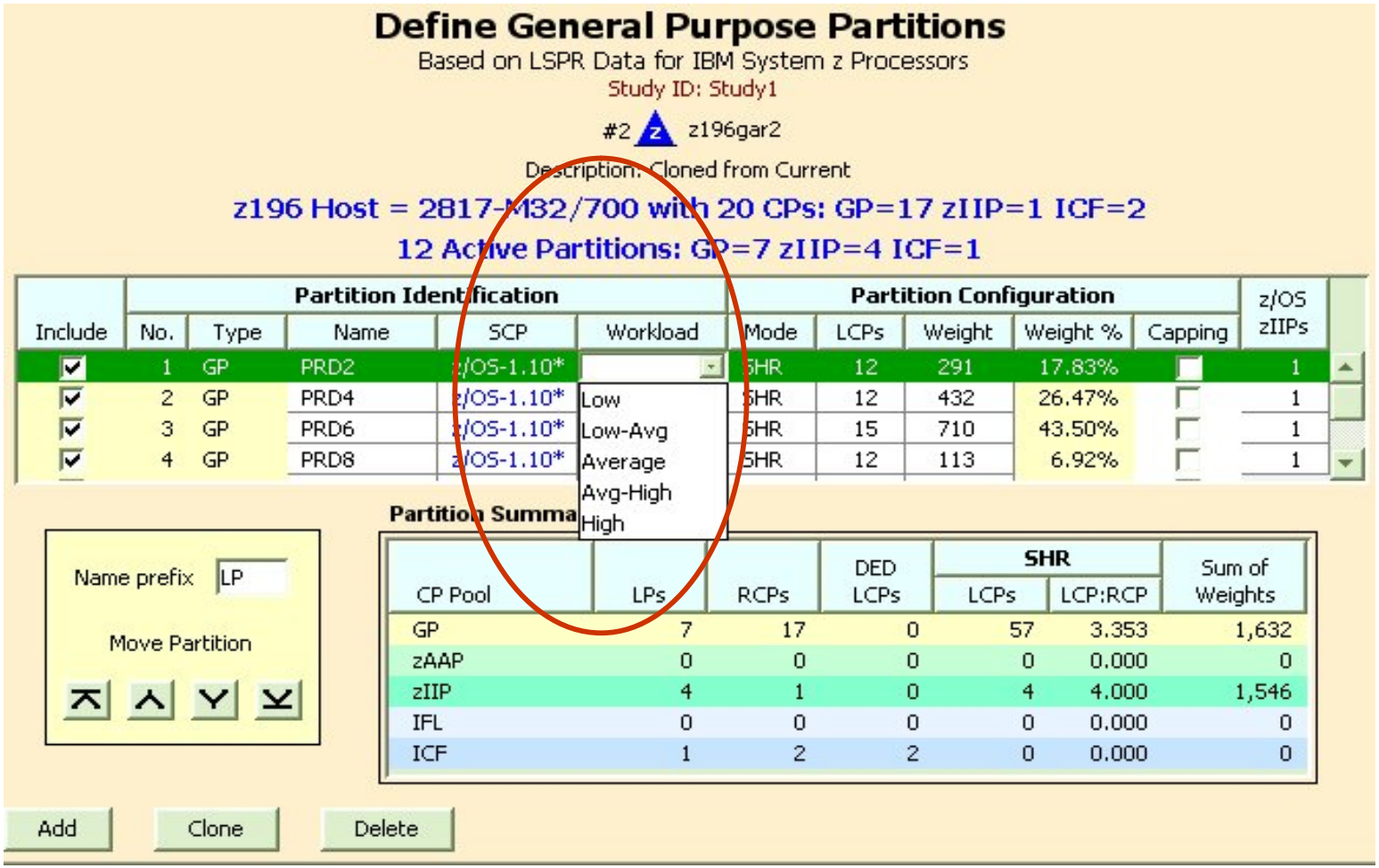
Capacity Reports

Host Summary Partition Detail Partition Utilized Capacity

Step-By-Step z196 Upgrade zPCR Study

Do Changes Like LCP & If you Have Any & Check CFs.

17



Step-By-Step z196 Upgrade zPCR Study

Result Of Defining zIIP To LPARs

18

Partition Detail Report

Based on LSPR Data for IBM System z Processors

Study ID: Study1

#2 z196gar2

Description: Cloned from Current

z196 Host = 2817-M32/700 with 20 CPs: GP=17 zIIP=1 ICF=2

12 Active Partitions: GP=7 zIIP=4 ICF=1

Capacity basis: 2094-701 @ 1.000 for a single partition configuration

z196 and z10 processor capacity for z/OS is represented with HiperDispatch turned ON

	Partition Identification					Partition Configuration					Partition Capacity	
Include	No.	Type	Name	SCP	Workload	Mode	LCPs	Weight	Weight %	Capping	Minimum	Maximum
☑	4	GP	PRD8	z/OS-1.10*	Avg-High	SHR	12	113	6.92%	☐	1.661	16.931
☑	5	GP	TCF2GAR2	CFCC	CFCC	SHR	1	5	0.31%	☐	0.062	1.185
☑	6	GP	TST2	z/OS-1.10*	Average	SHR	2	6	0.37%	☐	0.100	3.198
☑	7	GP	TST3	z/OS-1.10*	Average	SHR	3	75	4.60%	☐	1.250	4.799
☑	*1	zIIP	PRD2	z/OS-1.10*	Avg-High	SHR	1	291	18.82%	☐	0.288	1.529
☑	*2	zIIP	PRD4	z/OS-1.10*	Avg-High	SHR	1	432	27.94%	☐	0.427	1.529
☑	*3	zIIP	PRD6	z/OS-1.10*	Avg-High	SHR	1	710	45.92%	☐	0.677	1.475
☑	*4	zIIP	PRD8	z/OS-1.10*	Avg-High	SHR	1	113	7.31%	☐	0.112	1.529
☑	8	ICF	PCF2GAR2	CFCC	CFCC	DED	2	n/a		☐	3.027	3.027

Table View

Display: ◉ All Partitions ○ Includes Only

Pools: ☑ GP ☐ IFL ☐ zAAP ☑ ICF ☑ zIIP

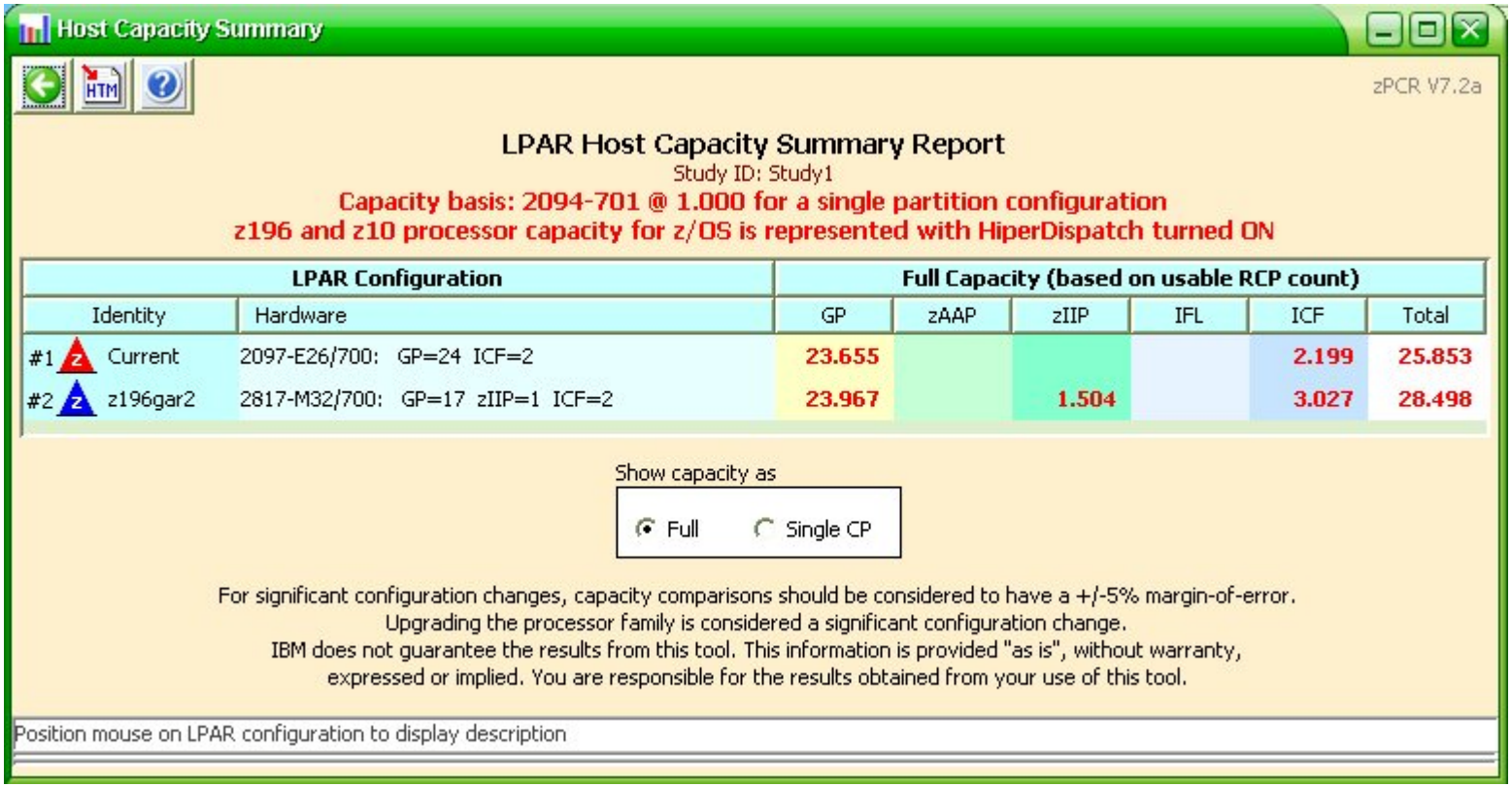
Capacity Summary by Pool

CP Pool	RCPs	Partitions	LCPs	Capacity
GP	17	7	57	23.967
zAAP	0	0	0	0.000
zIIP	1	4	4	1.504
IFL	0	0	0	0.000
ICF	2	1	2	3.027
Totals	20	12	63	28.498

