



Advanced Technical Skills (ATS) North America

# zPCR Capacity Sizing Lab

**SHARE - Sessions 11599 / 11497**

August 7, 2012

John Burg

Materials created by John Fitch and Jim Shaw

IBM



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# zPCR Capacity Sizing Labs

## ■ Part 1 - Intro and Overview

- zPCR Introduction
- Includes Advanced Mode Update
- What's new up through zPCR V7.9b

## ■ Part 2 – Hands-on Lab

- 1 Exercise to demonstrate the use of Advanced Mode functions in zPCR
  - 6 Tasks
  - 1 optional specialty engine consideration
- Use as a refresher



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# zPCR Capacity Sizing Lab – Part 1 Introduction and Overview

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**Advanced  
Technical  
Skills**

TECHNICAL SALES  
NORTH AMERICA

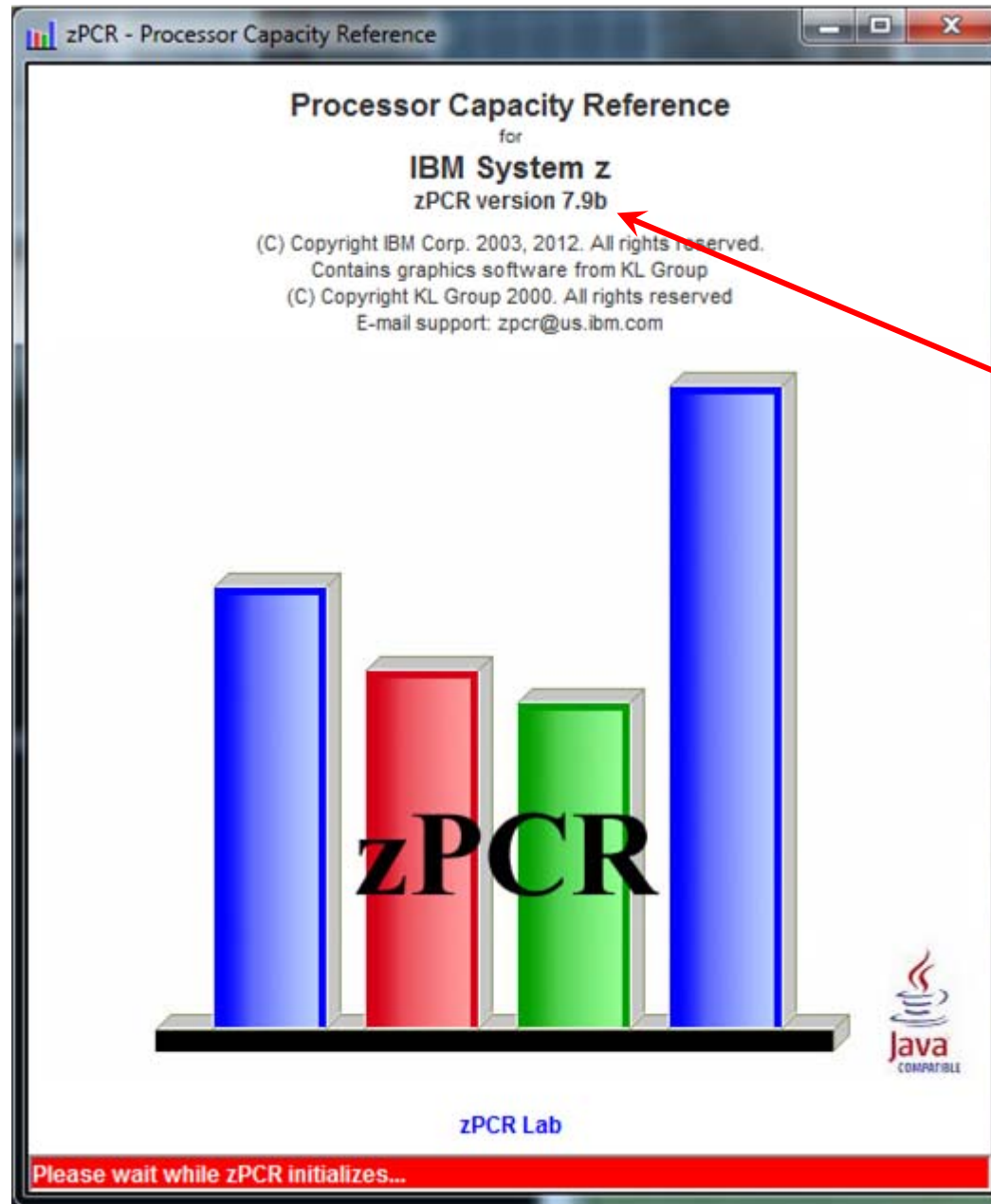
# Agenda

- **Introducing zPCR**
- **LSPR Background**
- **MIPS Tables vs. zPCR LPAR Configuration Capacity Planning**
- **zPCR Basic / Advanced Mode**
- **zPCR Preferences**
- **zPCR Execution Flow**
- **EDF Files**
- **zPCR Output**
- **Where to get more Information**
- **Summary**

# Introducing zPCR

- **Provides capacity relationships for System z processors, considering**
  - LPAR configuration
  - SCP/workload environment
  - Use of specialty CPs (zAAP, zIIP, IFL, and ICF)
- **Based on IBM Large Systems Performance Reference (LSPR)**
- **The IBM tool to properly size mainframe upgrades**
  - Expected accuracy of  $\pm 5\%$
- **A PC based tool written in Java for Windows XP/Win 7**
  - “As Is”, no charge tool available from the web
- **New Processor Announcements available in zPCR for:**
  - IBM Account Teams - at Announcement
  - Customers - generally within 30 days after Announcement

# zPCR Logo Window



Version  
Identification

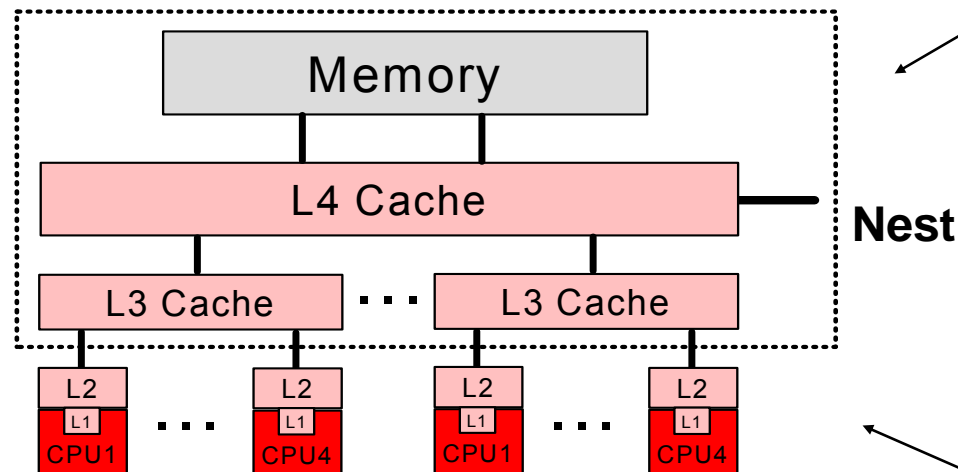
# New Day Dawning in System z Capacity Planning

## Processor Design

- CPU
- Memory Hierarchy (Nest)

## Hypervisor (PR/SM)

- Amount of virtualization



## Operating System

- Virtualization at address space level

## Workload Characteristics

- Instructions
- Dispatch Profile
- I/O Rate



# Introduction to LSPR

- **A set of representative SCP/workload environments**
  - SCPs: z/OS, z/VM, and Linux on System z
  - Workload categories: Low ←Relative Nest Intensity→ High
  - A methodology focused on processor capacity
  - No significant external constraints
  - Equivalent (reasonably high, e.g.  $\geq 90\%$ ) processor utilization
- **A metric to communicate the results**
  - ITR: Internal Throughput Rate
  - Transactions or Jobs per processor busy second
- **Information stored on the web**
  - <https://www.ibm.com/servers/resourceLink/lib03060.nsf/pages/lsprindex?OpenDocument>

## LSPR Benchmarks

- LSPR data is built from a set of benchmarks running representative workloads
- Over time, LSPR benchmarks are changed to reflect changes in processor architecture, operating system capabilities, and new patterns for production workloads
  - **LSPR tables are labeled based on the z/OS operating system level used at time of the benchmark**
- Cannot directly compare relative processor capacity across different versions of LSPR benchmarks

# LSPR Workload Categories

- Various combinations of workload primitives are measured on which the new workload categories are based
  - Applications include CICS, DB2, IMS, OSAM, VSAM, WebSphere, COBOL, utilities
- **Low** (relative nest intensity)
  - Workload curve representing light use of the memory hierarchy
  - Similar to past high scaling workload primitives
- **Average** (relative nest intensity)
  - Workload curve expected to represent the majority of customer workloads
  - Similar to the past LoLo-mix curve
- **High** (relative nest intensity)
  - Workload curve representing heavy use of the memory hierarchy
  - Similar to the past DI-mix curve
- zPCR extends published categories
  - **Low-Avg**
    - 50% Low and 50% Average
  - **Avg-High**
    - 50% Average and 50% High

# LSPR Tables

- Multi-image (MI) Processor Capacity Ratio table
  - Median complex LPAR configuration for each model based on customer profiles
  - Most representative for vast majority of customers
  - Same workload assumed in every partition
  - z/OS only
  - Used for “high level” sizing, e.g. “MIPS Tables”
  - Used to develop the MSU rating

# MIPS Tables vs zPCR

## ■ MIPS Tables

- Adequate for Business Planning
  - High level sizing for hardware and software budget planning
  - Based on “averages”
- Must be referenced to a specific set of LSPR benchmarks or invalid

## ■ zPCR Sizing - LPAR Configuration Capacity Planning

- Detailed Capacity Sizing based on:
  - Specific LPAR configuration (number, weights, and logical processors)
  - Specific SCP/workload mix
  - Specific use of specialty engines (zAAP, zIIP, IFL, and ICF)
- Built around concept of a Reference CPU

