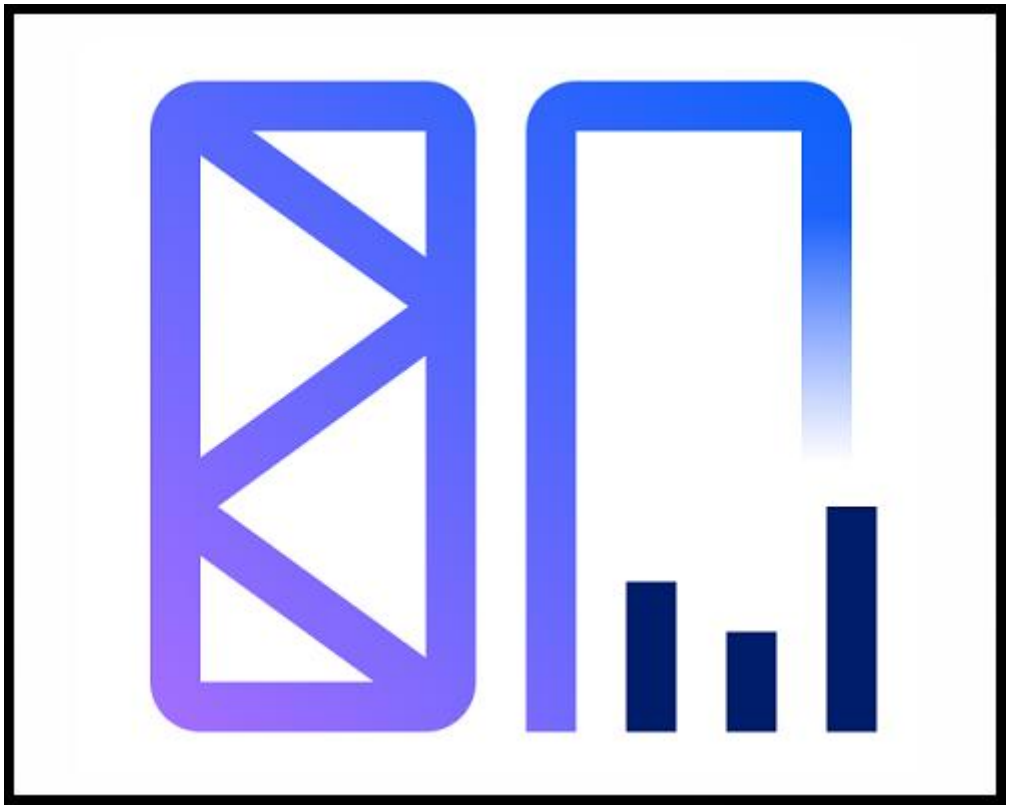
IBM z Processor Capacity Reference (IBM zPCR)

IBM zPCR Familiarization Exercise



IBM zPCR Version 9.7.5

zPCR 975 Familiarization Exercise 2025e06.docx
October 16, 2025

IBM PCR Capacity Sizing Exercise

Objective

You will use IBM zPCR (**zPCR**) to define a current LPAR configuration and then project the capacity expectation for an upgrade to newer technology. The capacity results will then be used to determine if the upgrade model is adequate to support all of the work, and to determine if the amount of CP resource available to each partition is adequate to support that partition's workload with the anticipated growth applied.

Problem

XYZ Corporation currently has a **z15** (**8561-707**) installed, which based on their last **zPCR** study, as having **12,447 MIPS** of usable capacity. The 8561-707 is currently averaging **100% busy** during peak processing periods. The workload environment includes 8 logical partitions, all running z/OS on General Purpose CPs as shown in the table below.

Partition Name	LP mode	LCPs	Weight	Capped	SCP / Workload
1 CICSA	SHR	7	340	No	z/OS-2.4 Average
2 BATCHA	SHR	7	195	No	z/OS-2.4 Average
3 BATCHB	SHR	2	32	No	z/OS-2.4 Average
4 TESTB	SHR	2	12	No	z/OS-2.4 Average
5 TESTIMS	SHR	5	36	No	z/OS-2.4 Average
6 CICSB	SHR	7	297	No	z/OS-2.4 Average
7 IMSA	SHR	5	73	No	z/OS-2.4 Average
8 TESTCICS	SHR	2	15	No	z/OS-2.4 Average

A plan is being developed to **replace the current z15 with a newer technology IBM z17 (z17) processor**. The specific model chosen must provide at least 34**% additional capacity**, or **16,679 MIPS** (i.e., **12,447 MIPS x 1.34**). The current configuration is to be moved to the new processor with the partitions and their workloads continuing as today. The corporation has turned on **CPU MF** counters and has collected **SMF 113** data. They ran **CP3KEXTR** to create an EDF file for the CICSA partition containing data from 2020-02-03. The data spans from 8:00 AM through 12:00 PM using 15-minute intervals.