Step-By-Step z196 Upgrade zPCR Study

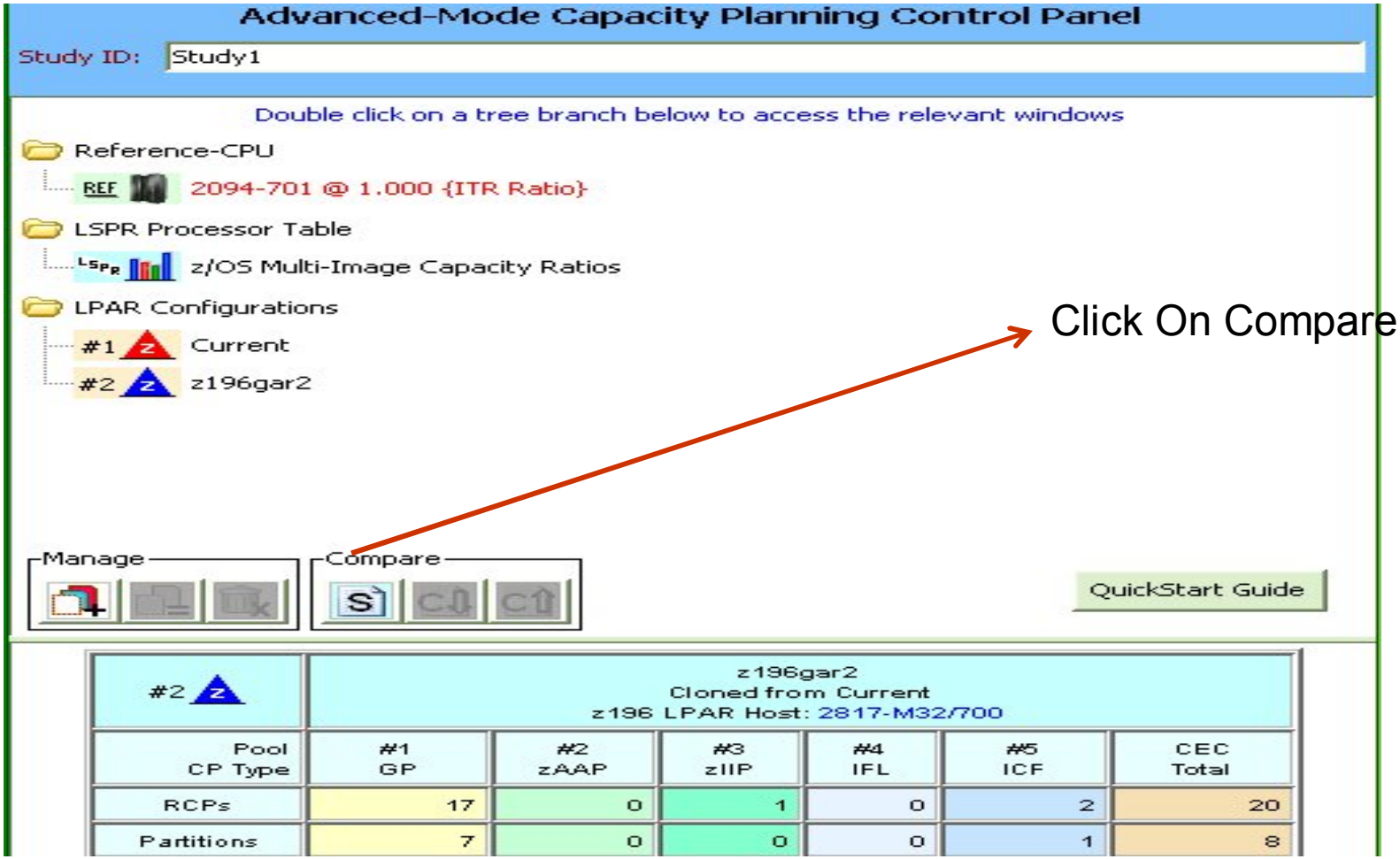
After zIIP was Defined To LPARs

19



Step-By-Step z196 Upgrade zPCR Study

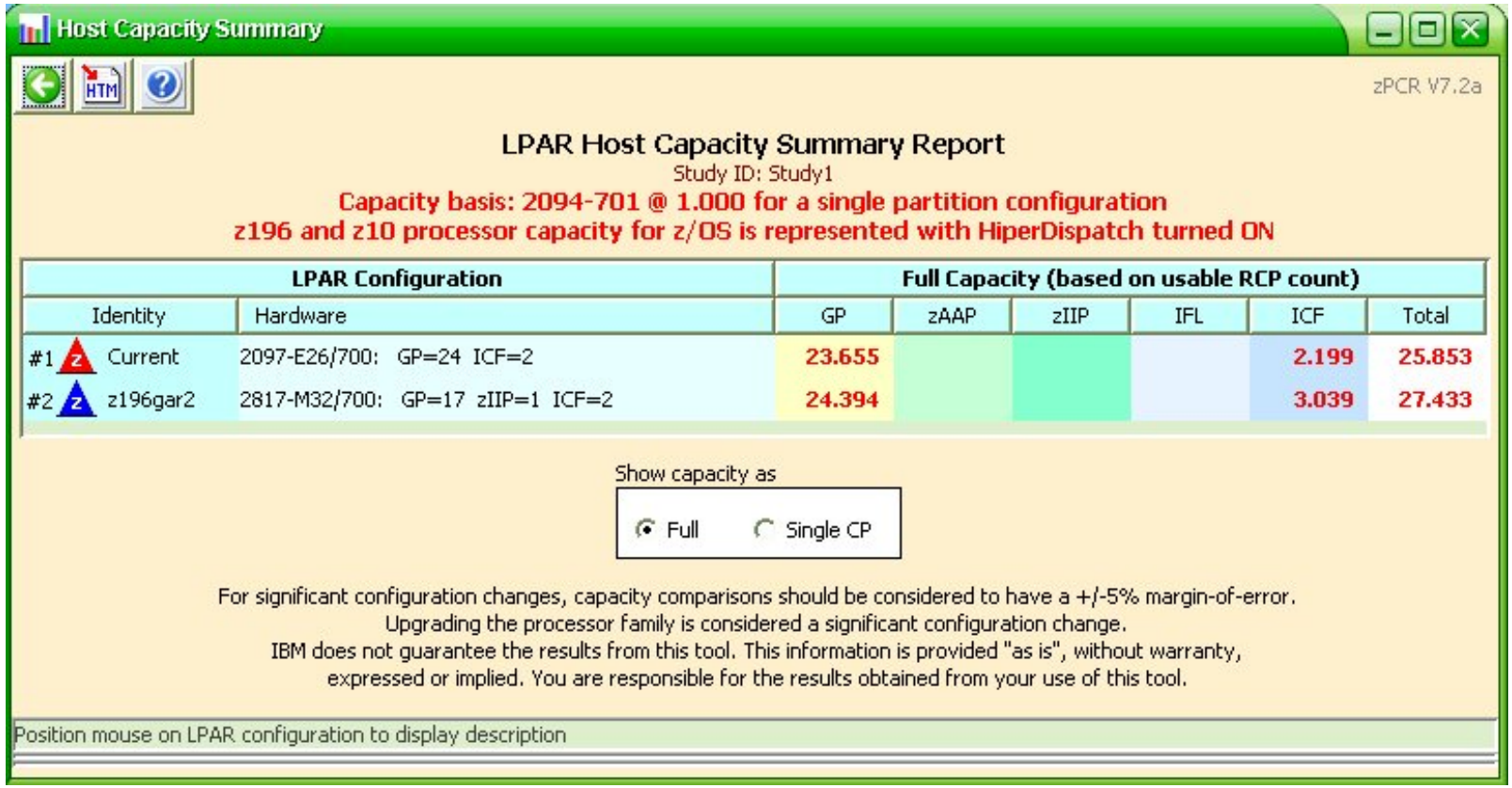
20



Step-By-Step z196 Upgrade zPCR Study

6% Capacity Increase

21



CAPACITY PER CPU IS INCREASED BY 45% (23.65/24 versus 24.39/17)

Step-By-Step z196 Upgrade zPCR Study

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LSPR TABLE In ResourceLink

https://www-304.ibm.com/servers/resourcelink/lib03060.nsf/pages/lsprzOS11MIJuly2010?OpenDocument&pathID=

IBM System z10 EC
(System z9 2094-701 = 1.00)

Processor	#CP	PCI**	MSU***	Low*	Average*	High*
2097-724	24	14517	1748	30.90	25.93	22.36
2817-717	17	15076	1816	30.12	26.93	24.40
					3.85 %	**9.1 %**