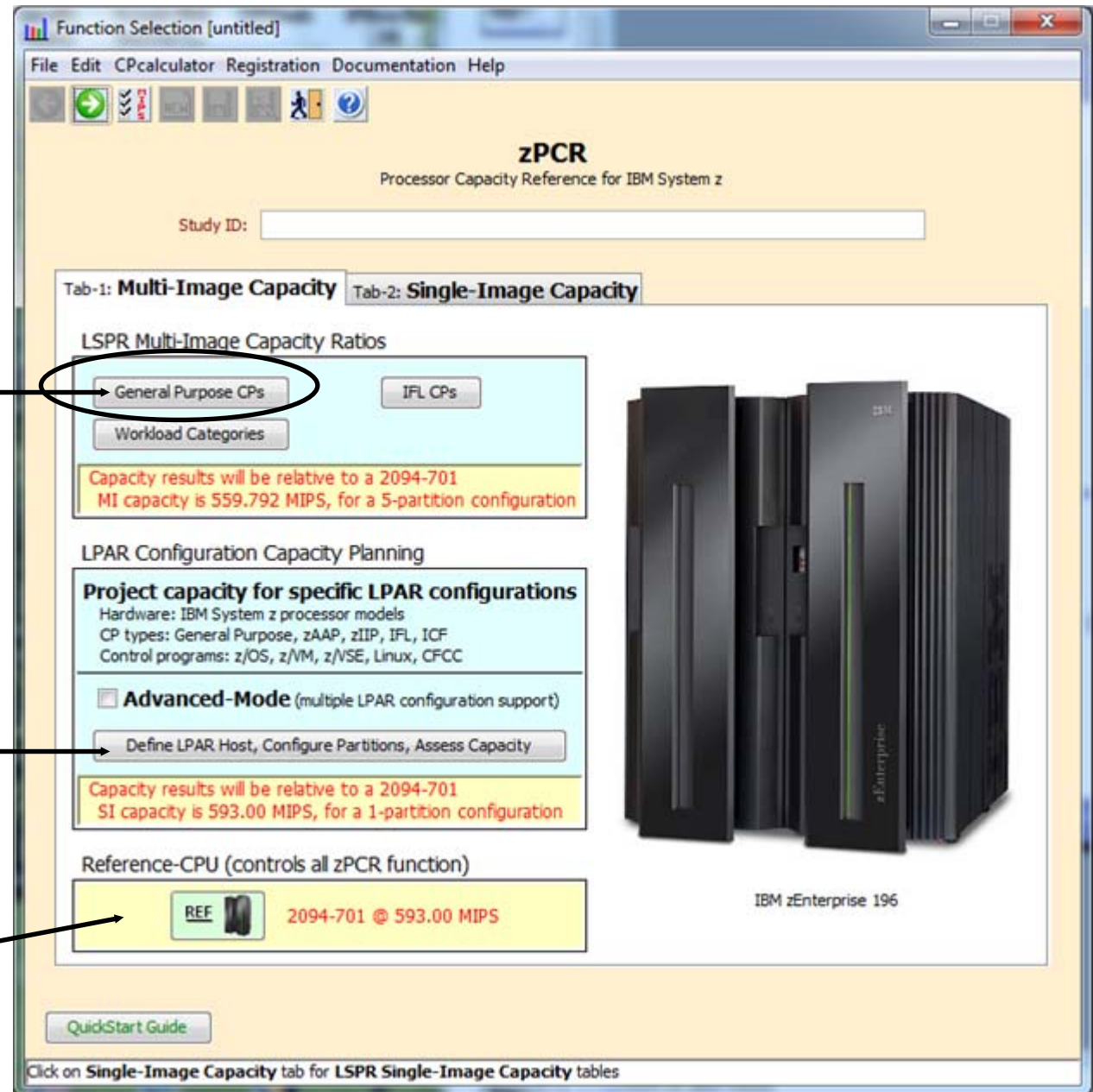
# zPCR Home Page

MIPS Table

LSPR Multi-Image

zPCR LPAR  
Configuration  
Capacity Planning

Setting the  
Reference  
Processor



## zPCR Basic Mode and Advanced Mode

### ■ zPCR can be run in 2 Modes:

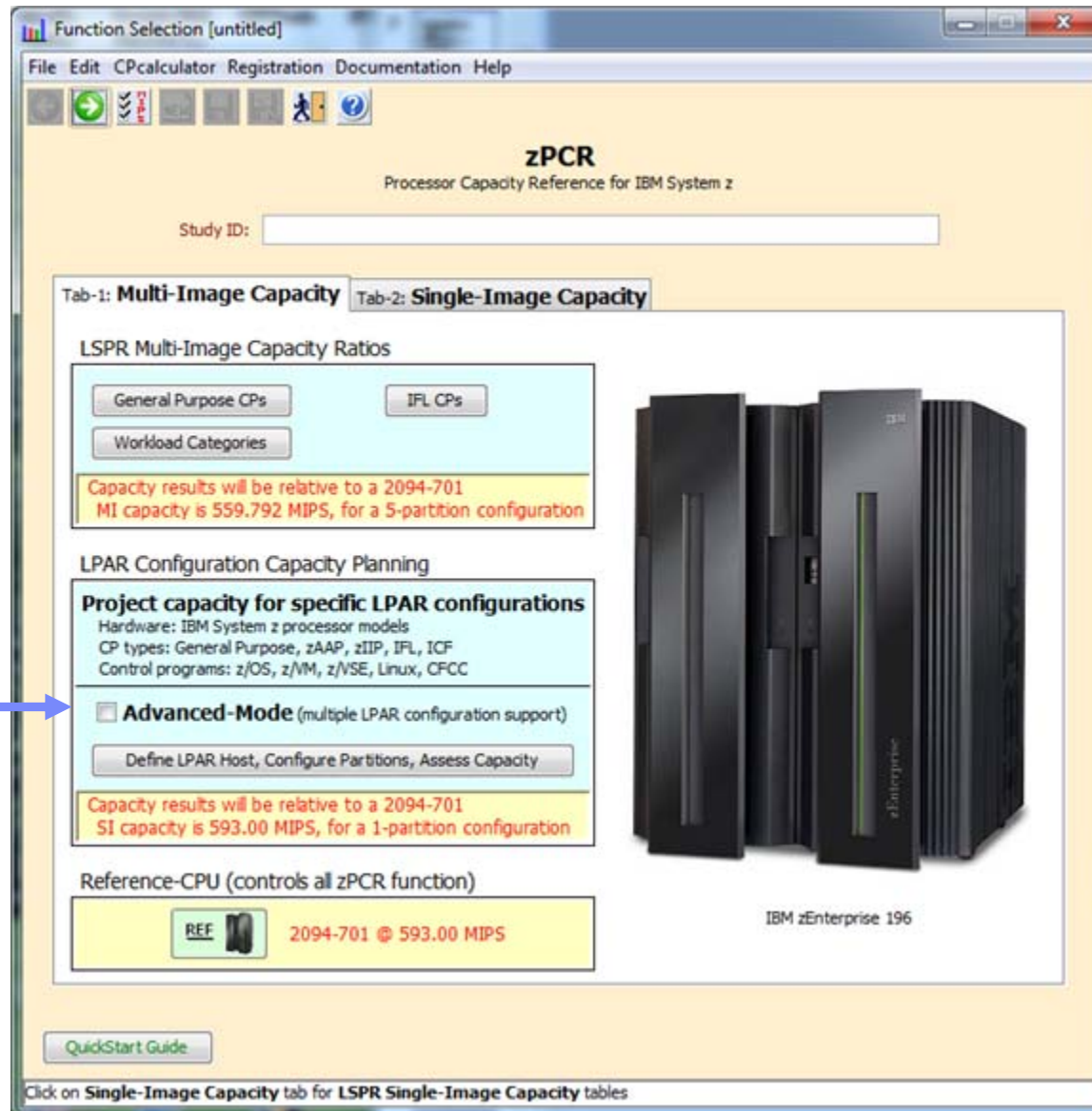
#### — Basic Mode

- Operates on 1 LPAR configuration at a time

#### — Advanced Mode

- Operates up to 7 LPAR Configurations at a time
- Shows Capacity Comparisons between 2 LPAR configurations
- More efficient than running zPCR multiple times
  - Manually comparing the results
- Recommended Mode

# Introducing zPCR– Advanced Mode





# zPCR Advanced Mode

- **Provides Capacity Comparisons between 2 LPAR configurations**
  - The “Current” Vs “Alternate” (Alt-1, Alt-2, Alt-3, Alt-4, Alt-5, Alt-6)
  - More efficient than running zPCR multiple times and manually comparing the results
  - Ability to drag & drop RMF partition reports, zPCR files and EDF\* files onto “Current” & “Alternate”
- **Recommended when comparing capacity changes including:**
  - Changing the LPAR host processor family
  - Changing the LPAR host processor’s CP configuration
  - Changing the way that one or more partitions are defined, (e.g. weights, LCPs, SEs)
  - Adding one or more new partitions
  - Deleting one or more current partitions
- **For Capacity Comparisons to be useful, configurations being compared should both contain some or all of the same partitions**
  - (i.e., in terms of partition type, name, SCP, and workload)

\* Note: EDF (Enterprise Data Files) are new with zPCR 7.x and are created using CP3KEXTR for z/OS and CP3KVMEXT for z/VM

# Advanced Mode Function

- **Multiple LPAR configurations (up to seven can be defined)**
- **Several additional functions are available**
  - *LPAR Host / Partition Comparison Reports*
    - Compares capacity results between LPAR configurations
  - *Margin of Error Consideration*
    - Shows the effect on capacity when  $\pm 5\%$  margin-of-error is applied
  - *Optimize SHR LCPs*
    - Optimizes LCPs
  - *LPAR Host Capacity Summary*
    - Summarizes MIPS by pool type for Current and all Alternates
- **All capacity values based on a single Reference-CPU setting**
  - 1-way processors only

# Reference CPU and Typical

## Reference Processor

- Used to scale the capacity all of the LSPR processors relative to this processor
  - Must be set to any IBM System z 1-way model (GCP model)

## “Typical”

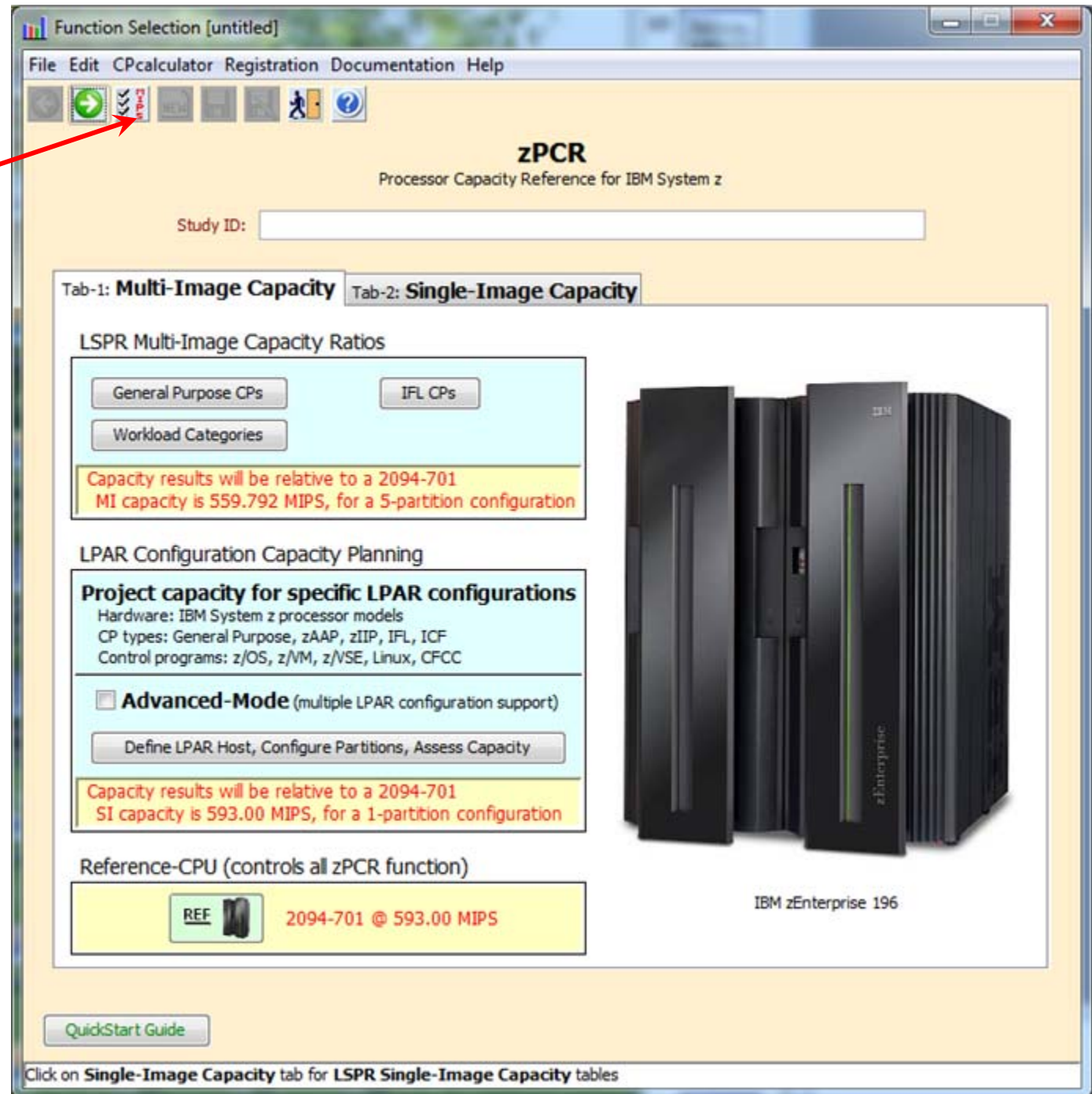
- 2094-701
  - 593 MIPS
- IBM recommended and widely accepted in the Industry