In addition, the corporation is looking at adding new workload to IFL partitions running **Linux on IBM Z** under z/VM and associating zIIP CPs with the z/OS CICSA and CICSB partitions. They are considering activating SMT on the z17 for both the IFL and zIIP LCPs.

Overview

Here are the 7 primary tasks that comprise this **zPCR** familiarization exercise, addressing the planned changes described above.

*** The actual Lab starts on the next page ***

Note that zPCR version 9.7.5 or later is required for this exercise

Configure z17 replacement for the current z15

- Task-1: Initialize zPCR.
- Task-2: Create the current LPAR configuration from EDF.
- Task-3: Rename current LPAR configuration and review capacity.
- Task-4: Save the zPCR study.
- Task-5: Find an appropriate z17 replacement processor.
- Task-6: Model the intended z17 upgrade.
- Task-7: Review capacity results and save the study.

Upgrade z17 replacement

- Task-8: Add zIIP and IFL CPs and configure partitions to exploit them.
- Task-9: Activate SMT for zIIP and IFL logical CPs.
- Task-10: Review final z17 capacity results.

Additional views of the intended z17 LPAR host

- Task-11: Review additional z17 perspectives.

Notes concerning using zPCR:

When instructed to **Return**, the  icon should be used.

The **Double Return**  icon may be used to close multiple open windows, returning directly to the ***Control Panel*** window.

If you need help understanding acronyms used in zPCR, press  (the Help icon). Go down to the Definition of Terms chapter (next to last one), and browse through the terms.

This exercise has been validated with zPCR 9.7.5, made available 10/28/2025.

Task-1: **Initialize zPCR**

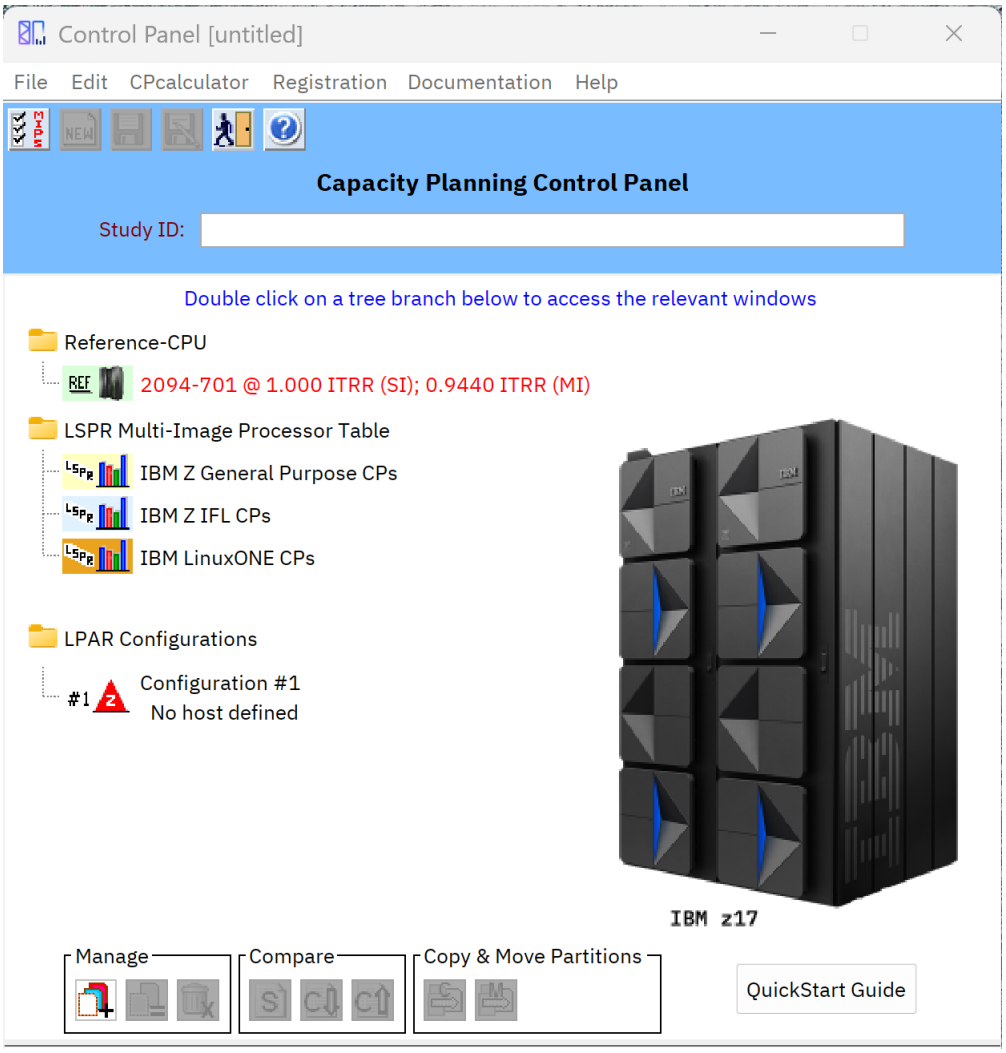
In this task you will set up **zPCR** for this exercise.