zPCR : 6% Capacity Increase

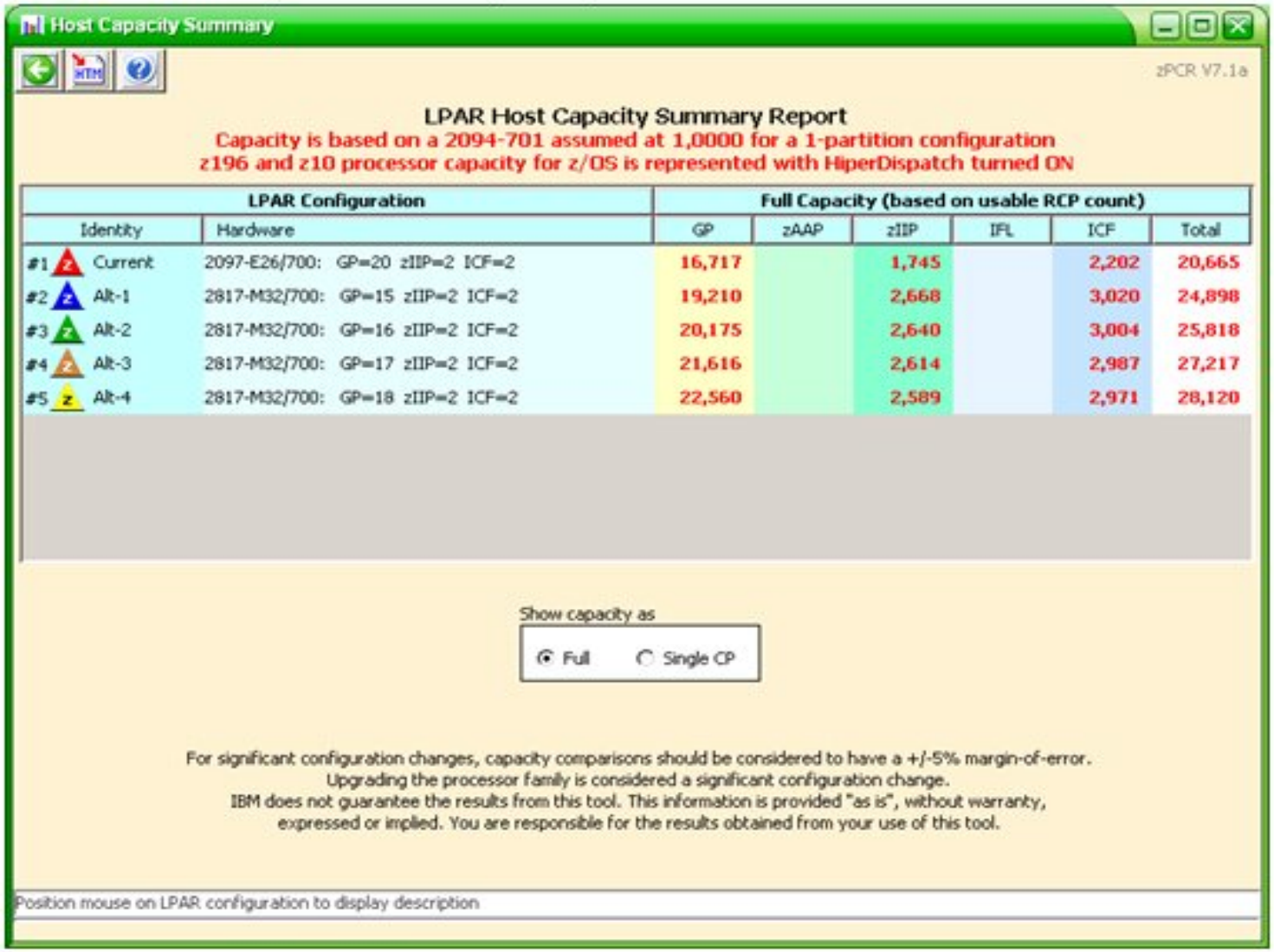

z196 Upgrade Choosing Model Using zPCR

Z196 Upgrade Choosing Model Using zPCR

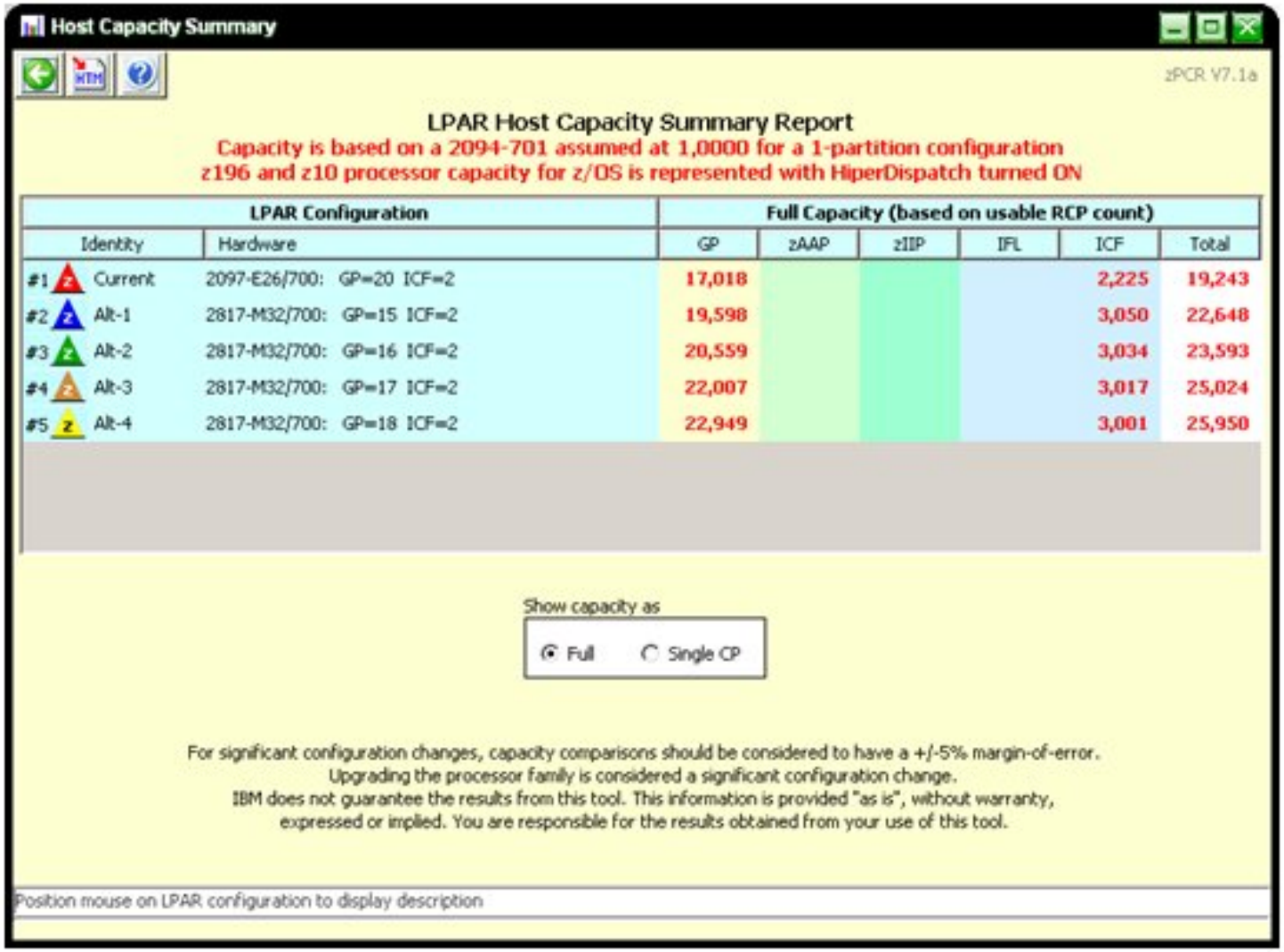
- Repeat Creating New LPAR Config By Chaging Host Model In Previous Steps