It is critical all capacity being compared be obtained using a consistent **Reference-CPU** metric

	Reference-CPU	zPCR Comparison Reports		
				Relative Capacity Difference
	2094-701	z196 708	z196 710	
Relative Capacity	1.00	14.78	17.97	1.22
MIPS	593	8,769	10,656	(1,887 MIPS) 1.22

## zPCR Function Selection Window

Set "Startup" preferences



## Default zPCR Startup Preferences

The screenshot shows the 'Preferences' dialog box with the 'Startup Preferences' tab selected. The dialog is titled 'Preferences' and has standard window controls (minimize, maximize, close). Below the title bar are three icons: a green arrow, a red X, and a blue question mark. The main content area is divided into several sections:

- Reference-CPU Metrics:** A table showing 'Processor Model' as '2094-701', 'Scaling Factor' as '1.000', and 'Scaling Metric' as '{ITR Ratio}'. A 'Change' button is at the bottom.
- zPCR Operating Mode:** A section with 'Start in' and two radio buttons: 'Advanced-Mode' (unselected) and 'Basic-Mode' (selected).
- Workload Category Display List:** A list of categories: 'Low', 'Low-Avg', 'Average', 'Avg-High', and 'High'. A 'Change' button is at the bottom.
- Directory path for Saved Studies:** A text field showing 'i:\zPCR7.9b\Study Files' and a 'Browse' button.
- Directory path for RMF Reports:** A text field showing 'i:\zPCR7.9b\RMF Files' and a 'Browse' button.
- Directory path for EDFs:** A text field showing 'i:\zPCR7.9b\EDF Files' and a 'Browse' button.
- Directory path for CSV files:** A text field showing 'i:\zPCR7.9b\CSV Files' and a 'Browse' button.

A 'Restore Defaults' button is located at the bottom right of the dialog. At the very bottom, a status bar reads: 'Click "Return" to save preference settings; "Cancel" to discard changes'.

## Recommended zPCR Startup Preferences

Preferences

Startup Preferences

Reference-CPU Metrics

Processor Model	2094-701
Scaling Factor	593.00
Scaling Metric	MIPS

Change

zPCR Operating Mode

Start in

☒ Advanced-Mode

☐ Basic-Mode

Workload Category Display List

Low  
Low-Avg  
Average  
Avg-High  
High

Change

Directory path for Saved Studies

Current directory

i:\zPCR7.9b\Study Files

Browse

Directory path for RMF Reports

Current directory

i:\zPCR7.9b\RMF Files

Browse

Directory path for EDFs

Current directory

i:\zPCR7.9b\EDF Files

Browse

Directory path for CSV files

Current directory

i:\zPCR7.9b\CSV Files

Browse

Restore Defaults

Click "Return" to save preference settings; "Cancel" to discard changes

Set "Advanced Mode" as the default when starting zPCR

Set "Reference-CPU" Metrics to "Typical" as the default



# Reference CPU continued...

## ■ Reference Processor Window

- The **Reference-CPU** window is accessed primarily from the **Function Selection** window by clicking the **Reference-CPU** button

Select "Typical"

The screenshot shows the 'Reference-CPU' window with the following content:

**Reference-CPU**  
**zPCR Global Setting**  
Only 1-way GP processor models are allowed  
Study ID: Not specified

Processor Model and Capacity Assumption

Family	Model	Scaling-Factor	Scaling-Metric
z9 EC/700	2094-701	593.00	MIPS

Some Alternative Settings

☒ Typical ☐ Startup ☐ Default

☐ Update zPCR Startup Preferences on Return

Capacity results will be relative to a 2094-701  
SI capacity is 593.00 MIPS, for a 1-partition configuration  
MI capacity is 559.792 MIPS, for a 5-partition configuration

A red arrow points from the text 'Select "Typical"' to the 'Typical' radio button in the 'Some Alternative Settings' section.

## zPCR Function Selection Window

Function Selection [untitled]

File Edit CPcalculator Registration Documentation Help

**zPCR**  
Processor Capacity Reference for IBM System z

Study ID:

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

LSPR Multi-Image Capacity Ratios

General Purpose CPs IFL CPs

Workload Categories

Capacity results will be relative to a 2094-701  
MI capacity is 559.792 MIPS, for a 5-partition configuration

LPAR Configuration Capacity Planning

**Project capacity for specific LPAR configurations**  
Hardware: IBM System z processor models  
CP types: General Purpose, zAAP, zIIP, IFL, ICF  
Control programs: z/OS, z/VM, 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

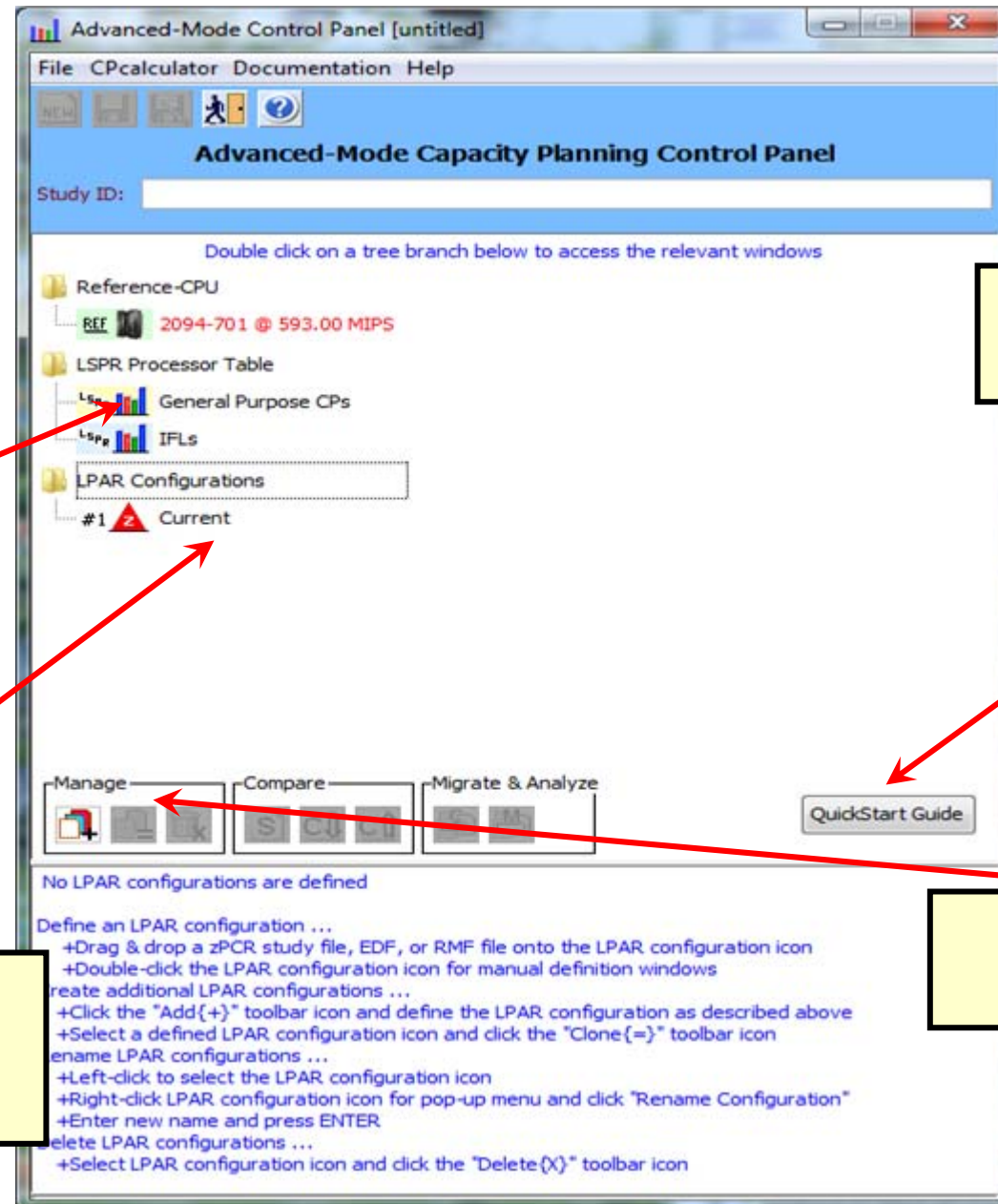
Click on **Single-Image Capacity** tab for **LSPR Single-Image Capacity** tables



Select "Advanced-Mode" check box and press "Enter Advanced-Mode"



## zPCR Advanced-Mode Capacity Planning Control Panel



View "QuickStart" Guide

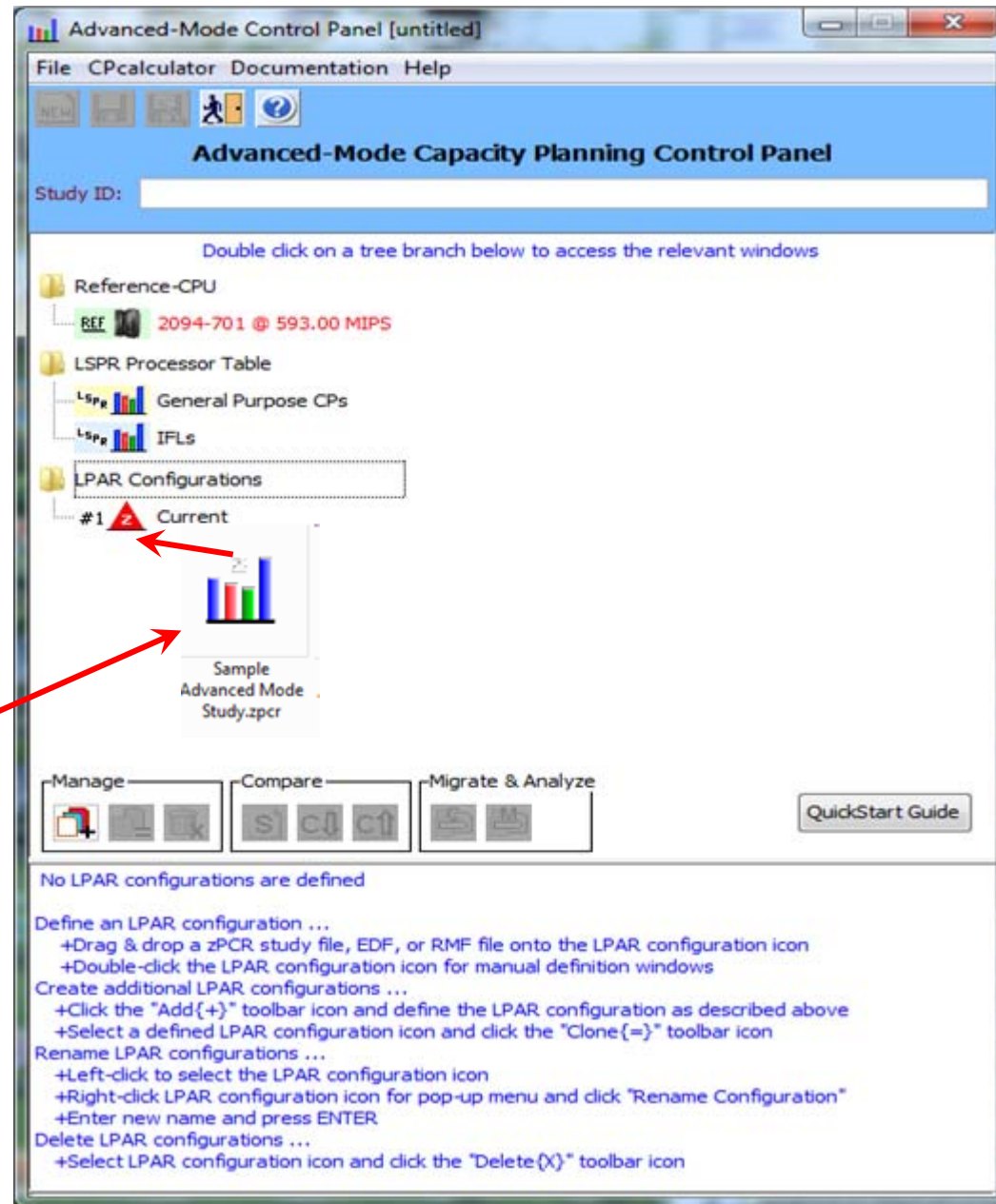
View Multi-Image LSPR table

LPAR Configurations  
Right "click" to rename  
up to 20 characters

Manage Multiple  
Configurations

You may drag and drop zPCR study files, RMF reports or EDFs onto the LPAR Configurations planning area or use the file drop down to load zPCR study files.