Note: **zPCR**'s default ***Reference-CPU*** setting is the **2094-701 rated at 1.00**. In order to have capacity results represented with typical MIPS values, we need to set the ***Reference-CPU*** to the **2094-701 rated at 593 MIPS**.

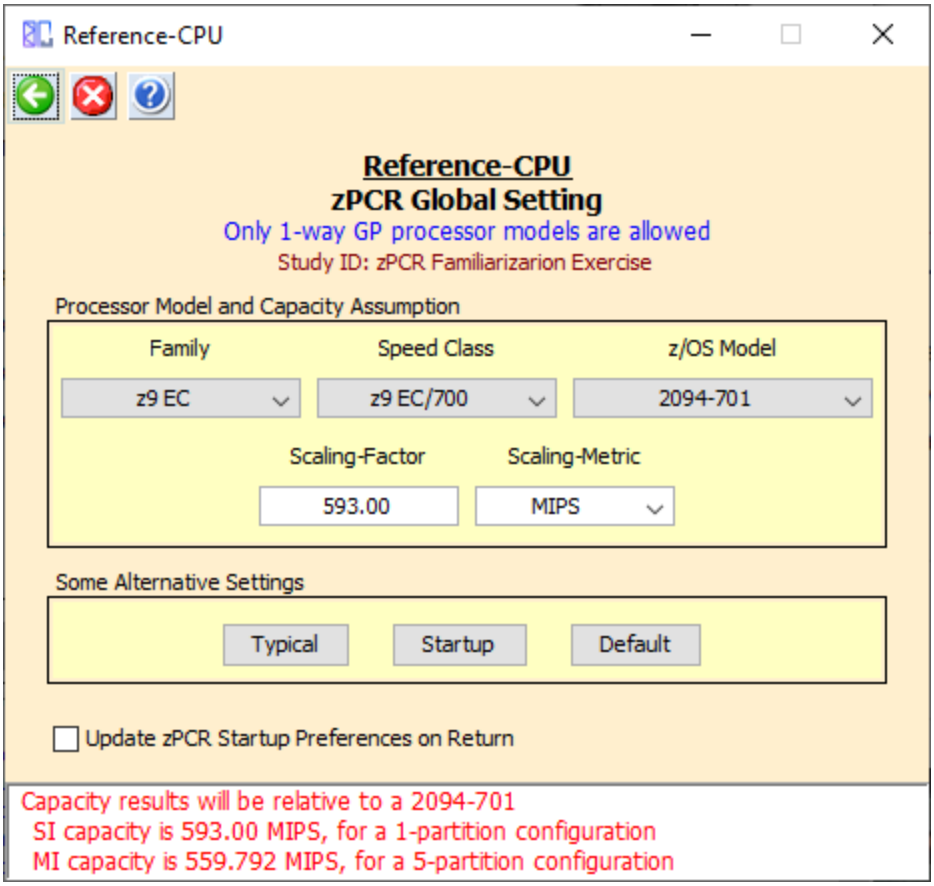
Analysis Steps

1. Start **zPCR**. Once the ***Logo*** window stages, you will be viewing the ***Control Panel*** window.

Control Panel Window



2. On the ***Control Panel*** window double click REF **2094-701 @ 1.000 ITRR (SI)**. to change the **Reference-CPU** scaling-factor and scaling-metric. The ***Reference-CPU*** window will appear.