- I Have Done These Using Four Different z196 Models

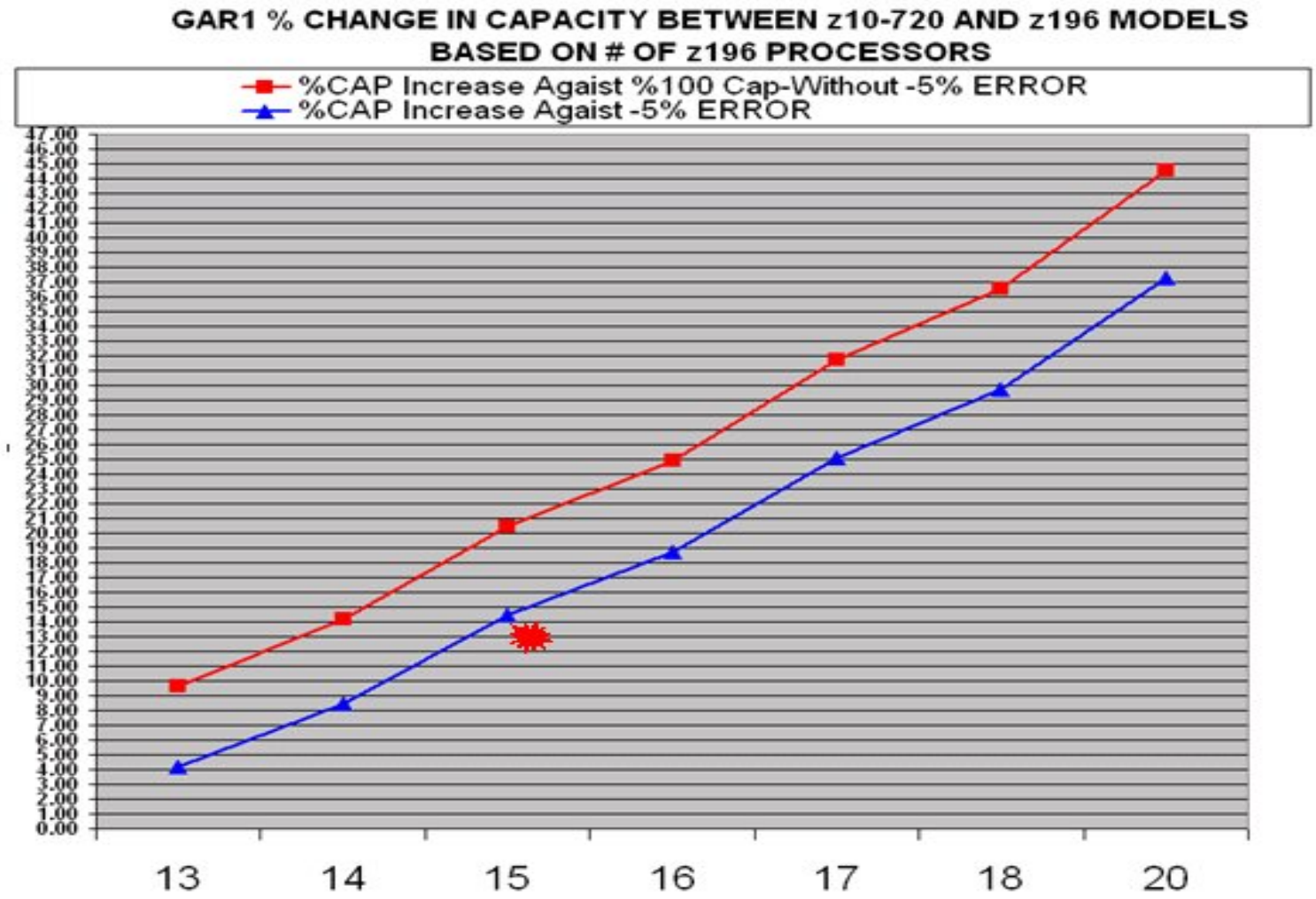
Z196 Upgrade Choosing Model Using zPCR



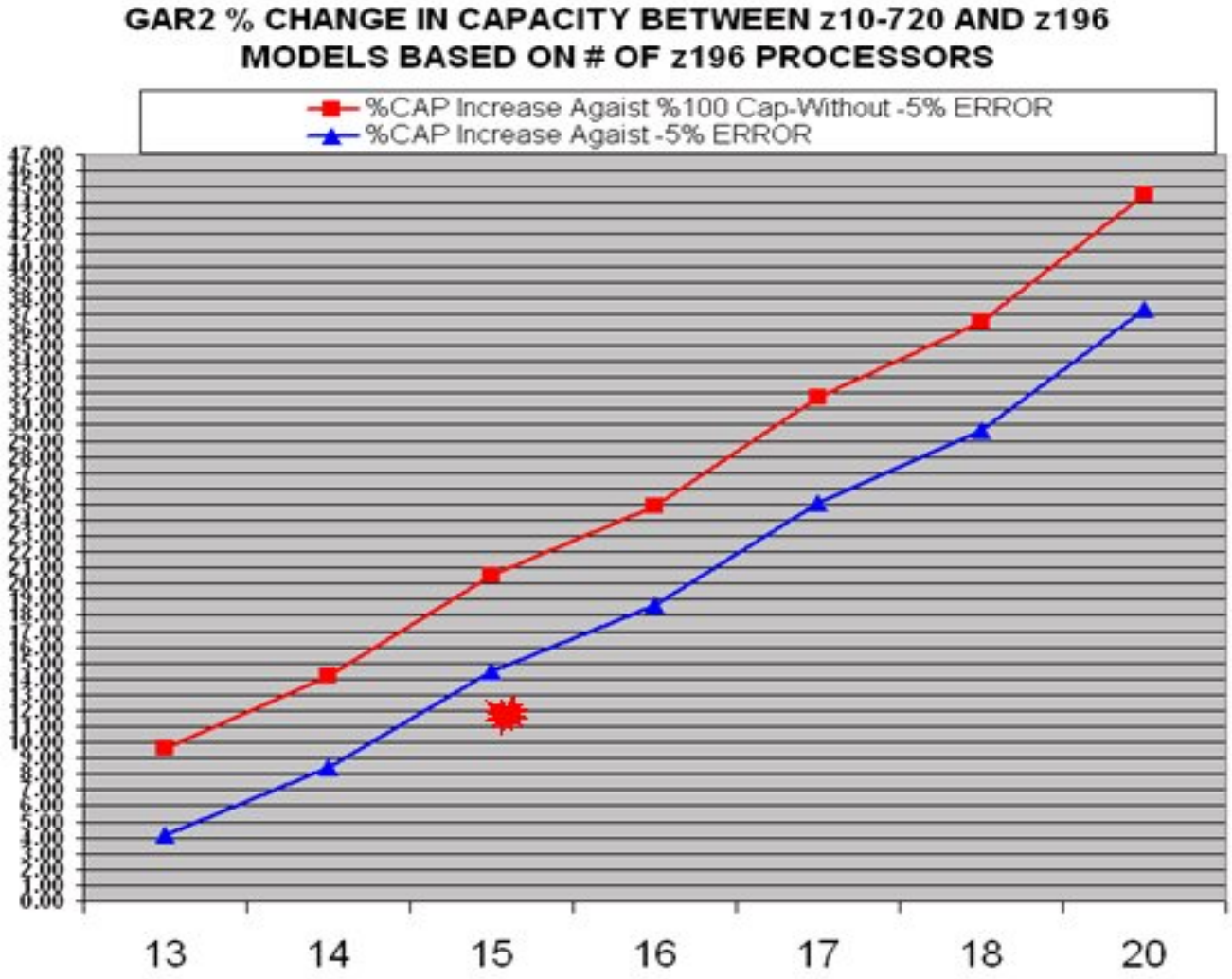
Z196 Upgrade Choosing Model Using zPCR



Z196 Upgrade Choosing Model Using zPCR

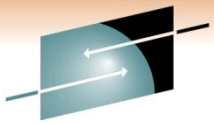


Z196 Upgrade Choosing Model Using zPCR



Z10 To z196 Upgrade IBM Analiz

Z10 To z196 Upgrade IBM Analiz



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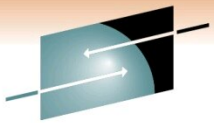
z196 Serial 60E26 – PRDA, PRDC, PRDE, PRDF

Machine	SYSID	Mon	Day	SH	Hour	CPI	Prb State	Est Instr Cmplx CPI	Est Finite CPI	Est SCPL1M	L1MP	L15P / L2P	L3P	L2LP / L4LP	L2RP / L4RP	MEMP	Rel Nest Intensity	LPARCPU	Eff GHz	LSPR Wkld Hint
z10 722	PRDA	NOV	22	P	TOTAL	11.52	35.1	3.77	7.75	129	6.0	67.3	0.0	19.4	3.0	10.4	1.04	269.3	4.4	HIGH
z10 724	PRDA	JAN	3	P	TOTAL	10.04	44.1	3.51	6.53	126	5.2	67.8	0.0	19.1	2.8	10.3	1.03	247.6	4.4	HIGH
z10 724	PRDA	JAN	17	P	TOTAL	9.99	43.4	3.54	6.46	131	4.9	68.4	0.0	17.7	3.2	10.8	1.06	296.4	4.4	HIGH
						10.52	**40.8**	**3.61**	**6.91**	**129**	**5.4**	**67.8**	**0.0**	**18.7**	**3.0**	**10.5**	**1.04**	**271.1**		
z196 717	PRDA	JAN	31	P	TOTAL	6.83	43.5	2.73	4.10	81	5.1	56.9	22.7	10.4	5.6	4.5	1.06	105.6	5.2	HIGH
z196 717	PRDA	FEB	1	P	TOTAL	6.86	48.3	2.84	4.03	81	5.0	57.7	23.0	12.3	1.2	5.8	1.08	98.2	5.2	HIGH
						6.85	**45.9**	**2.79**	**4.07**	**81**	**5.0**	**57.3**	**22.9**	**11.3**	**3.4**	**5.1**	**1.07**	**101.9**		
		Relative Capacity Ratio				**1.82**														
z10 722	PRDC	NOV	22	P	TOTAL	12.98	30.5	3.80	9.18	149	6.1	60.7	0.0	24.5	2.6	12.2	1.22	372.2	4.4	HIGH
z10 724	PRDC	JAN	3	P	TOTAL	12.24	33.3	3.75	8.49	143	6.0	62.8	0.0	23.2	2.1	11.9	1.17	342.2	4.4	HIGH
z10 724	PRDC	JAN	17	P	TOTAL	11.59	31.3	3.65	7.94	140	5.7	63.4	0.0	23.0	2.3	11.4	1.14	428.6	4.4	HIGH
						12.27	**31.7**	**3.73**	**8.54**	**144**	**5.9**	**62.3**	**0.0**	**23.6**	**2.3**	**11.8**	**1.18**	**381.0**		
z196 717	PRDC	JAN	31	P	TOTAL	8.31	34.1	3.25	5.06	82	6.2	54.5	27.4	10.2	2.3	5.6	1.10	224.9	5.2	HIGH
z196 717	PRDC	FEB	1	P	TOTAL	6.40	29.8	3.01	3.38	70	4.8	58.3	24.5	8.2	5.4	3.6	0.92	247.3	5.2	AVG
						7.36	**31.9**	**3.13**	**4.22**	**76**	**5.5**	**56.4**	**26.0**	**9.2**	**3.9**	**4.6**	**1.01**	**236.1**		
		Relative Capacity Ratio				**1.97**														
z10 722	PRDE	NOV	22	P	TOTAL	10.70	51.8	3.30	7.40	153	4.8	62.3	0.0	24.7	2.1	11.0	1.12	1015.1	4.4	HIGH
z10 724	PRDE	JAN	3	P	TOTAL	8.84	49.3	3.20	5.64	120	4.7	66.7	0.0	22.4	2.0	8.9	0.94	884.4	4.4	AVG
z10 724	PRDE	JAN	17	P	TOTAL	9.86	50.7	3.27	6.59	134	4.9	62.9	0.0	24.3	2.9	9.9	1.06	974.2	4.4	HIGH
						9.80	**50.6**	**3.26**	**6.54**	**136**	**4.8**	**63.9**	**0.0**	**23.8**	**2.3**	**9.9**	**1.04**	**957.9**		
z196 717	PRDE	JAN	31	P	TOTAL	6.17	51.5	2.86	3.31	69	4.8	60.7	25.5	8.1	0.7	5.0	0.92	526.7	5.2	AVG
z196 717	PRDE	FEB	1	P	TOTAL	6.11	50.5	2.92	3.18	67	4.8	61.5	25.0	7.8	0.7	5.0	0.91	472.7	5.2	AVG
						6.14	**51.0**	**2.89**	**3.25**	**68**	**4.8**	**61.1**	**25.2**	**7.9**	**0.7**	**5.0**	**0.92**	**499.7**		
		Relative Capacity Ratio				**1.89**														
z10 722	PRDF	NOV	22	P	TOTAL	6.48	46.0	3.08	3.40	138	2.5	69.9	0.0	16.2	4.0	9.9	1.00	122.0	4.4	AVG
z10 724	PRDF	JAN	3	P	TOTAL	7.19	18.9	3.54	3.64	143	2.5	67.3	0.0	17.4	4.3	11.0	1.10	246.9	4.4	AVG
z10 724	PRDF	JAN	17	P	TOTAL	7.12	29.8	3.65	3.47	99	3.5	75.9	0.0	14.1	3.9	6.2	0.70	326.4	4.4	AVG
						6.93	**31.6**	**3.42**	**3.50**	**127**	**2.8**	**71.0**	**0.0**	**15.9**	**4.1**	**9.0**	**0.93**	**231.8**		
z196 717	PRDF	JAN	31	P	TOTAL	5.11	27.7	3.04	2.07	58	3.6	68.5	16.2	10.8	1.4	3.1	0.71	72.3	5.2	AVG
z196 717	PRDF	FEB	1	P	TOTAL	4.88	20.2	3.02	1.86	52	3.6	71.9	13.9	10.2	1.3	2.7	0.63	173.1	5.2	AVG
						5.00	**24.0**	**3.03**	**1.97**	**55**	**3.6**	**70.2**	**15.1**	**10.5**	**1.4**	**2.9**	**0.67**	**122.7**		
		Relative Capacity Ratio				**1.64**														