## zPCR Advanced-Mode Capacity Loading a file via Drag and Drop



Browse Windows Explorer to find the file then "drag" it to the zPCR Advanced Mode" window and "drop" it on Current

## zPCR Advanced-Mode Capacity Renaming the configuration step 1

Advanced-Mode Control Panel [E:\...Sample Advanced Mode Study.zpcr]

File CPcalculator Documentation Help

Advanced-Mode Capacity Planning Control Panel

Study ID: Sample zPCR Study

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

- Reference-CPU
  - REF 2094-701 @ 593.00 MIPS
- LSPR Processor Table
  - LSPR General Purpose CPs
  - LSPR IFLs
- LPAR Configurations
  - #1 **Current** Rename Configuration

Manage Compare Migrate & Analyze

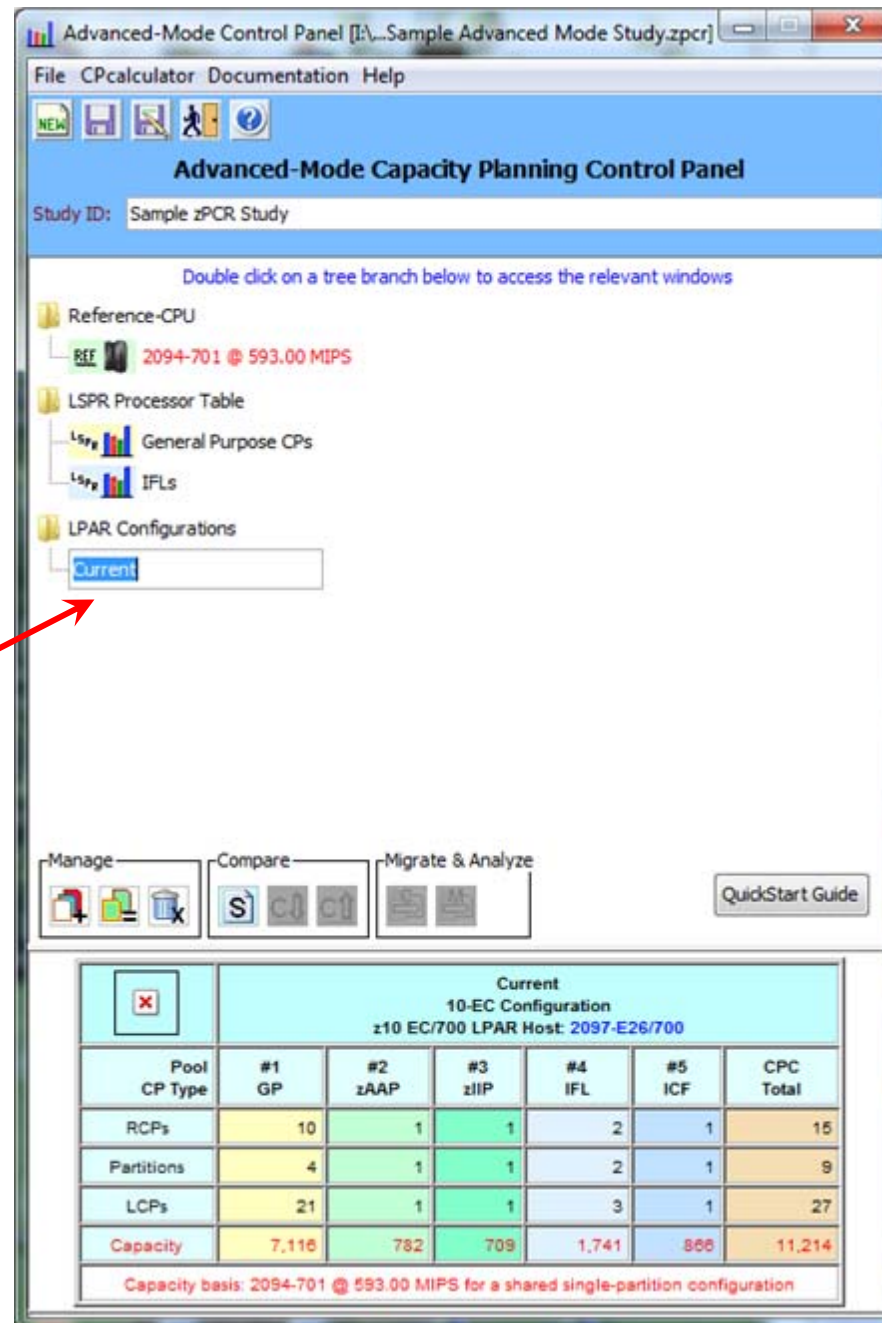
QuickStart Guide

Current 10-EC Configuration z10 EC/700 LPAR Host: 2097-E26/700						
Pool CP Type	#1 GP	#2 zAAP	#3 zIIP	#4 IFL	#5 ICF	CPC Total
RCPs	10	1	1	2	1	15
Partitions	4	1	1	2	1	9
LCPs	21	1	1	3	1	27
Capacity	7,116	782	709	1,741	868	11,214

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

Select "Current",  
Right Click, Click on  
"Rename  
Configuration"

# zPCR Advanced-Mode Capacity Renaming the configuration step 2



Type over “Current”  
with “z10-2097 E26”  
and Press Enter



# zPCR Advanced-Mode Capacity Planning Control Panel

Configuration Renamed

Configuration Summary

Advanced-Mode Control Panel [F:\...Sample Advanced Mode Study.zp...]

File CPcalculator Documentation Help

Advanced-Mode Capacity Planning Control Panel

Study ID: Sample zPCR Study

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

- Reference-CPU
  - REF 2094-701 @ 593.00 MIPS
- LSPR Processor Table
  - LSPR General Purpose CPs
  - LSPR IFLs
- LPAR Configurations
  - #1 z10 2097-E26

Manage Compare Migrate & Analyze QuickStart Guide

#1	z10 2097-E26 10-EC Configuration z10 EC/700 LPAR Host: 2097-E26/700					
Pool CP Type	#1 GP	#2 zAAP	#3 zIIP	#4 IFL	#5 ICF	CPC Total
RCPs	10	1	1	2	1	15
Partitions	4	1	1	2	1	9
LCPs	21	1	1	3	1	27
Capacity	7,116	782	709	1,741	868	11,214

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

# zPCR Advanced-Mode Capacity Planning Control Panel

1 Select  
2 then Click on Clone

Advanced-Mode Control Panel [F:\sharelab.zpcr]

File CPcalculator Documentation Help

Advanced-Mode Capacity Planning Control Panel

Study ID: Sample zPCR Study

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

- Reference-CPU
  - REF 2094-701 @ 593.00 MIPS
- LSPR Processor Table
  - LSPR General Purpose CPs
  - LSPR IFLs
- LPAR Configurations
  - #1 **z10 2097-E26**

Manage Compare Migrate & Analyze

QuickStart Guide

z10 2097-E26 10-EC Configuration z10 EC/700 LPAR Host: 2097-E26/700						
Pool	#1 GP	#2 zAAP	#3 zIIP	#4 IFL	#5 ICF	CPC Total
RCPs	10	1	1	2	1	15
Partitions	4	1	1	2	1	9
LCPs	21	1	1	3	1	27
Capacity	7,116	782	709	1,741	806	11,214

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

## zPCR Advanced-Mode Capacity Planning Control Panel

1) Select 2 Configurations then  
2) Click on Comparison Report

Note “Down Arrow” compares Bottom Configuration (#3) Relative to Top Configuration (#1)

“Up Arrow” compares Top Configuration (#1) Relative to Bottom Configuration (#3)

The screenshot shows the 'Advanced-Mode Capacity Planning Control Panel' window. The 'Study ID' is 'Sample zPCR Study'. The tree view on the left shows the following structure:

- Reference-CPU
  - REF 2094-701 @ 593.00 MIPS
- LSPR Processor Table
  - General Purpose CPs
  - IFLs
- LPAR Configurations
  - #1 z10 2097-E26
  - #2 z10 2097-E40
  - #3 z196 2817-M15

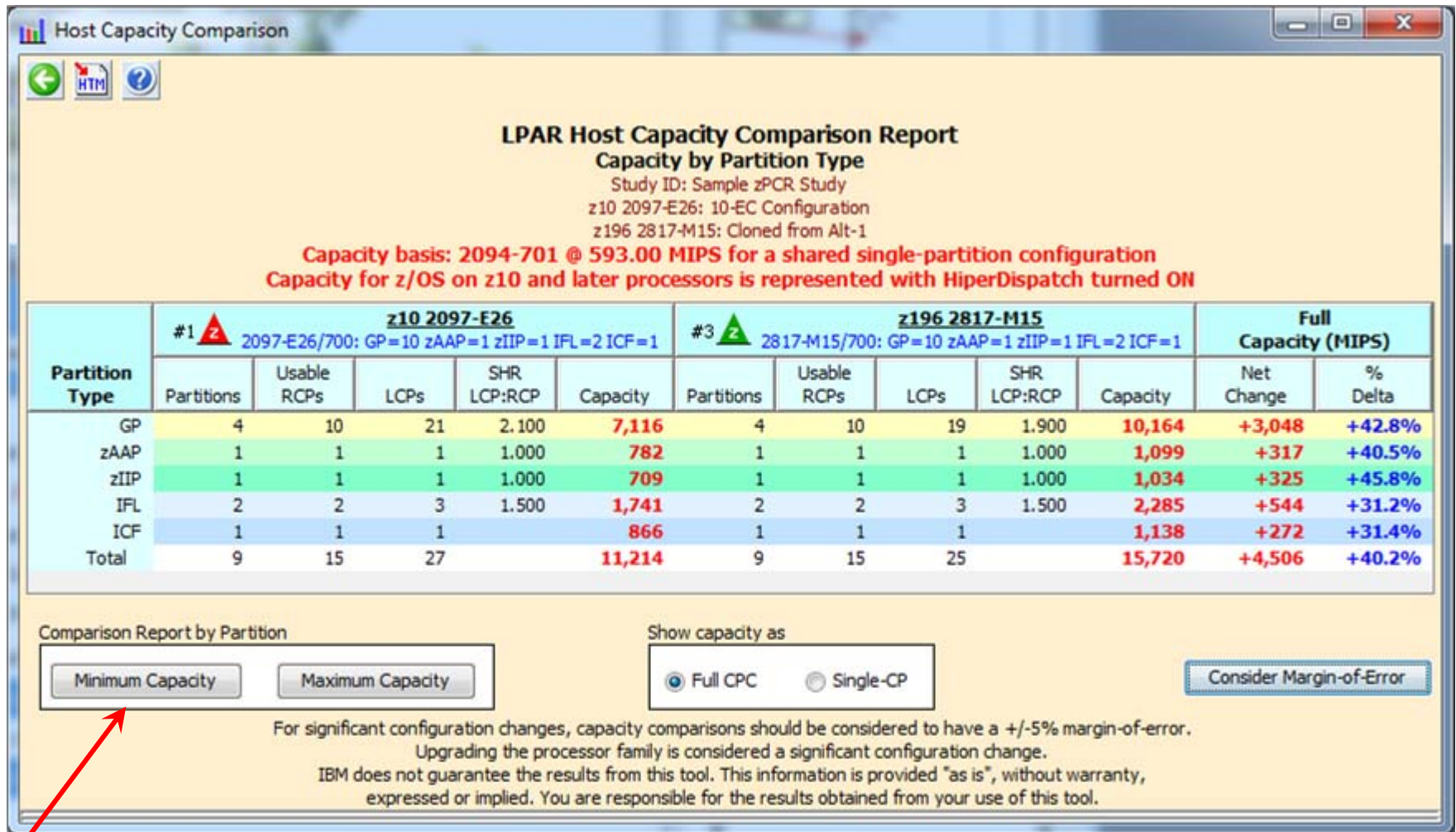
At the bottom, there are three buttons: 'Manage', 'Compare', and 'Migrate & Analyze'. The 'Compare' button has three sub-buttons: a 'Down Arrow' (S), a 'Compare' (C), and an 'Up Arrow' (C). The 'QuickStart Guide' button is also present.