a) Click **Typical** to set the ***Reference-CPU*** to **2094-701 @ 593 MIPS**.
   Note: Any IBM Z 1-way processor may be selected with any reasonable scaling-factor/metric. **Typical** establishes the IBM recommended setting which is widely accepted in the Industry.

b) Check the box named **Update zPCR Startup Preferences on Return**

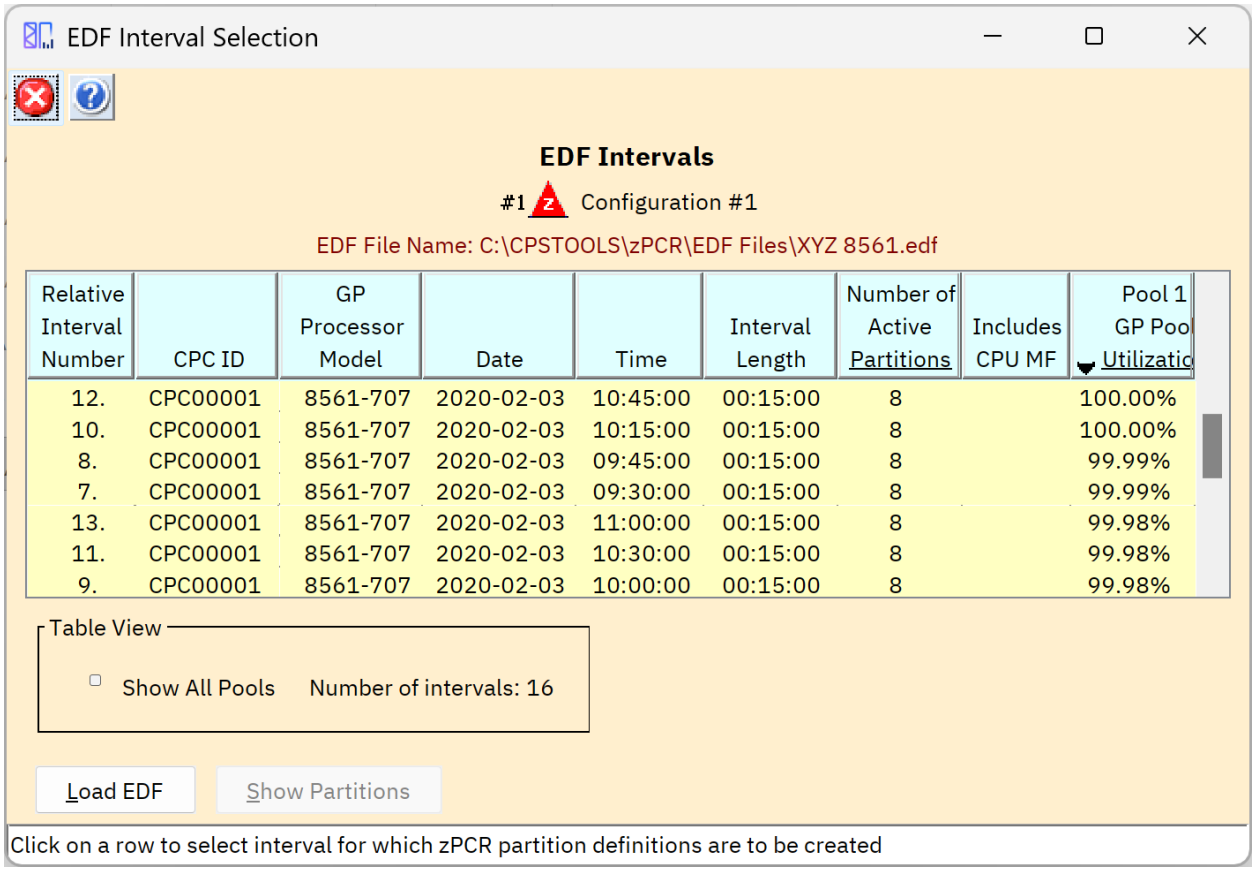
c) Click **Return**.

Task-2: **Create the current LPAR configuration from EDF**

Load the current z15 LPAR configuration into **zPCR** using the EDF supplied with the tool.