Z10 To z196 Upgrade IBM Analiz



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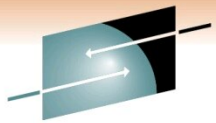
z196 Serial 60E16 – PRDB, PRDD, PRDG, PRDW

Machine	SYSID	Mon	Day	SH	Hour	CPI	Prb State	Est Instr Cmplx CPI	Est Finite CPI	Est SCPL1M	L1MP	L15P / L2P	L3P	L2LP / L4LP	L2RP / L4RP	MEMP	Rel Nest Intensity	LPARCPU	Eff GHz	LSPR Wkld Hint
z10 722	PRDB	NOV	22	P	TOTAL	8.10	40.4	3.09	5.00	120	4.2	69.6	0.0	19.4	1.2	9.9	0.96	419.7	4.4	AVG
z10 722	PRDB	JAN	3	P	TOTAL	7.47	35.6	3.18	4.29	108	4.0	71.5	0.0	18.4	1.3	8.9	0.88	432.5	4.4	AVG
z10 722	PRDB	JAN	17	P	TOTAL	6.82	30.0	2.89	3.94	112	3.5	70.1	0.0	19.3	1.4	9.3	0.92	505.4	4.4	AVG
						7.46	**35.3**	**3.05**	**4.41**	**113**	**3.9**	**70.4**	**0.0**	**19.0**	**1.3**	**9.3**	**0.92**	**452.5**		
z196 717	PRDB	JAN	31	P	TOTAL	5.61	40.7	2.57	3.04	69	4.4	62.7	22.4	8.7	1.2	4.9	0.92	274.5	5.2	AVG
z196 717	PRDB	FEB	1	P	TOTAL	5.50	39.0	2.58	2.92	68	4.3	63.0	22.7	8.3	1.1	4.9	0.91	266.8	5.2	AVG
						5.56	**39.9**	**2.58**	**2.98**	**69**	**4.4**	**62.9**	**22.6**	**8.5**	**1.2**	**4.9**	**0.92**	**270.7**		
		Relative Capacity Ratio				**1.59**														
z10 722	PRDD	NOV	22	P	TOTAL	10.98	35.9	3.73	7.25	119	6.1	63.9	0.0	24.8	2.6	8.6	0.96	770.0	4.4	HIGH
z10 722	PRDD	JAN	3	P	TOTAL	9.97	38.7	3.67	6.30	107	5.9	66.9	0.0	23.3	1.9	7.9	0.87	679.5	4.4	AVG
z10 722	PRDD	JAN	17	P	TOTAL	9.65	41.9	3.62	6.03	109	5.5	66.4	0.0	23.6	1.9	8.1	0.89	691.2	4.4	AVG
						10.20	**38.8**	**3.67**	**6.53**	**112**	**5.8**	**65.8**	**0.0**	**23.9**	**2.1**	**8.2**	**0.91**	**713.6**		
z196 717	PRDD	JAN	31	P	TOTAL	7.90	40.2	3.40	4.51	68	6.6	57.8	25.9	11.6	0.6	4.2	0.88	516.9	5.2	HIGH
z196 717	PRDD	FEB	1	P	TOTAL	7.79	40.3	3.37	4.42	68	6.5	58.8	25.0	11.3	0.7	4.3	0.88	440.1	5.2	HIGH
						7.85	**40.3**	**3.39**	**4.47**	**68**	**6.6**	**58.3**	**25.4**	**11.4**	**0.6**	**4.2**	**0.88**	**478.5**		
		Relative Capacity Ratio				**1.54**														
z10 722	PRDG	NOV	22	P	TOTAL	9.10	30.9	3.28	5.82	137	4.2	67.1	0.0	20.9	2.0	10.0	1.01	512.6	4.4	HIGH
z10 722	PRDG	JAN	3	P	TOTAL	6.81	27.3	2.87	3.94	112	3.5	70.2	0.0	19.3	1.6	9.0	0.90	507.1	4.4	AVG
z10 722	PRDG	JAN	17	P	TOTAL	7.67	32.3	2.99	4.68	116	4.0	69.1	0.0	19.7	1.9	9.3	0.94	505.4	4.4	AVG
						7.86	**30.2**	**3.05**	**4.81**	**122**	**3.9**	**68.8**	**0.0**	**20.0**	**1.8**	**9.4**	**0.95**	**508.4**		
z196 717	PRDG	JAN	31	P	TOTAL	5.45	34.8	2.58	2.87	65	4.4	63.0	22.6	6.4	4.4	3.6	0.85	306.3	5.2	AVG
z196 717	PRDG	FEB	1	P	TOTAL	5.11	32.7	2.47	2.63	65	4.1	62.9	22.6	6.4	4.4	3.6	0.85	291.9	5.2	AVG
						5.28	**33.7**	**2.53**	**2.75**	**65**	**4.2**	**63.0**	**22.6**	**6.4**	**4.4**	**3.6**	**0.85**	**299.1**		
		Relative Capacity Ratio				**1.76**														
z10 722	PRDW	NOV	22	P	TOTAL	6.18	29.4	2.69	3.49	141	2.5	66.1	0.0	20.1	4.4	9.4	1.01	152.6	4.4	AVG
z10 722	PRDW	JAN	3	P	TOTAL	7.10	36.1	3.19	3.91	124	3.2	68.8	0.0	18.8	3.7	8.7	0.93	130.5	4.4	AVG
z10 722	PRDW	JAN	17	P	TOTAL	5.66	36.7	2.97	2.69	92	2.9	75.4	0.0	15.4	4.0	5.3	0.64	252.9	4.4	LOW
						6.31	**34.0**	**2.95**	**3.36**	**119**	**2.8**	**70.1**	**0.0**	**18.1**	**4.0**	**7.8**	**0.86**	**178.7**		
z196 717	PRDW	JAN	31	P	TOTAL	5.06	31.2	2.77	2.30	67	3.4	62.4	20.1	11.2	2.8	3.5	0.83	84.7	5.2	AVG
z196 717	PRDW	FEB	1	P	TOTAL	4.33	47.8	2.51	1.82	57	3.2	65.9	17.9	11.1	2.8	2.3	0.67	250.8	5.2	AVG
						4.70	**39.5**	**2.64**	**2.06**	**62**	**3.3**	**64.2**	**19.0**	**11.1**	**2.8**	**2.9**	**0.75**	**167.8**		
		Relative Capacity Ratio				**1.59**														

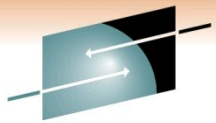
Z10 To z196 Upgrade IBM Analiz



z196 Serial 60E26 – PRDA, PRDC, PRDE, PRDF

Machine	SYSID	Mon	Day	SH	Hour	CPSEC	IOSSCT	CPUDASD
z10 722	PRDA	NOV	22	P	TOTAL	82,673	2,807.4	29.45
z10 724	PRDA	JAN	3	P	TOTAL	76,005	2,708.0	28.07
z10 724	PRDA	JAN	17	P	TOTAL	90,144	3,087.9	29.19
						82,940	**2,867.8**	**28.90**
z196 717	PRDA	JAN	31	P	TOTAL	32,130	1,750.9	18.35
z196 717	PRDA	FEB	1	P	TOTAL	29,733	1,527.5	19.46
						30,932	**1,639.2**	**18.91**
		Relative Capacity Ratio						**1.53**
z10 722	PRDC	NOV	22	P	TOTAL	114,524	3,625.7	31.59
z10 724	PRDC	JAN	3	P	TOTAL	104,854	3,382.7	31.00
z10 724	PRDC	JAN	17	P	TOTAL	130,235	4,368.8	29.81
						116,537	**3,792.4**	**30.80**
z196 717	PRDC	JAN	31	P	TOTAL	69,010	4,002.1	17.24
z196 717	PRDC	FEB	1	P	TOTAL	75,565	4,659.9	16.22
						72,287	**4,331.0**	**16.73**
		Relative Capacity Ratio						**1.84**
z10 722	PRDE	NOV	22	P	TOTAL	318,118	9,164.5	34.71
z10 724	PRDE	JAN	3	P	TOTAL	280,657	9,768.1	28.73
z10 724	PRDE	JAN	17	P	TOTAL	303,089	8,881.7	34.13
						300,621	**9,271.4**	**32.52**
z196 717	PRDE	JAN	31	P	TOTAL	168,634	8,865.2	19.02
z196 717	PRDE	FEB	1	P	TOTAL	149,892	7,908.0	18.95
						159,263	**8,386.6**	**18.99**
		Relative Capacity Ratio						**1.71**
z10 722	PRDF	NOV	22	P	TOTAL	34,969	1,558.8	22.43
z10 724	PRDF	JAN	3	P	TOTAL	73,622	2,605.4	28.26
z10 724	PRDF	JAN	17	P	TOTAL	97,968	3,809.7	25.72
						68,853	**2,658.0**	**25.47**
z196 717	PRDF	JAN	31	P	TOTAL	21,181	1,937.9	10.93
z196 717	PRDF	FEB	1	P	TOTAL	51,158	3,993.4	12.81
						36,170	**2,965.7**	**11.87**
		Relative Capacity Ratio						**2.15**