The comparison table below shows the results for the selected configurations:

z10 2097-E26 10-EC Configuration z10 EC/700 LPAR Host: 2097-E26/700						
Pool CP Type	#1 GP	#2 zAAP	#3 zIIP	#4 IFL	#5 ICF	CPC Total
RCPs	10	1	1	2	1	15
Partitions	4	1	1	2	1	9
LCPs	21	1	1	3	1	27
Capacity	7,116	782	709	1,741	886	11,214

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

# Host Capacity Comparison Report



Click "Minimum Capacity" to get Partition Capacity Comparison Report

Minimum Capacity is Partition Capacity when weights are being enforced



# Partition Minimum Capacity Comparison Report

**Partition Capacity Comparison**

**Partition Capacity Comparison Report**  
Based on Partition Minimum Capacity  
Study ID: Sample zPCR Study  
z10 2097-E26: 10-EC Configuration  
z196 2817-M15: Cloned from Alt-1

**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 List of All Included Partitions With Unique ID Metrics				#1 <b>z10 2097-E26</b> 2097-E26/700: GP=10 zAAP=1 zIIP=1 IFL=2 ICF=1							#3 <b>z196 2817-M15</b> 2817-M15/700: GP=10 zAAP=1 zIIP=1 IFL=2 ICF=1							Full Capacity (MIPS)	
Type	Name	SCP	Workload	Partition Definition				Minimum Capacity	Partition Definition				Minimum Capacity	Net Change	% Delta				
				LP#	Mode	LCPs	Weight%	CAP		LP#	Mode	LCPs	Weight	Weight%	CAP				
GP	LP-01	z/OS-1.9*	Average	1	SHR	10	53.23%	3,865		1	SHR	8	700	53.23%		5,500	+1,635	+42.3%	
GP	LP-02	z/OS-1.9*	Average	2	SHR	6	30.42%	2,207		2	SHR	6	400	30.42%		3,121	+914	+41.4%	
zAAP	LP-02	z/OS-1.9*	Average		SHR	1	100.00%	782			SHR	1	400	100.00%		1,099	+317	+40.5%	
GP	LP-03	z/OS-1.9*	High	3	SHR	4	15.21%	968		3	SHR	4	200	15.21%		1,433	+465	+48.0%	
zIIP	LP-03	z/OS-1.9*	High		SHR	1	100.00%	709			SHR	1	200	100.00%		1,034	+325	+45.8%	
GP	LP-04	z/VM	High/LV	4	SHR	1	1.14%	76	✓	4	SHR	1	15	1.14%	✓	110	+34	+44.7%	
ICF	LP-07	CFCC	CFCC	5	DED	1	n/a	866		5	DED	1	n/a			1,138	+272	+31.4%	
IFL	LP-05	Linux	Average/L	6	SHR	2	88.89%	1,547		6	SHR	2	200	88.89%		2,031	+484	+31.3%	
IFL	LP-06	Linux	Average/L	7	SHR	1	11.11%	193		7	SHR	1	25	11.11%		254	+61	+31.6%	

**Change Controls**

Commit Changes    Undo Changes    Optimize SHR LCPs    Consider Margin-of-Error

For significant configuration changes, capacity comparisons should be considered to have a +/-5% margin-of-error.  
Upgrading the processor family is considered a significant configuration change.  
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.

## zPCR Margin of Error

- **A new processor capacity expectation should normally be considered as having a margin of error of up to +5% or - 5%**
  - The full  $\pm 5\%$  margin of error should be considered when:
    - The LPAR host processor family is changed
    - Very significant changes are made to the LPAR host CP configuration
    - Significant changes are made to the partition configuration
  - The margin of error is due to factors that include variability in workload/instruction mix and processor utilization
  - When changes are minor, the margin-of-error should be less

# Partition Capacity Comparison Report

**Partition Capacity Comparison Report**  
Based on Partition Minimum Capacity

Study ID: Sample zPCR Study  
z10 2097-E26: 10-EC Configuration  
z196 2817-M15: Cloned from Alt-1

**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 List of All Included Partitions With Unique ID Metrics				#1 <b>z10 2097-E26</b> 2097-E26/700: GP=10 zAAP=1 zIIP=1 IFL=2 ICF=1						#3 <b>z196 2817-M15</b> 2817-M15/700: GP=10 zAAP=1 zIIP=1 IFL=2 ICF=1						Full Capacity (MIPS)		
				Partition Definition					Minimum Capacity	Partition Definition					Minimum Capacity	Net Change	% Delta	
Type	Name	SCP	Workload	LP#	Mode	LCPs	Weight%	CAP		LP#	Mode	LCPs	Weight	Weight%	CAP			
GP	LP-01	z/OS-1.9*	Average	1	SHR	10	53.23%	3,865		1	SHR	8	700	53.23%		5,500	+1,635	+42.3%
GP	LP-02	z/OS-1.9*	Average	2	SHR	6	30.42%	2,207		2	SHR	6	400	30.42%		3,121	+914	+41.4%
zAAP	LP-02	z/OS-1.9*	Average		SHR	1	100.00%	782			SHR	1	400	100.00%		1,099	+317	+40.5%
GP	LP-03	z/OS-1.9*	High	3	SHR	4	15.21%	968		3	SHR	4	200	15.21%		1,433	+465	+48.0%
zIIP	LP-03	z/OS-1.9*	High		SHR	1	100.00%	709			SHR	1	200	100.00%		1,034	+325	+45.8%
GP	LP-04	z/VM	High/LV	4	SHR	1	1.14%	76	✓	4	SHR	1	15	1.14%	✓	110	+34	+44.7%
ICF	LP-07	CFCC	CFCC	5	DED	1	n/a	866		5	DED	1	n/a			1,138	+272	+31.4%
IFL	LP-05	Linux	Average/L	6	SHR	2	88.89%	1,547		6	SHR	2	200	88.89%		2,031	+484	+31.3%
IFL	LP-06	Linux	Average/L	7	SHR	1	11.11%	193		7	SHR	1	25	11.11%		254	+61	+31.6%

Change Controls

Commit Changes    Undo Changes    Optimize SHR LCPs

Consider Margin-of-Error

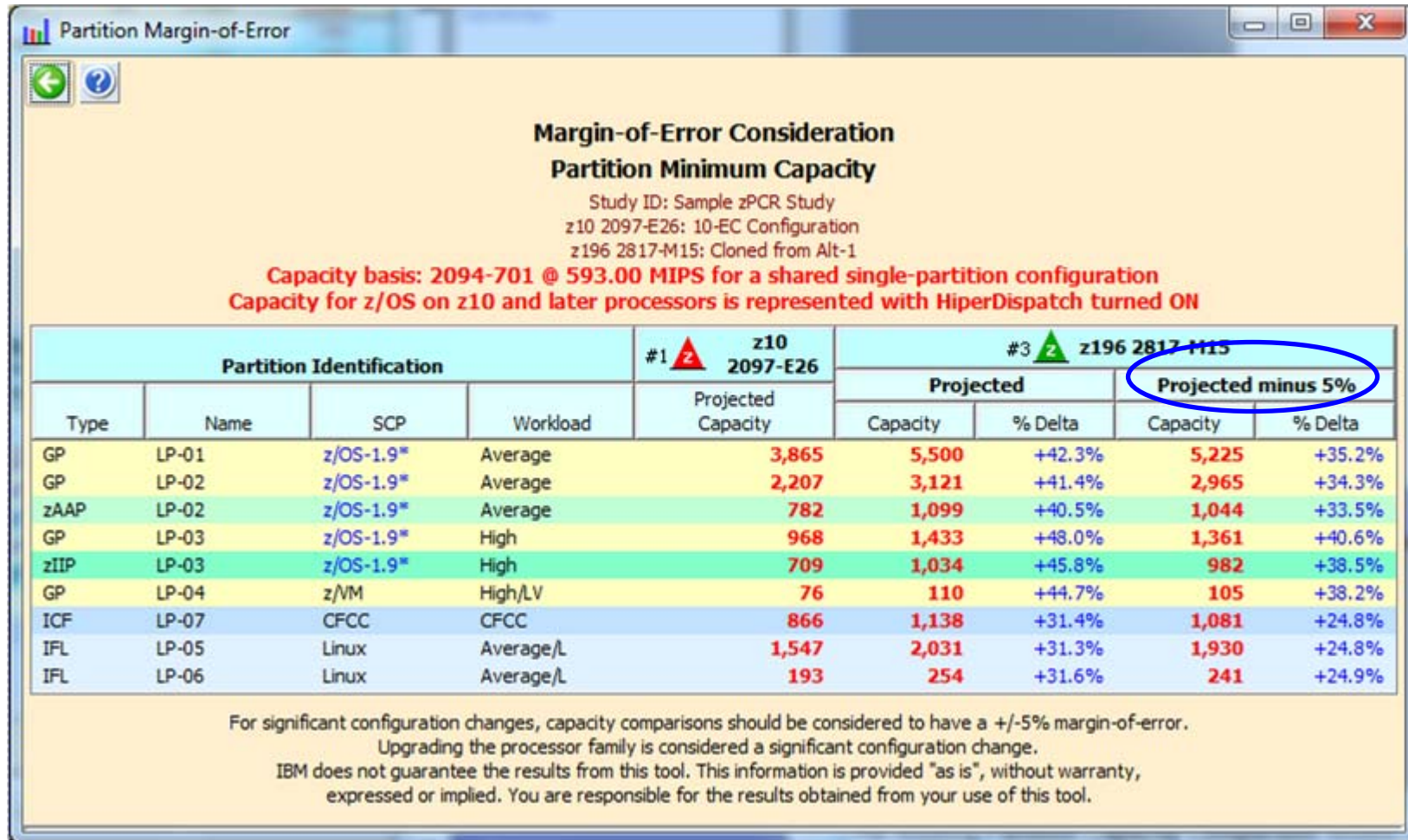
For significant configuration changes, capacity comparisons should be considered to have a +/-5% margin-of-error.  
Upgrading the processor family is considered a significant configuration change.  
IBM does not guarantee the results from this tool. This information is provided "as is", without warranty,  
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.