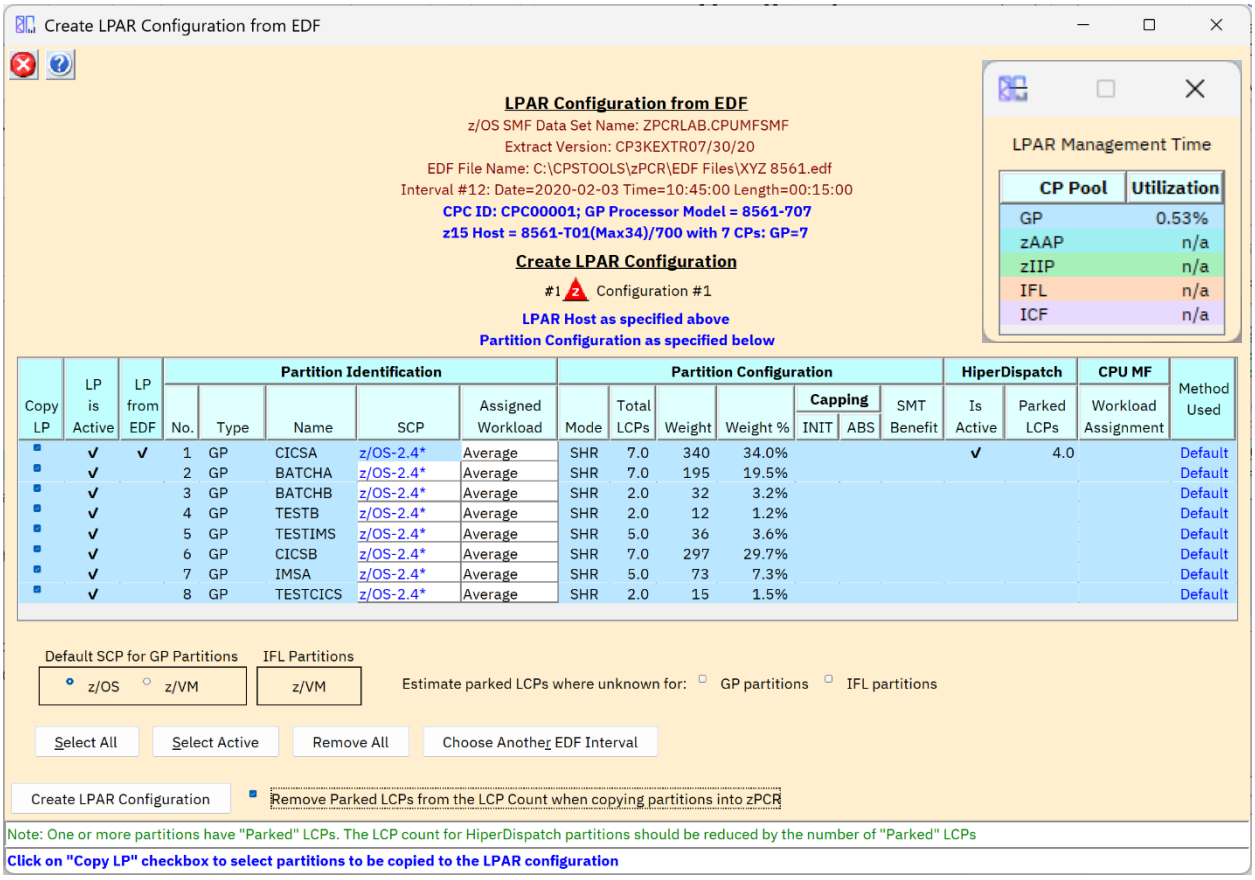
Analysis Steps

1. Sample EDF files are provided with zPCR. Using **This PC** (**Finder** on Mac), open **Documents** > **zPCR Defaults** > **EDF Files**. Drag **XYZ 8561.edf** from the folder to **Configuration #1**. This will open the ***EDF Interval Selection*** window.



2. Sort the intervals on utilization by clicking the **Pool 1 GP Pool Utilization** column header.

3. Select Interval #12 and double click to open the ***Create LPAR Configuration from EDF*** window (close the notice concerning ***Estimating Parked LCPs***).



4. Check the "**Remove Parked LCPs …**" check box at the bottom of the window,

5. Click the **Create LPAR Configuration** button to transfer the LPAR host processor and its 8 GP partitions to the active **zPCR** study.