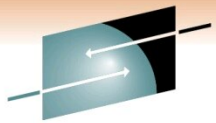
Z10 To z196 Upgrade IBM Analiz



z196 Serial 60E16 – PRDB, PRDD, PRDG, PRDW

Machine	SYSID	Mon	Day	SH	Hour	CPSEC	IOSSCT	CPUDASD
z10 722	PRDB	NOV	22	P	TOTAL	129,763	4,589.5	28.27
z10 722	PRDB	JAN	3	P	TOTAL	134,851	4,033.1	33.44
z10 722	PRDB	JAN	17	P	TOTAL	156,998	4,429.2	35.45
						140,537	**4,350.6**	**32.39**
z196 717	PRDB	JAN	31	P	TOTAL	86,317	4,072.4	21.20
z196 717	PRDB	FEB	1	P	TOTAL	83,126	4,191.8	19.83
						84,721	**4,132.1**	**20.52**
		Relative Capacity Ratio						**1.58**
z10 722	PRDD	NOV	22	P	TOTAL	238,825	8,223.4	29.04
z10 722	PRDD	JAN	3	P	TOTAL	209,662	7,097.3	29.54
z10 722	PRDD	JAN	17	P	TOTAL	204,282	6,675.9	30.60
						217,589	**7,332.2**	**29.73**
z196 717	PRDD	JAN	31	P	TOTAL	161,222	8,922.4	18.07
z196 717	PRDD	FEB	1	P	TOTAL	136,912	7,478.2	18.31
						149,067	**8,200.3**	**18.19**
		Relative Capacity Ratio						**1.63**
z10 722	PRDG	NOV	22	P	TOTAL	156,186	5,448.4	28.67
z10 722	PRDG	JAN	3	P	TOTAL	158,412	5,618.7	28.19
z10 722	PRDG	JAN	17	P	TOTAL	156,113	5,475.2	28.51
						156,904	**5,514.1**	**28.46**
z196 717	PRDG	JAN	31	P	TOTAL	93,835	5,730.8	16.37
z196 717	PRDG	FEB	1	P	TOTAL	89,523	5,927.4	15.10
						91,679	**5,829.1**	**15.74**
		Relative Capacity Ratio						**1.81**
z10 722	PRDW	NOV	22	P	TOTAL	44,913	3,110.6	14.44
z10 722	PRDW	JAN	3	P	TOTAL	37,785	2,269.8	16.65
z10 722	PRDW	JAN	17	P	TOTAL	76,548	2,978.7	25.70
						53,082	**2,786.4**	**18.93**
z196 717	PRDW	JAN	31	P	TOTAL	24,670	2,632.2	9.37
z196 717	PRDW	FEB	1	P	TOTAL	76,980	6,333.9	12.15
						50,825	**4,483.1**	**10.76**
		Relative Capacity Ratio						**1.76**

Z10 To z196 Upgrade IBM Analiz



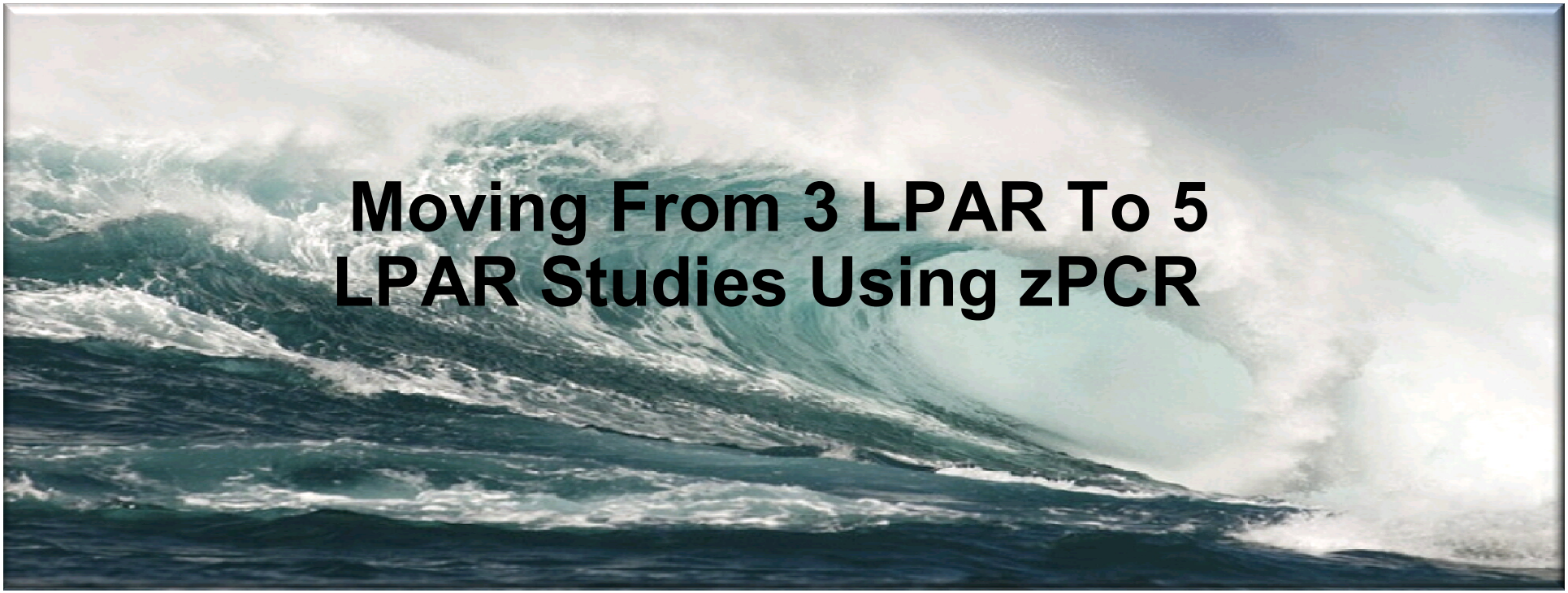
Summary

- **LSPR Multi Image Table**
  - Average Workload z10 722 Vs z196 717 – **1.44 Expectation**
  - Average Workload z10 724 Vs z196 717 – **1.47 Expectation**

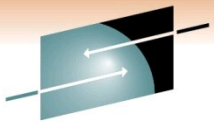
- **z196 60E26**
  - Overall All LPARs CPU/DASD EXCP **1.78** Vs z10
  - Averaged 20% less busy than z10
    - Backing out Low Utilization Effect 10% = **1.62** Vs z10
  - ~12% better than z10 722 expectation 1.44
  - ~10% better than z10 724 expectation 1.47

- **z196 60E16**
  - Overall All LPARs CPU/DASD EXCP **1.71** Vs z10
  - Averaged 10% less busy than z10
    - Backing out Low Utilization Effect 5% = **1.63** Vs z10
  - ~ 13% better than expectation 1.44

- **Overall Estimate that the 2 z196s delivered ~10% better than Expectation**


Moving From 3 LPAR To 5
LPAR Studies Using zPCR

Moving From 3 To 5 LPAR – June 2008



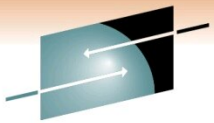

```
zPCR (5.0b) - LPAR Capacity Report
    Based on LSPR data for IBM System z processors
LPAR Host and Partition Capacity
    LPAR Host =  2097-E26/700 configured with 18 CPs:  GP=14 zIIP=2 ICF=2
    Partitions: Active=6 GP=4 zAAP=0 zIIP=1 IFL=0 ICF=1
    Capacity is relative to a 2094-701 assumed at 1,00
```

	LP Identification				LP Definition					LP Capacity	
Inc	No	Type	Name	SCP	Workload	Mode	#LCPs	Weight	Weight%	Capping	Minimum	Maximum
Y	1	GP	PRD1	z/OS-1.8*	OLTP-W	SHR	14	715	72,0%		9,153	12,712
Y	2	GP	PRD7	z/OS-1.8*	OLTP-W	SHR	13	165	16,6%	Y	2,085	2,085
Y	3	GP	TCF1GAR1	CFCC	CFCC	SHR	1	8	0,8%		0,099	0,880
Y	4	GP	TST1	z/OS-1.8*	OLTP-W	SHR	4	105	10,6%	Y	1,522	1,522
Y	2	zIIP	PRD7	z/OS-1.8*	OLTP-W	SHR	2	165	100,0%		1,768	1,768
Y	5	ICF	PCF2GAR2	CFCC	CFCC	DED	2	n/a			2,225	2,225

LPAR configuration capacity summary

4	Partitions in GP RCP pool	12,860
0	Partitions in zAAP RCP pool	0,000
1	Partitions in zIIP RCP pool	1,768
0	Partitions in IFL RCP pool	0,000
1	Partitions in ICF RCP pool	2,225
6	Partitions - combined total	16,852

Moving From 3 To 5 LPAR – June 2008



zPCR (5.0b) - LPAR Capacity Report
Based on LSPR data for IBM System z processors
LPAR Host and Partition Capacity
LPAR Host = 2097-E26/700 configured with 18 CPs: GP=14 zIIP=2 ICF=2
Partitions: Active=7 GP=5 zAAP=0 zIIP=1 IFL=0 ICF=1
Capacity is relative to a 2094-701 assumed at 1,00

LP Identification						LP Definition					LP Capacity	
Inc	No	Type	Name	SCP	Workload	Mode	#LCPs	Weight	Weight%	Capping	Minimum	Maximum
Y	1	GP	PRD1	z/OS-1.8*	OLTP-W	SHR	8	365	38,7%		5,192	7,665
Y	2	GP	PRD7	z/OS-1.8*	OLTP-W	SHR	13	165	17,5%	Y	2,175	2,175
Y	3	GP	TCF1GAR1	CFCC	CFCC	SHR	1	8	0,8%		0,104	0,872
Y	4	GP	TST1	z/OS-1.8*	OLTP-W	SHR	4	105	11,1%	Y	1,587	1,587
Y	**5**	**GP**	**prd2**	**z/OS-1.8***	**OLTP-W**	**SHR**	**8**	**300**	**31,8%**		**4,267**	**7,665**
Y	2	zIIP	PRD7	z/OS-1.8*	OLTP-W	SHR	2	165	100,0%		1,767	1,767
Y	6	ICF	PCF2GAR2	CFCC	CFCC	DED	2	n/a			2,225	2,225

LPAR configuration capacity summary

5	Partitions in GP RCP pool	13,324
0	Partitions in zAAP RCP pool	0,000
1	Partitions in zIIP RCP pool	1,767
0	Partitions in IFL RCP pool	0,000
1	Partitions in ICF RCP pool	2,225
7	Partitions - combined total	17,317