Margin-of-Error



# Margin of Error Report



# Optimize Shared Logical Processors

- **When migrating to a new processor evaluate the weights & logical processors needed**
  - If Hard Capping partitions, evaluate amount of capacity required to be guaranteed
- **Operating System impact on Logical Processors needs to be reviewed**
- **Level of optimization for LCP Count Assignment can be chosen as follows**
  - **Moderate:**
    - When the weight percent indicates number of logical CPs greater than or equal to 2.6
      - The exact number of logical CPs plus 1 (rounded up to the nearest whole number) will be assigned
    - When the weight percent indicates number of logical CPs should be less than 2.6
      - the exact number of logical CPs (rounded up to the nearest whole number) will be assigned
  - **Minimum:**
    - The weight percent is used to determine the exact number of logical CPs (rounded up to the nearest whole number) will be assigned

# Partition Capacity Comparison Report

**Partition Capacity Comparison**

## Partition Capacity Comparison Report

Based on Partition Minimum Capacity

Study ID: Sample zPCR Study  
z10 2097-E26: 10-EC Configuration  
z196 2817-M15: Cloned from Alt-1

**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 List of All Included Partitions With Unique ID Metrics				#1 <b>z10 2097-E26</b> 2097-E26/700: GP=10 zAAP=1 zIIP=1 IFL=2 ICF=1						#3 <b>z196 2817-M15</b> 2817-M15/700: GP=10 zAAP=1 zIIP=1 IFL=2 ICF=1						Full Capacity (MIPS)		
				Partition Definition					Minimum Capacity	Partition Definition					Minimum Capacity	Net Change	% Delta	
Type	Name	SCP	Workload	LP#	Mode	LCPs	Weight%	CAP		LP#	Mode	LCPs	Weight	Weight%	CAP			
GP	LP-01	z/OS-1.9*	Average	1	SHR	10	53.23%	3,865		1	SHR	8	700	53.23%		5,500	+1,635	+42.3%
GP	LP-02	z/OS-1.9*	Average	2	SHR	6	30.42%	2,207		2	SHR	6	400	30.42%		3,121	+914	+41.4%
zAAP	LP-02	z/OS-1.9*	Average		SHR	1	100.00%	782			SHR	1	400	100.00%		1,099	+317	+40.5%
GP	LP-03	z/OS-1.9*	High	3	SHR	4	15.21%	968		3	SHR	4	200	15.21%		1,433	+465	+48.0%
zIIP	LP-03	z/OS-1.9*	High		SHR	1	100.00%	709			SHR	1	200	100.00%		1,034	+325	+45.8%
GP	LP-04	z/VM	High/LV	4	SHR	1	1.14%	76	✓	4	SHR	1	15	1.14%	✓	110	+34	+44.7%
ICF	LP-07	CFCC	CFCC	5	DED	1	n/a	866		5	DED	1	n/a			1,138	+272	+31.4%
IFL	LP-05	Linux	Average/L	6	SHR	2	88.89%	1,547		6	SHR	2	200	88.89%		2,031	+484	+31.3%
IFL	LP-06	Linux	Average/L	7	SHR	1	11.11%	193		7	SHR	1	25	11.11%		254	+61	+31.6%

**Change Controls**

Commit Changes
Undo Changes
Optimize SHR LCPs

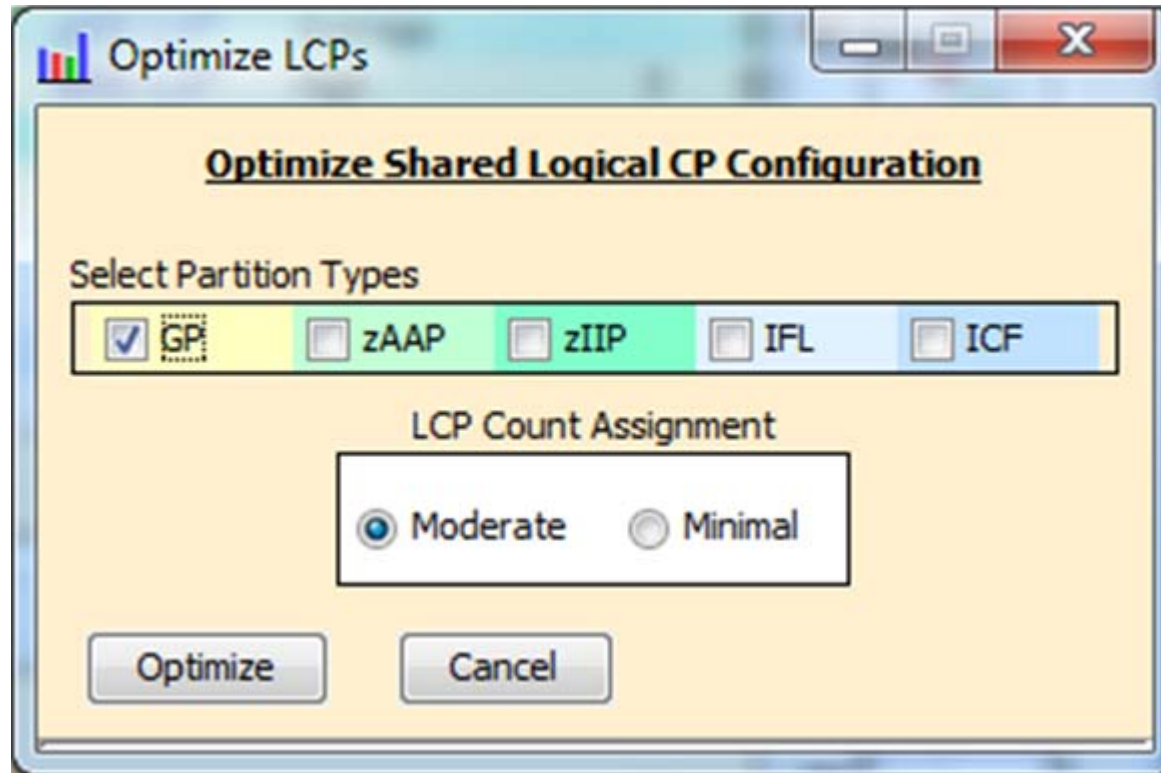
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Input fields have white background; Single-click a "selection field" for drop-down list; Double click a "key-in field" to open.

"Optimize" SHR LCPs

# Optimize Share LCP Configuration





# Commit the Changes

**Partition Capacity Comparison Report**  
Based on Partition Minimum Capacity

Study ID: Sample zPCR Study  
z10 2097-E26: 10-EC Configuration  
z196 2817-M15: Cloned from Alt-1

**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 List of All Included Partitions With Unique ID Metrics				#1  z10 2097-E26 2097-E26/700: GP=10 zAAP=1 zIIP=1 IFL=2 ICF=1						#3  z196 2817-M15 2817-M15/700: GP=10 zAAP=1 zIIP=1 IFL=2 ICF=1						Full Capacity (MIPS)		
				Partition Definition					Minimum Capacity	Partition Definition					Minimum Capacity	Net Change	% Delta	
Type	Name	SCP	Workload	LP #	Mode	LCPs	Weight%	CAP		LP #	Mode	LCPs	Weight	Weight%	CAP			
GP	LP-01	z/OS-1.9*	Average	1	SHR	10	53.23%	3,865		1	SHR	7	700	53.23%		5,570	+1,705	+44.1%
GP	LP-02	z/OS-1.9*	Average	2	SHR	6	30.42%	2,207		2	SHR	5	400	30.42%		3,157	+950	+43.0%
zAAP	LP-02	z/OS-1.9*	Average		SHR	1	100.00%	782			SHR	1	400	100.00%		1,114	+332	+42.5%
GP	LP-03	z/OS-1.9*	High	3	SHR	4	15.21%	968		3	SHR	2	200	15.21%		1,412	+444	+45.9%
zIIP	LP-03	z/OS-1.9*	High		SHR	1	100.00%	709			SHR	1	200	100.00%		1,074	+365	+51.5%
GP	LP-04	z/VM	High/LV	4	SHR	1	1.14%	76	✓	4	SHR	1	15	1.14%	✓	111	+35	+46.1%
ICF	LP-07	CFCC	CFCC	5	DED	1	n/a	866		5	DED	1	n/a			1,138	+272	+31.4%
IFL	LP-05	Linux	Average/L	6	SHR	2	88.89%	1,547		6	SHR	2	200	88.89%		2,033	+486	+31.4%
IFL	LP-06	Linux	Average/L	7	SHR	1	11.11%	193		7	SHR	1	25	11.11%		254	+61	+31.6%

Change Controls

Commit Changes    Undo Changes    Optimize SHR LCPs

Consider Margin-of-Error

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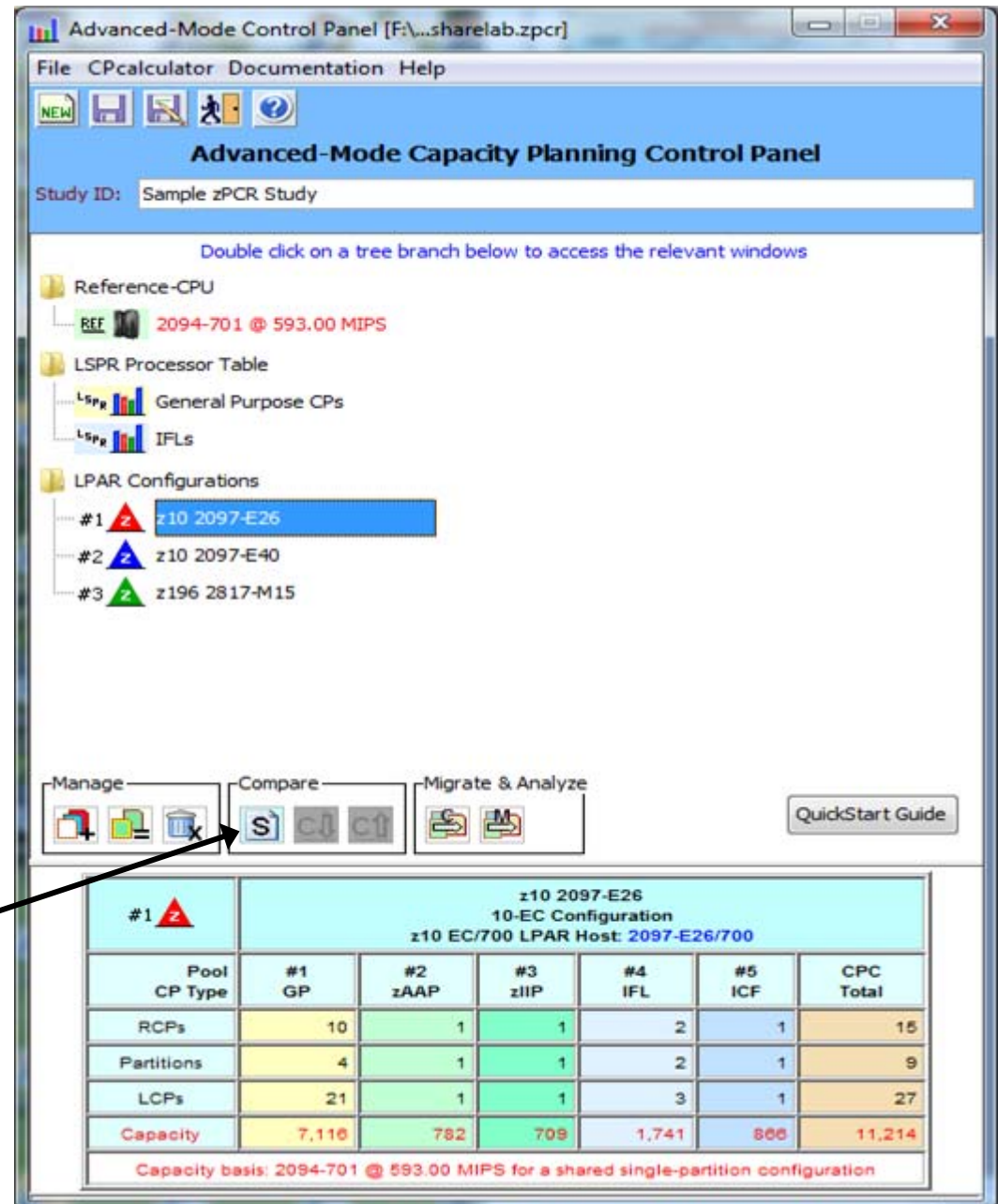
Input fields have white background. Single-click a "selection field" for drop-down list; Double click a "key-in field" to open.