6. Click **OK** to dismiss the ***zPCR EDF Copy Partitions*** transfer dialog.

   Note: Partition **CICSA** has 7 LCPs defined, but 4 are parked (not active). Therefore, when the configuration is read into zPCR it will be defined with 3 LCPs. Since **CICSA** is the only one with EDF available, it is the only partition where the LCP count will be adjusted.

Control Panel Window

Control Panel [untitled]

File Edit CPcalculator Registration Documentation Help

Capacity Planning Control Panel

Study ID: zPCR Familiarization Exercise

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

- Reference-CPU
  - 2094-701 @ 593.00 MIPS (SI); 559.792 MIPS (MI)
- LSPR Multi-Image Processor Table
  - IBM Z General Purpose CPs
  - IBM Z IFL CPs
  - IBM LinuxONE CPs
- LPAR Configurations
  - #1 Configuration #1 z15-T01(Max34) 8561-707

IBM z17

Manage | Compare | Copy & Move Partitions | QuickStart Guide

#1	Configuration #1 Created from EDF XYZ 8561.edf for CPC00001 interval #12: Date=2020-02-03 Time=10:45:00 Length=00:15:00 z15/700 LPAR Host: 8561-T01(Max34)/700					
Pool CP Type	**#1 GP**	**#2 zAAP**	**#3 zIIP**	**#4 IFL**	**#5 ICF**	**CPC Total**
RCPs	7	0	0	0	0	7
Partitions	8	0	0	0	0	8
LCPs	33	0	0	0	0	33
Capacity	12,447	n/a	n/a	n/a	n/a	12,447

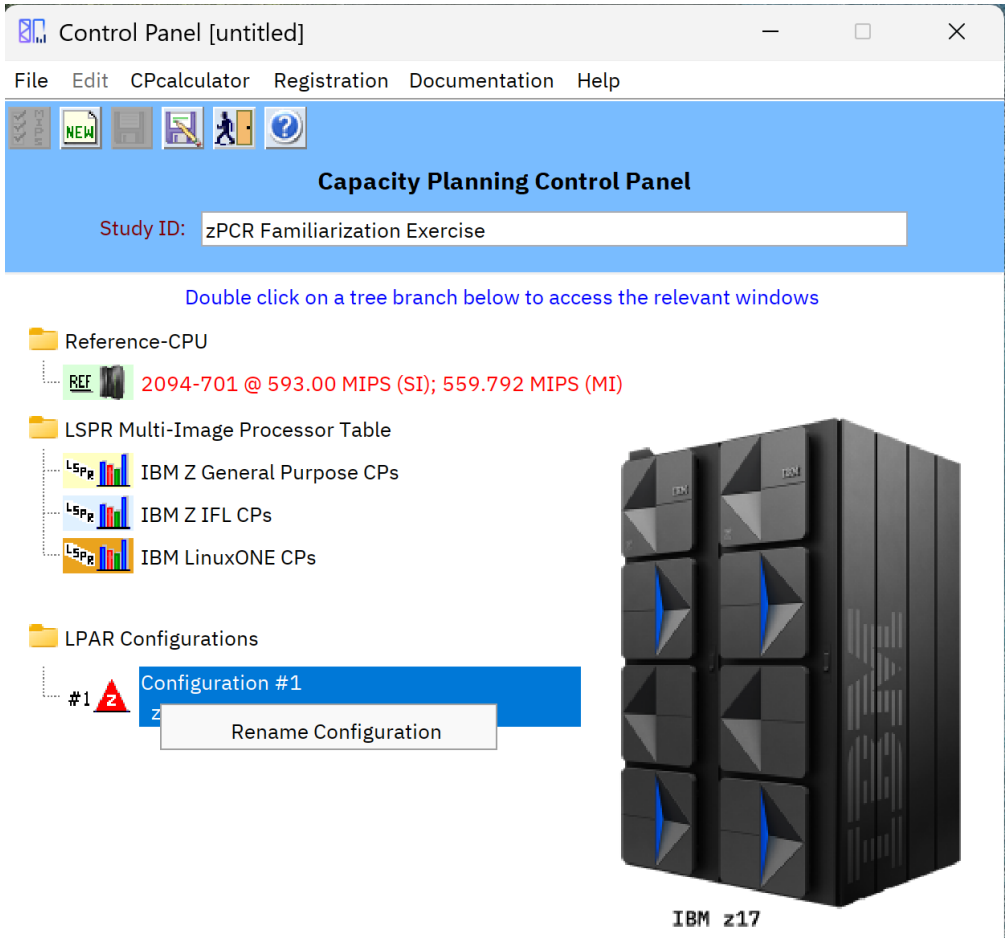
Task-3: **Rename current LPAR configuration and review capacity**

Rename the LPAR configuration and review the capacity assessment.