Moving From 3 To 5 LPAR – June 2008

Adding 1 more LPAR To GAR1

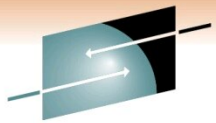
PRDB ITR 9,153

PRDB + New LPAR ITR = 5,192 + 4,267 = 9,454

TOTAL CEC Before : 12860 TOTAL CEC After : 13324

ZPCR ESTIMATION RESULTS			ACTUAL RESULTS
Prod LPARs Total	9,153 To 9,454	3.28 % Improvement	3.15 %
TOTAL CEC	12860 To 13324	3.60 % Improvement	3.32 %

Moving From 3 To 5 LPAR – June 2008



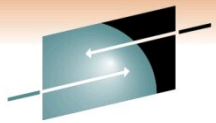
zPCR (5.0b) - LPAR Capacity Report
Based on LSPR data for IBM System z processors
LPAR Host and Partition Capacity
LPAR Host = 2097-E26/700 configured with 16 CPs: GP=14 ICF=2
Partitions: Active=4 GP=3 zAAP=0 zIIP=0 IFL=0 ICF=1
Capacity is relative to a 2094-701 assumed at 1,00

	LP Identification				LP Definition					LP Capacity	
Inc	No	Type	Name	SCP	Workload	Mode	#LCPs	Weight	Weight%	Capping	Minimum	Maximum
Y	1	GP	PRD2	z/OS-1.8*	OLTP-W	SHR	14	968	96,8%		12,806	13,229
Y	2	GP	TST3	z/OS-1.8*	OLTP-W	SHR	2	18	1,8%	Y	0,285	0,285
Y	3	GP	TCF2GAR2	CFCC	CFCC	SHR	1	14	1,4%	Y	0,179	0,179
Y	4	ICF	PCF2GAR2	CFCC	CFCC	DED	2	n/a			2,252	2,252

LPAR configuration capacity summary

3	Partitions in GP RCP pool	13,270
0	Partitions in zAAP RCP pool	0,000
0	Partitions in zIIP RCP pool	0,000
0	Partitions in IFL RCP pool	0,000
1	Partitions in ICF RCP pool	2,252
4	Partitions - combined total	15,522

Moving From 3 To 5 LPAR – June 2008




```
zPCR (5.0b) - LPAR Capacity Report
    Based on LSPR data for IBM System z processors
LPAR Host and Partition Capacity
    LPAR Host =  2097-E26/700 configured with 16 CPs:  GP=14 ICF=2
    Partitions: Active=5 GP=4 zAAP=0 zIIP=0 IFL=0 ICF=1
    Capacity is relative to a 2094-701 assumed at 1,00
```

	LP Identification				LP Definition					LP Capacity	
Inc	No	Type	Name	SCP	Workload	Mode	#LCPs	Weight	Weight%	Capping	Minimum	Maximum
Y	1	GP	PRD2	z/OS-1.8*	OLTP-W	SHR	8	488	48,8%		6,812	7,976
Y	2	GP	TST3	z/OS-1.8*	OLTP-W	SHR	2	18	1,8%	Y	0,282	0,282
Y	3	GP	TCF2GAR2	CFCC	CFCC	SHR	1	14	1,4%	Y	0,177	0,177
Y	**4**	**GP**	**PRD1**	**z/OS-1.8***	**OLTP-W**	**SHR**	**8**	**480**	**48,0%**		**6,700**	**7,976**
Y	5	ICF	PCF2GAR2	CFCC	CFCC	DED	2	n/a			2,252	2,252

LPAR configuration capacity summary

4	Partitions in GP RCP pool	13,971
0	Partitions in zAAP RCP pool	0,000
0	Partitions in zIIP RCP pool	0,000
0	Partitions in IFL RCP pool	0,000
1	Partitions in ICF RCP pool	2,252
5	Partitions - combined total	16,223

Moving From 3 To 5 LPAR – June 2008

Adding 1 more LPAR To GAR2

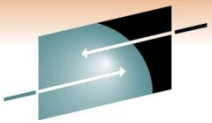
PRDA ITR 12,806

PRDA + New LPAR ITR = 6,812 + 6,700 = 13,512

TOTAL CEC Before : 13,270 TOTAL CEC After : 13,971

ZPCR ESTIMATION RESULTS				ACTUAL
Prod LPARs Total	12,806	To 13,512	5,51 % Improvement	5,30 %
TOTAL CEC	13,270	To 13,971	5,28 % Improvement	5.10 %

Scaling Metrics – MIPS Usage



Partition Detail Report

Based on LSPR Data for IBM System z Processors

Study ID: Study1

#2 z196gar2

Description: Cloned from Current

z196 Host = 2817-M32/700 with 20 CPs: GP=17 zIIP=1 ICF=2

9 Active Partitions: GP=7 zIIP=1 ICF=1

Capacity basis: 2094-701 @ 593.00 MIPS for a single partition configuration

z196 and z10 processor capacity for z/OS is represented with HiperDispatch turned ON

	Partition Identification					Partition Configuration					Partition Capacity	
Include	No.	Type	Name	SCP	Workload	Mode	LCPs	Weight	Weight %	Capping	Minimum	Maximum
☑	1	GP	PRD2	z/OS-1.10*	Avg-High	SHR	12	291	17.83%	☐	2,587	10,242
☑	2	GP	PRD4	z/OS-1.10*	Avg-High	SHR	12	432	26.47%	☐	3,841	10,242
☑	3	GP	PRD6	z/OS-1.10*	Avg-High	SHR	15	710	43.50%	☐	6,202	12,578
☑	4	GP	PRD8	z/OS-1.10*	Avg-High	SHR	12	113	6.92%	☐	985	10,046
☑	5	GP	TCF2GAR2	CFCC	CFCC	SHR	1	5	0.31%	☐	37	703
☑	6	GP	TST2	z/OS-1.10*	Average	SHR	2	6	0.37%	☐	59	1,897
☑	7	GP	TST3	z/OS-1.10*	Average	SHR	3	75	4.60%	☐	742	2,848
☑	*4	zIIP	PRD8	z/OS-1.10*	Avg-High	SHR	1	113	100.00%	☐	945	945
☑	8	ICF	PCF2GAR2	CFCC	CFCC	DED	2	n/a		☐	1,793	1,793

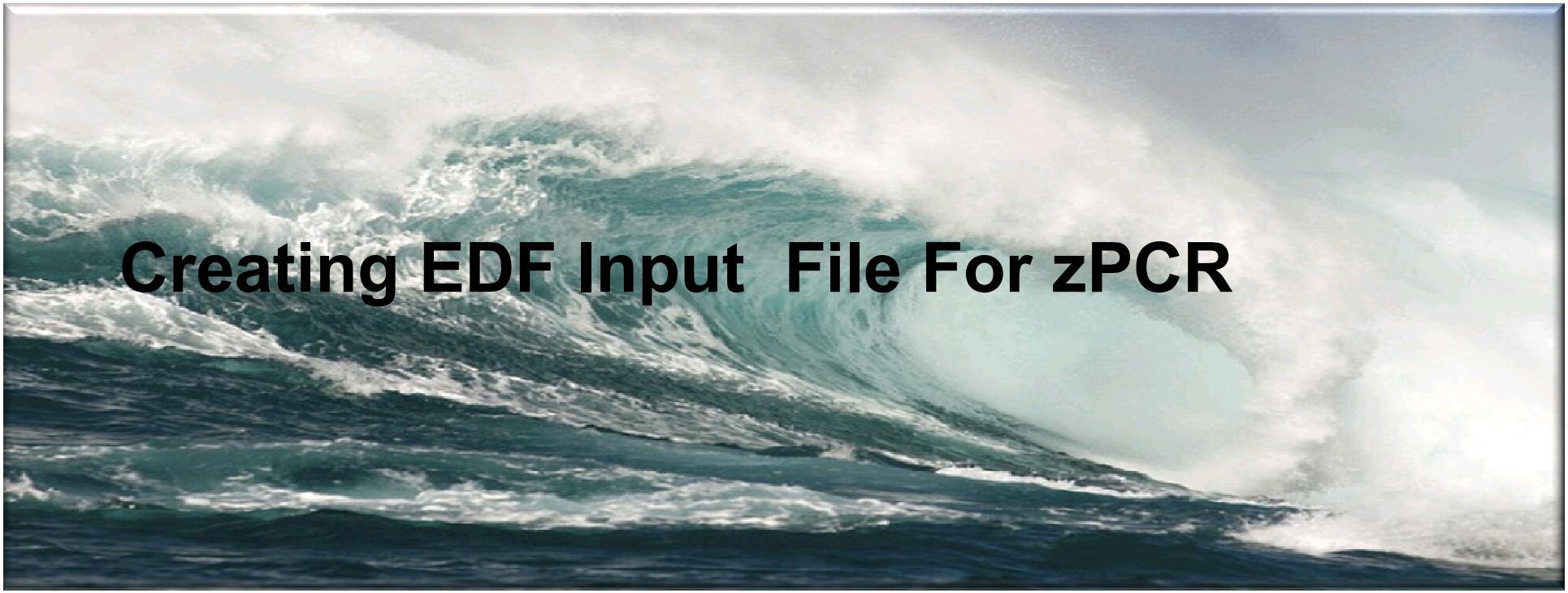
Table View

Display: ◉ All Partitions ○ Includes Only

Pools: ☑ GP ☐ IFL ☐ zAAP ☑ ICF ☑ zIIP

Capacity Summary by Pool

CP Pool	RCPs	Partitions	LCPs	Capacity
GP	17	7	57	14,453
zAAP	0	0	0	0
zIIP	1	1	1	945
IFL	0	0	0	0
ICF	2	1	2	1,793
Totals	20	9	60	17,190