Commit, Undo Changes, or  
change by hand (any white area)



# Show Host Capacity Summary

- Click on the **Host Capacity Summary** icon  to view the report.



Advanced-Mode Control Panel [F:\...sharelab.zpcr]

File CPcalculator Documentation Help

NEW Save Print Run Help

**Advanced-Mode Capacity Planning Control Panel**

Study ID: Sample zPCR Study

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

- Reference-CPU
  - REF 2094-701 @ 593.00 MIPS
- LSPR Processor Table
  - General Purpose CPs
  - IFLs
- LPAR Configurations
  - #1 z10 2097-E26
  - #2 z10 2097-E40
  - #3 z196 2817-M15

Manage Compare Migrate & Analyze

QuickStart Guide

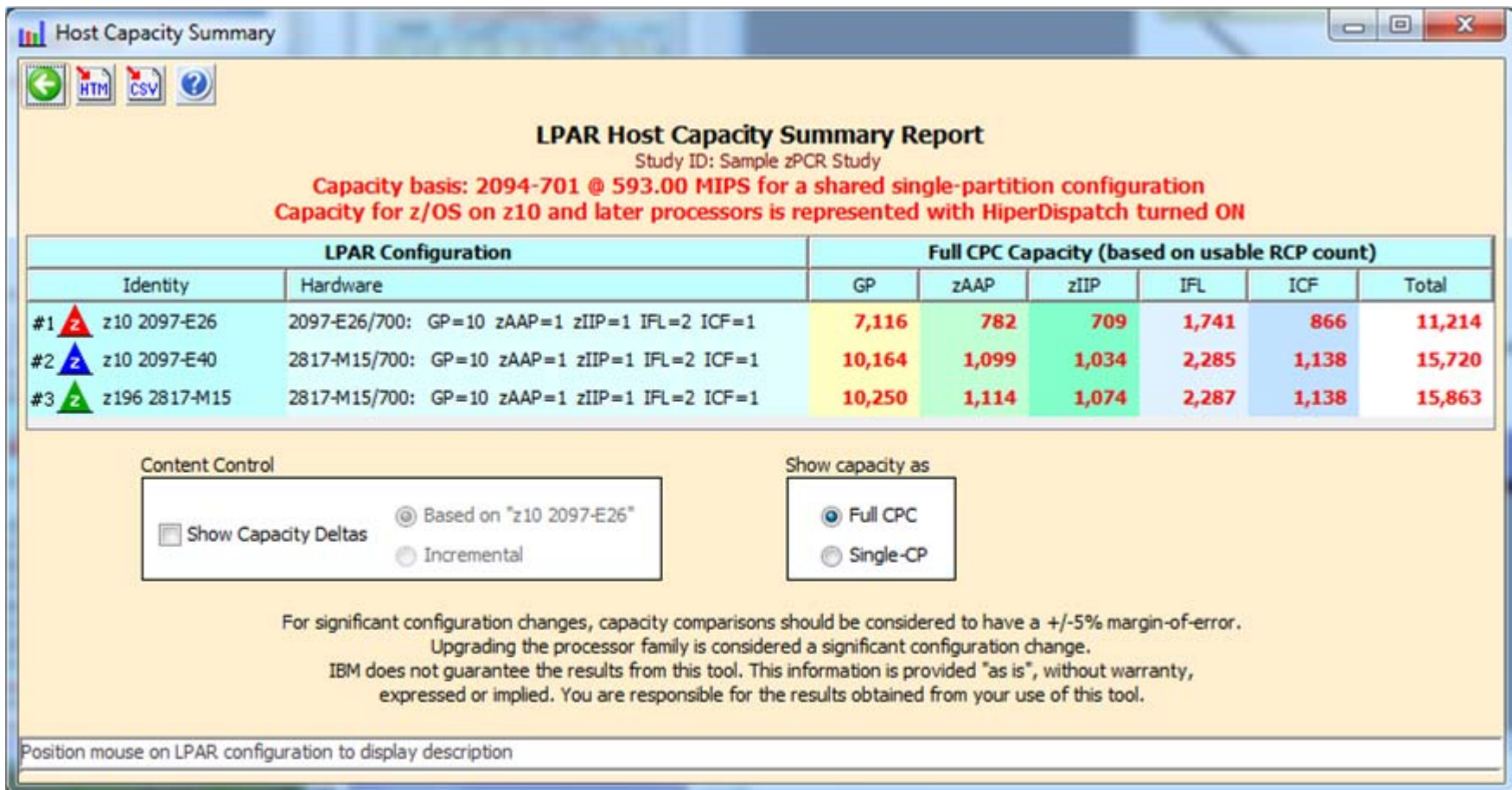
z10 2097-E26 10-EC Configuration z10 EC/700 LPAR Host: 2097-E26/700						
Pool CP Type	#1 GP	#2 zAAP	#3 zIIP	#4 IFL	#5 ICF	CPC Total
RCPs	10	1	1	2	1	15
Partitions	4	1	1	2	1	9
LCPs	21	1	1	3	1	27
Capacity	7,116	782	709	1,741	866	11,214

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

Click Host Capacity Summary

# Host Capacity Summary




- For each defined LPAR configuration, its icon and name are provided, along with the processor model information and number of real CPs configured to each pool
  - To display the description field of any LPAR configuration, place the mouse pointer anywhere on that row
- Click on the **Return** to take you back at the **Advanced-Mode Control Panel**



**Host Capacity Summary**

**LPAR Host Capacity Summary Report**  
Study ID: Sample zPCR Study

**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**

LPAR Configuration		Full CPC Capacity (based on usable RCP count)					
Identity	Hardware	GP	zAAP	zIIP	IFL	ICF	Total
#1 	z10 2097-E26 2097-E26/700: GP=10 zAAP=1 zIIP=1 IFL=2 ICF=1	7,116	782	709	1,741	866	11,214
#2 	z10 2097-E40 2817-M15/700: GP=10 zAAP=1 zIIP=1 IFL=2 ICF=1	10,164	1,099	1,034	2,285	1,138	15,720
#3 	z196 2817-M15 2817-M15/700: GP=10 zAAP=1 zIIP=1 IFL=2 ICF=1	10,250	1,114	1,074	2,287	1,138	15,863

**Content Control**

☐ Show Capacity Deltas

☒ Based on "z10 2097-E26"

☐ Incremental

**Show capacity as**

☒ Full CPC

☐ Single-CP

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expressed or implied. You are responsible for the results obtained from your use of this tool.

Position mouse on LPAR configuration to display description

Advanced-Mode Control Panel [F:\...sharelab.zpcr]

File CPcalculator Documentation Help

**Advanced-Mode Capacity Planning Control Panel**

Study ID: Sample zPCR Study

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

- Reference-CPU
  - REF 2094-701 @ 593.00 MIPS
- LSPR Processor Table
  - LSPR General Purpose CPs
  - LSPR IFLs
- LPAR Configurations
  - #1 z10 2097-E26
  - #2 z10 2097-E40
  - #3 z196 2817-M15

Manage Compare Migrate & Analyze QuickStart Guide

z10 2097-E26 10-EC Configuration z10 EC/700 LPAR Host: 2097-E26/700						
Pool CP Type	#1 GP	#2 zAAP	#3 zIIP	#4 IFL	#5 ICF	CPC Total
RCPs	10	1	1	2	1	15
Partitions	4	1	1	2	1	9
LCPs	21	1	1	3	1	27
Capacity	7,116	782	709	1,741	866	11,214

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

Exit zPCR

Save Study

## 3 Ways to Input Data into zPCR

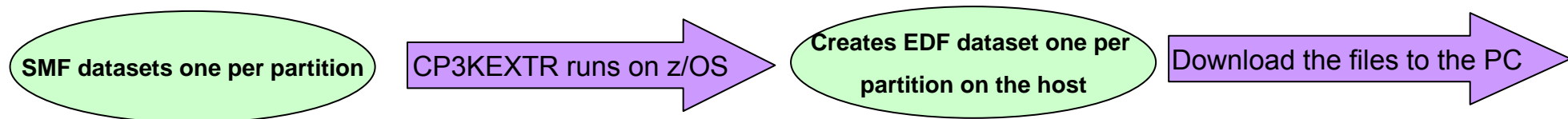
- **1 – Manually**
  - For “what if” when no processor/system exists
  
- **2 – RMF**
  - When processor/system exists
  
- **3 - EDF File**
  - When processor/system exists
  - Recommended because of CPU MF input

# EDF Input for zPCR

## z/OS

Turn on CPU MF to start SMF 113 recording (primary partitions)

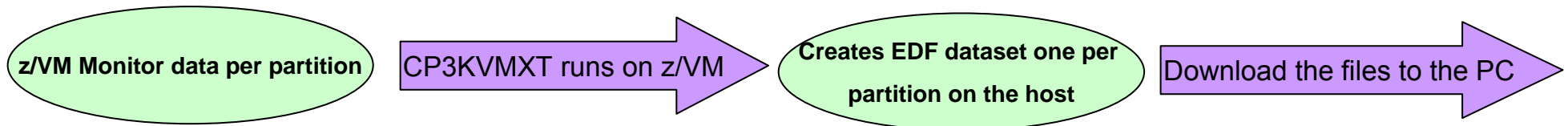
Post process SMF data with CP3KEXTR to produce EDF



## z/VM

Enable Monitor to record CPU MF data (primary partitions)

Post process Monitor data with CP3KVMXT to produce EDF



# z/OS EDF Input

## z/OS on System z

Turn on CPU MF to start SMF 113 recording (primary partitions)

Post process SMF data with CP3KEXTR to produce EDF

Get zPCR CP3KEXTR here: <http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS4229>

## Windows PC with zPCR installed

Download EDF (1 per partition) to PC

In zPCR, Get Host and Partitions from EDF

Load EDF(s)

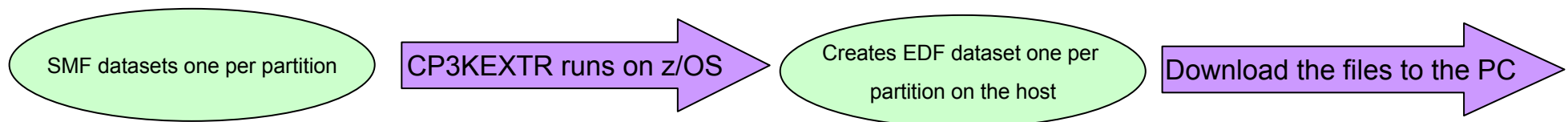
Select a representative interval

Show LPAR Host and its partition configuration

Create LPAR Configuration

Partitions with SMF 113s will assign “CPU MF” workload

Partitions with SMF 74s will show “DASD I/O” workload





# Load the EDF files into zPCR

Get host and partitions  
from EDF file

LPAR Host and Partition Configuration [untitled]

**LPAR Configuration Capacity Planning**  
Based on LSPR Data for IBM System z Processors  
Study ID: Not specified

Description:

LPAR Host Processor	
Processor	Family
Processor	Model
Speed	Setting
Books	Configured
Books	Unused
Maximum	CPs
Maximum	Partitions