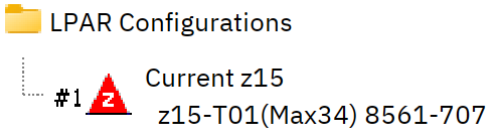
Analysis Steps

1. Rename "**Configuration #1**" to "**Current z15**". On the ***Control Panel*** window, Single-click **#1 Configuration #1** to select it.

2. Right click on the selected area to reveal the **Rename Configuration** popup button.



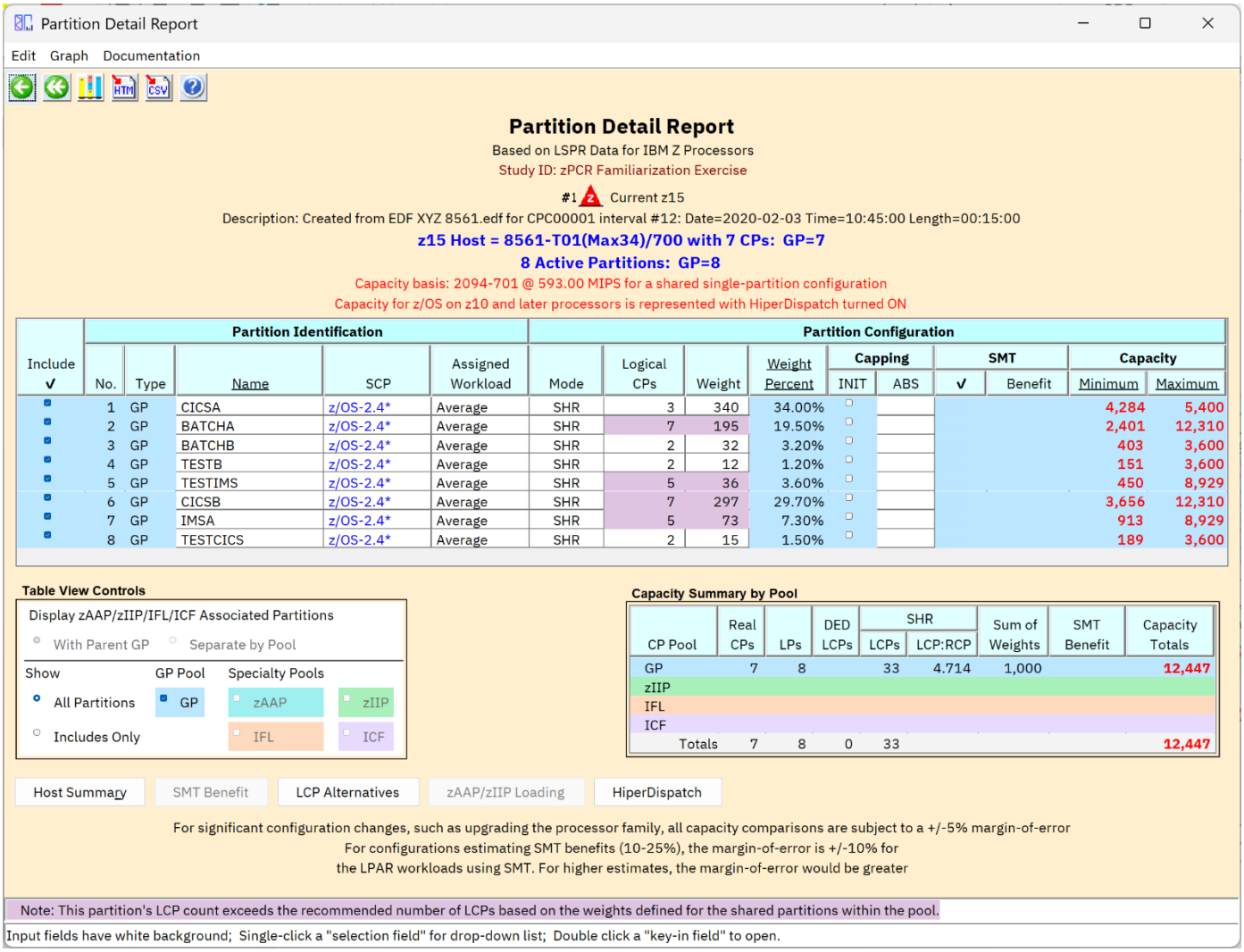
3. Click the **Rename Configuration** button, key in the LPAR configuration name that you wish to use, and press **Enter**.