Creating EDF Input File For zPCR

Creating EDF Input File For zPCR

CP3KEXTR Is Needed To Create EDF Files That Will Be used As Input To zPCR

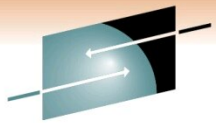
Download CP3EXTR

Creating EDF Input File For zPCR

IBM CPTOOLS PDS

```
  Menu  Functions  Confirm  Utilities  Help
------------------------------------------------------------------------------
VIEW                    IMT3.CPSTOOLS.JCL
          Name      Prompt          Size    Created
_____  $README                        9   2005/02/08
_____  BCUMAP
_____  EDFI
_____  EXTRACT                       76   2005/02/08
_____  EXTRAC2                       61   2005/02/08
_____  EXTRAC3                       27   2005/02/08
_____  EXTRA1                        74   2010/12/14
_____  EXTRA5
_____  EXTRSMLL                      58   2010/08/10
_____  PGNMAP
_____  ZOBJEXTR                    2948   2005/02/08
       **End**
```

Creating EDF Input File For zPCR



JCL To Extract SMF Records For CP3EXTR Program

```
SDSF EDIT     TNPFMER2 (J0302550) JCLEDIT                      Columns 00001 00072
****** ******************************** Top of Data ********************************
000001 //TNPFMER2 JOB  SYS,ZEKE,CLASS=F,MSGCLASS=X,MSGLEVEL=(1,1),REGION=32M
000002 //SMFDMPA  EXEC PGM=IFASMFDP
000003 //DUMPIN   DD  DSN=PSYS.TV04Y.SMFARC.G1248V00,DISP=SHR
000004 //DUMPOUT  DD  DSN=&&PAS,DISP=(,PASS),UNIT=SYSDA,
000005 //       SPACE=(CYL,(1900,590)),DCB=(LRECL=137,RECFM=VBA,BLKSIZE=1693),
000006 //       VOL=(,,,99)
000007 //SYSPRINT DD  SYSOUT=X
000008 //SYSIN    DD    *
000009  INDD(DUMPIN,OPTIONS(DUMP))
000010  OUTDD(DUMPOUT,TYPE(23,70,72,74,113))
000011 //MXGSRTA  EXEC PGM=SORT
000012 //SORTIN   DD  DSN=&&PAS,DISP=(OLD,PASS)
000013 //SYSOUT   DD  SYSOUT=X
000014 //SORTOUT  DD DSN=PGAR.DNTMP.WRK.PERF.ZPJ32,DISP=(NEW,CATLG),
000015 //       SPACE=(CYL,(1900,590)),DCB=(LRECL=32760,RECFM=VBS),
000016 //       VOL=(,,,99)
000017 //SORTWK01 DD  SPACE=(CYL,500)
000018 //SORTWK02 DD  SPACE=(CYL,500)
000019 //SORTWK03 DD  SPACE=(CYL,500)
000020 //SORTWK04 DD  SPACE=(CYL,500)
000021 //SORTWK05 DD  SPACE=(CYL,500)
000022 //SORTWK06 DD  SPACE=(CYL,500)
000023 //SORTWK07 DD  SPACE=(CYL,500)
000024 //EXITLIB  DD  DSN=SYS1.LINKLIB,DISP=SHR
000025 //SYSIN    DD  *
000026      SORT FIELDS=(11,4,CH,A,7,4,CH,A),EQUALS
000027      MODS E15=(ERBPPE15,36000,,N),E35=(ERBPPE35,3000,,N)
****** ***************************** Bottom of Data ********************************
```

Creating EDF Input File For zPCR

JCL To Run Extract Program

```
SDSF EDIT     IMTEXTR  (J0303551) JCLEDIT                      Columns 00001
****** ******************************** Top of Data ***************************
000001 //IMTEXTR  JOB    CLASS=F,NOTIFY=&SYSUID,
000002 //  USER=IMT3,PASSWORD=
000003 //EXTR      EXEC   PGM=LOADER
000004 //PRINT001   DD    SYSOUT=*
000005 //SMFIN     DD     DISP=SHR,DSN=PGAR.DNTMP.WRK.PERF.ZPJ32
000006 //EDF001     DD    DISP=SHR,DSN=IMT3.CPSTOOLS.JCL(PRDEEDF)
000007 //PGN001     DD    DISP=SHR,DSN=IMT3.CPSTOOLS.JCL(PRDEPG)
000008 //BCU001     DD    DISP=SHR,DSN=IMT3.CPSTOOLS.JCL(PRDEBC)
000009 //SYSOUT    DD    SYSOUT=*
000010 //SORTWK01 DD     UNIT=SYSDA,SPACE=(CYL,(200))
000011 //SORTWK02 DD     UNIT=SYSDA,SPACE=(CYL,(200))
000012 //SORTWK03 DD     UNIT=SYSDA,SPACE=(CYL,(200))
000013 //SORTWK04 DD     UNIT=SYSDA,SPACE=(CYL,(200))
000014 //SYSIN001   DD    *
000015 ENT='GARANTI BANK'          öööö  YOUR COMPANY NAME
000016 SYSID=PRDE                 öööö  JES SYSID
000017 DURATION=00:15                   RMF/SMF DURATION FOR GATHER
000018 *                                DURATION >= RMF INTERVAL
000019 TIME=(00:00-24:00)               CONTINGUOUS PERIOD OF INTEREST
000020 DATE=(01/31/11-01/31/11)   öööö  CONTINGUOUS DAYS
000021 PGN=GOAL
000022 BCU=AUTO
000023 *SHOWACT=NONE              SHOWACT=NONE REDUCES OUTPUT SIZE.
000024 *SORT=YES                   IF RECORDS ARE IN SORTED ORDER
000025 *                          OMITTING SORT=YES WILL SPEED THINGS UP.
000026 /*
000027 //SYSLOUT   DD     SYSOUT=*
000028 //SYSLIN     DD    DISP=SHR,DSN=IMT3.CPSTOOLS.JCL(ZOBJEXTR)
****** ******************************** Bottom of Data ************************
```

Creating EDF Input File For zPCR

Sample EDF File Content

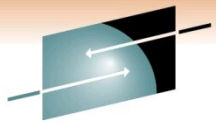
```
VIEW        IMT3.CPSTOOLS.JCL(PRDEEDF) - 01.00              Columns 00001 00072
****** ***************************** Top of Data ********************************
000001 HEAD   ENT=GARANTI BANK R70INT=15 SMFDSN=PGAR.DNTMP.WRK.PERF.ZPJ32
000002        SOURCE=CP3KEXTR11/30/10
000003 CEC S  CECID=CEC0E26 CPUMOD=2817-717 SUPVR=LPAR VC=00 PR=20 SR=60E26 CPV=
000004        17 0 96 ICFV=2 2 2 0 96 ZIIPV=1 1 1 0 96 CPUMODV=2817-717 CMIND=1
000005        96 HWCMODV=2817-M32 HWIND=1 1 1 0 96
000006 SYS S  SYSID=PRDE SCP=Z/OS VERSION=ZV011000 HPTSID=PPLEX NSAMPS=96 GL=1 W
000007        BIT=64 RMFV=RMF0750 PAR=1.81 RMFINT=1 DTSRC=RMF RMFINTL=15 SRM=466
000008        GMTOF=2:00 SYSN=PRDE DASDIO=7580.9 PAGE=0 CS=0 ES=0 CSAVAIL=0 ESAV
000009        SCPCS=0 SCPES=0 LPGRPN=N/A GAR2LMT LPL1=2 2 2 0 96 LPL3=2 2 2 0 96
000010        2 2 0 96 LPL5=2 2 2 0 96 LPL7=2 2 2 0 96 CECUTILV=72.2 24.7 99.6 1
000011        81.2 99 99.2 89.5 91.1 91.5 97.7 96.6 98.9 84.2 95.2 94.9 98.8 99.
000012        84.3 81.2 68.6 74.6 59.7 82.9 67.6 66.6 99.6 99.5 94.7 70.2 41.7 4
000013        30.1 30.4 31.3 24.7 32.9 40.5 66.8 69.5 74.1 72 71.7 69.3 65 64.3
000014        61.8 65.7 66.4 67.7 57.6 49.4 50.6 53 51.3 58.7 64.8 75.1 75.8 79.
000015        72.5 73.4 77.3 78.3 85.8 79.5 78.9 77.6 81.3 73.3 85.4 81.8 84.9 8
000016        80.6 70.9 85.6 69.1 62.7 44.3 65.4 52.1 55.9 48.9 77.4 82.8 77.5 7
000017        98.4 99.1 80 51.7 75.4 79.4 88.3 54.7 AINR=4.9 1.3 9.9 2.3 96 3.6
000018        3.4 4.4 3.6 5.8 3.4 4 3.4 6.7 2.6 3.2 2.5 3.3 2.5 2.9 1.7 2.3 1.7
000019        1.7 1.8 2.4 1.7 2 1.3 1.4 1.3 1.8 1.6 1.3 1.5 3.2 3.9 6.8 7.2 7 7
000020        7.1 7 7.1 6.9 7.4 7.5 6.8 5.8 5.3 5.3 5.3 5.3 5.6 6.4 7.3 7.7 7.9
000021        7.6 7.9 8 7.8 8 7.7 7.8 7.4 6.4 6.7 6.2 5.7 6.4 6.9 6.2 6 4.7 4.4
000022        2.9 4.1 3.5 4.3 3.3 3.4 2.8 8.2 7.4 4.6 2.1 4.4 5.1 7.7 2.8 AIN=12
000023        124.4 145.5 4.7 96 131.3 134.8 141.5 131.9 134.8 130.8 131.5 128.9
000024        132.8 133.5 131.7 128.9 128 129.2 129.5 127.9 126.4 127.4 125.6 12
000025        125.7 128 126.9 128.4 126.7 126.9 125.9 127.1 126 127.7 126.9 126.
000026        126.3 126.3 126.5 126 124.9 124.4 124.5 124.5 124.4 124.4 124.5 12
000027        124.5 124.4 124.5 124.5 124.4 124.5 124.5 124.4 124.4 124.4 124.5
000028        124.8 124.7 124.9 124.6 124.9 124.8 124.8 124.5 124.7 124.6 127.2
000029        127.6 127.4 127.3 127.6 130.5 130.9 131.5 130.1 131.9 129.2 133 13
000030        134.5 133.9 137.4 135 135.6 134.3 145.5 142.7 135.7 131.4 135.9 13
000031        143.1 132.2 BATCHV=3.7 0 18.6 4.3 96 7 11 17.5 8.3 10.9 6.9 7.7 5
```

Special Thanks To

John Burg

Gary King

Thank You



THANK YOU!