CP Type		Assigned	Unused
GP			
zAAP			
zIIP			
IFL			
ICF			
Total			

Logical Partition Configuration					
CP Pool	Partition Mode	No. of Real CPs	No. of Logical Partitions	CPs	LCP:RCP Ratio

**Define LPAR Host Processor**

Create Host and Partitions From

**Define Partitions**

Copy Partitions From

**Capacity Reports**

# Load the EDF files into zPCR – Select an Interval

Select an interval

DASD I/O data available

Sort on GP Pool Utilization

EDF Interval Selection

EDF File Name: I:\zpcr\UGSample.edf

Relative Interval Number	CPC ID	GP Processor Model	Date	Time	Interval Length	Number of Active Partitions	Available Data		Pool 1 GP Pool Utilization
							CPU-MF	DASD	
3.	CECAAAA	2097-713	2010-09-27	11:00:00	01:00:00	4	✓	✓	58.32%
2.	CECAAAA	2097-713	2010-09-27	10:00:00	01:00:00	4	✓	✓	55.56%
6.	CECAAAA	2097-713	2010-09-27	14:00:00	01:00:00	4	✓	✓	52.73%
4.	CECAAAA	2097-713	2010-09-27	12:00:00	01:00:00	4	✓	✓	52.14%
7.	CECAAAA	2097-713	2010-09-27	15:00:00	01:00:00	4	✓	✓	50.64%
5.	CECAAAA	2097-713	2010-09-27	13:00:00	01:00:00	4	✓	✓	49.95%
8.	CECAAAA	2097-713	2010-09-27	16:00:00	01:00:00	4	✓	✓	40.30%
15.	CECAAAA	2097-713	2010-09-27	23:00:00	00:45:00	4	✓	✓	32.37%
9.	CECAAAA	2097-713	2010-09-27	17:00:00	01:00:00	4	✓	✓	29.83%
11.	CECAAAA	2097-713	2010-09-27	19:00:00	01:00:00	4	✓	✓	28.48%

Table View

☐ Show All Pools    Number of intervals: 15

Load EDF    Show Partitions

Click on a row to select interval for which zPCR partition definitions are to be created

CPU MF (SMF 113) data available

# LPAR Configuration from EDF for Chosen Interval

Click "Create LPAR Configuration"

## LPAR Configuration from EDF

z/OS SMF Data Set Name: Sample.SMF.FILE  
 Extract Version: CP3KEXTR08/11/10  
 EDF File Name: I:\zpcr\UGSample.edf  
 Interval #3: Date=2010-09-27 Time=11:00:00 Length=01:00:00  
 CPC ID: CECAAAA; GP Processor Model = 2097-713  
 z10-EC Host = 2097-E26/700 with 13 CPs: GP=13

## Create Active Study

LPAR Host as specified above  
 Partition Configuration as specified below

Copy LP	Partition Identification						Partition Configuration					Additional Info		Workload Assignment Metrics						
	Active	No.	Type	Name	SCP	Assigned Workload	Mode	LCPs	Weight	Weight %	CAP			RNI	Physical Utilization	DASD I/O Rate/Sec	Workload Choice		Method Used	
												CPU-MF	DASD I/O							
<input checked="" type="checkbox"/>	✓	1	GP	LP-01	z/OS-1.11	Average	SHR	13.0	845	84.5%		✓	2.0	0.80	44.33%	4,610.8	Average	Average	CPU-MF	
<input checked="" type="checkbox"/>	✓	2	GP	LP-02	z/OS-1.11	Average	SHR	5.0	120	12.0%					12.86%				Default	
<input checked="" type="checkbox"/>	✓	3	GP	LP-03	z/OS-1.11	Average	SHR	2.0	25	2.5%					0.69%				Default	
<input checked="" type="checkbox"/>	✓	4	GP	LP-04	z/OS-1.11	Average	SHR	2.0	10	1.0%					0.11%				Default	

☒ Remove Parked LCPs from Partition LCP Count

Select All

Select Active

Remove All

Choose Another EDF Interval

DASD I/O Method  
Workload Selection Assistant

Create LPAR Configuration

Note: One or more partitions have "Parked" LCPs. The LCP count for HyperDispatch partitions should be reduced by the number of "Parked" LCPs

Click on "Copy LP" checkbox to select partitions to be copied to the active study

# Output Options

- **Types**

- CSV
- HTML

- **Processed by**

- Spreadsheets (HTML and CSV)
- Word Processors (HTML)
- Browsers (HTML)



# Output Results

Output to  
HTML file

Output to  
CSV file

**Partition Detail Report**  
Graph CPcalculator Documentation

Partition Detail Report  
Based on LSPR Data for IBM System z Processors  
Study ID: Sample zPCR Study

#1 z10 2097-E26  
Description: 10-EC Configuration  
z10 EC/700 Host = 2097-E26/700 with 15 CPs: GP=10 zAAP=1 zIIP=1 IFL=2 ICF=1  
9 Active Partitions: GP=4 zAAP=1 zIIP=1 IFL=2 ICF=1  
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

Include	Partition Identification					Partition Configuration					Partition Capacity	
	No.	Type	Name	SCP	Workload	Mode	LCPs	Weight	Weight %	CAP	Minimum	Maximum
<input checked="" type="checkbox"/>	1	GP	LP-01	z/OS-1.9*	Average	SHR	10	700	53.23%		3,865	7,261
<input checked="" type="checkbox"/>	2	GP	LP-02	z/OS-1.9*	Average	SHR	6	400	30.42%		2,207	4,353
<input checked="" type="checkbox"/>		zAAP	LP-02	z/OS-1.9*	Average	SHR	1	400	100.00%		782	782
<input checked="" type="checkbox"/>	3	GP	LP-03	z/OS-1.9*	High	SHR	4	200	15.21%		968	2,547
<input checked="" type="checkbox"/>		zIIP	LP-03	z/OS-1.9*	High	SHR	1	200	100.00%		709	709
<input checked="" type="checkbox"/>	4	GP	LP-04	z/VM	High/LV	SHR	1	15	1.14%	<input checked="" type="checkbox"/>	76	76
<input checked="" type="checkbox"/>	5	IFL	LP-05	Linux	Average/L	SHR	2	200	88.89%		1,547	1,741
<input checked="" type="checkbox"/>	6	IFL	LP-06	Linux	Average/L	SHR	1	25	11.11%		193	870
<input checked="" type="checkbox"/>	7	ICF	LP-07	CFCC	CFCC	DED	1	n/a			866	866

**Table View Controls**  
Display zAAP/zIIP/IFL Partitions  
☒ With Associated GP ☐ Separate by Pool  
Show GP Pool Specialty Pools  
☒ All Partitions ☒ GP ☒ zAAP ☒ zIIP  
☐ Includes Only ☒ IFL ☒ ICF

**Capacity Summary by Pool**

CP Pool	RCPs	Partitions	LCPs	SHR LCP:RCP	Capacity
GP	10	4	21	2.100	7,116
zAAP	1	1	1	1.000	782
zIIP	1	1	1	1.000	709
IFL	2	2	3	1.500	1,741
ICF	1	1	1	All DED	866
Totals	15	9	27		11,214

Host Summary Modify SCP/Workload LCP Alternatives zAAP/zIIP Loading Calibrate Capacity

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

# Single Spot on the Web to Get More Information

- zPCR Getting Started Page  
<http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS1381>
  - Contains:
    - Downloadable Code
    - zPCR Users Guide
    - External File Layout documentation
    - Links to both CP3KEXTR and CP3KVMXT
    - Link to enabling CPU MF information
  - Technical Support Information
    - Training materials in .avi format (voice over foils)
    - zPCR Demonstration
      - 5 sections (wmv files)
        - > Fundamentals
        - > LPAR planning (basic and Advanced mode)
    - Education Exercises
      - 1 Advanced Mode Exercise for z10 to z196
    - Special Notices and FAQs
- Q&A and defect support are available through email: [zpcr@us.ibm.com](mailto:zpcr@us.ibm.com)



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# System z Social Media

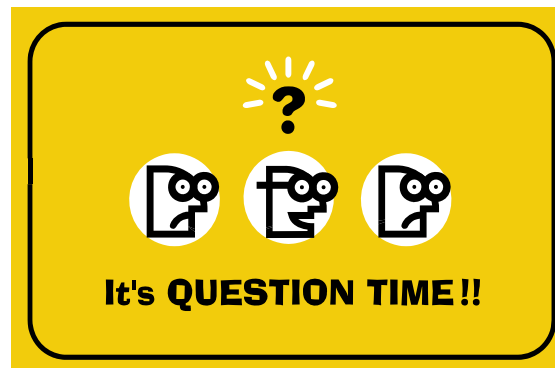
- System z official Twitter handle:
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# Summary

- **zPCR models your unique Processor configuration**
  - Based on LPARS, weights, # of logical processors, workload mix and Specialty Engines
- **Built upon LSPR benchmarks**
- **Using zPCR is Easy**
- **Use zPCR to correctly size your processor**



# Back Up

## In Advanced-Mode, some zPCR functions are not available

- **You cannot return to the Function Selection window**
- **Basic-mode study files cannot be created**
  - Studies will be saved in Advanced-Mode format
- **The MI Reference-CPU cannot be set independently of the Reference-CPU**
  - While viewing the Multi-image table you may set a “temporary” Reference-CPU.



# Acknowledgements

- **Many people contributed to this presentation including:**

John Fitch

Gary King

Jim Shaw

Brad Snyder

Kathy Walsh

# What is new in zPCR C V7.9b...

- **LPAR Configuration Capacity Planning** function:
  - zPCR algorithms for multi-book configurations have been updated.
    - Partition capacity results for multi-book systems will be higher than those from previous zPCR versions.
    - The largest improvements will be seen on 4-book processors, 2 and 3 book processors improvements will be less
- **Advanced-Mode** – The number of LPAR configurations defined has been increased from 6 to 7
- **LSPR Capacity Ratio tables** now default to showing all 5 LSPR workload categories
- **EDF** input for z/VM partitions:
  - CPU-MF counter data from z/VM is now recognized by zPCR
  - Will be used to make the workload assignment for the partition.
- **RNI calculation** – Minor change for z196 and z114 processors
- **Capacity results from zPCR v7.9b should not be compared to those of previous zPCR versions**
  - Capacity comparisons should always be made using the same zPCR version
    - Such comparisons will remain substantially unchanged regardless of the version being used.



Advanced Technical Skills (ATS) North America

# zPCR Capacity Sizing Lab – Part 2 Hands-on Lab

**SHARE - Session 11497**

August 7, 2012



John Burg

Brad Snyder

Materials created by John Fitch and Jim Shaw

IBM



# Agenda

- Lab Exercise Introduction
- Lab Exercise

## Overview of Lab Exercise

### ■ **XYZ Corporation Background**

- Currently has System z10 EC
  - 2097-707 (7 way GCPs)
  - Customer views it as having 5100 MIPS
  - Machine averages 92% busy during peak

### ■ **Plan being developed to replace with z196**

- Must have at least 20%+ additional capacity
  - at least 6150 MIPS



# Lab Exercise – Tasks to Complete

- Task 1 - Create a model of the current LPAR Configuration
- Task 2 - Calibrate the model to XYZ Company's capacity designation
- Task 3 - Save the current study in Advanced-Mode
- Task 4 - Find an appropriate z196 replacement processor
- Task 5 - Model the intended LPAR host using Advanced Mode
- Task 6 - Review the Capacity results and save the Study
  
- Additional
  - Model 1 zIIP in the proposed configuration
  
- Review Rename function

*The purpose of this lab is to enable familiarization and skill in executing zPCR Advanced Mode, and it may not necessarily reflect capacity sizing best practices*