Note: This rename operation will also be used in subsequent steps.

4. Double-click **#1 Current z15** to open the ***LPAR Host and Partition Configuration*** window for the LPAR configuration.

5. Click **Partition Detail** in the **Capacity *Reports*** group box to open the ***Partition Detail Report*** window. This window will reveal the total GP capacity available as **12,447 MIPS**.



Partition Detail Report

Edit Graph Documentation

Partition Detail Report

Based on LSPR Data for IBM Z Processors

Study ID: zPCR Familiarization Exercise

#1 Current z15

Description: Created from EDF XYZ 8561.edf for CPC00001 interval #12: Date=2020-02-03 Time=10:45:00 Length=00:15:00

z15 Host = 8561-T01(Max34)/700 with 7 CPs: GP=7

8 Active Partitions: GP=8

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								
	No.	Type	Name	SCP	Assigned Workload	Mode	Logical CPs	Weight	Weight Percent	Capping INIT	Capping ABS	SMT ✓	SMT Benefit	Capacity Minimum	Capacity Maximum
■	1	GP	CICSA	z/OS-2.4*	Average	SHR	3	340	34.00%					4,284	5,400
■	2	GP	BATCHA	z/OS-2.4*	Average	SHR	7	195	19.50%					2,401	12,310
■	3	GP	BATCHB	z/OS-2.4*	Average	SHR	2	32	3.20%					403	3,600
■	4	GP	TESTB	z/OS-2.4*	Average	SHR	2	12	1.20%					151	3,600
■	5	GP	TESTIMS	z/OS-2.4*	Average	SHR	5	36	3.60%					450	8,929
■	6	GP	CICSB	z/OS-2.4*	Average	SHR	7	297	29.70%					3,656	12,310
■	7	GP	IMSA	z/OS-2.4*	Average	SHR	5	73	7.30%					913	8,929
■	8	GP	TESTCICS	z/OS-2.4*	Average	SHR	2	15	1.50%					189	3,600

Table View Controls

Display zAAP/zIIP/IFL/ICF Associated Partitions

With Parent GP Separate by Pool

Show: All Partitions / Includes Only

GP Pool: GP

Specialty Pools: zAAP, zIIP, IFL, ICF

Capacity Summary by Pool

CP Pool	Real CPs	LPs	DED LCPs	SHR LCPs	SHR LCP:RCP	Sum of Weights	SMT Benefit	Capacity Totals
GP	7	8		33	4.714	1,000		12,447
zIIP								
IFL								
ICF								
Totals	7	8	0	33				12,447

Host Summary | SMT Benefit | LCP Alternatives | zAAP/zIIP Loading | HiperDispatch

For significant configuration changes, such as upgrading the processor family, all capacity comparisons are subject to a +/-5% margin-of-error
For configurations estimating SMT benefits (10-25%), the margin-of-error is +/-10% for
the LPAR workloads using SMT. For higher estimates, the margin-of-error would be greater

Note: This partition's LCP count exceeds the recommended number of LCPs based on the weights defined for the shared partitions within the pool.

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

Task-4: **Save the zPCR study**

Save the **zPCR** study for future reference.

Analysis Steps

1. Click **Double Return** to close the ***LPAR Configuration*** windows and return to the ***Control Panel*** window.

2. From the menu-bar on the ***Control Panel*** window, click **File**→**Save as**, to save your LPAR definitions for the current LPAR host processor (e.g., **Lab Task-4.zpcr**).

Note: A saved study may be reloaded into a subsequent zPCR invocation. All settings for the Reference-CPU, the LPAR host, and its defined partitions will be restored. The study can serve for future reference or provide an opportunity to consider changes.

Task-5: **Find an appropriate z17 replacement processor**

Browse the ***LSPR Multi-Image LSPR Capacity Ratios*** table to find an **IBM z17** processor that can provide the required capacity increment using the Average workload category.

Analysis Steps

From the window

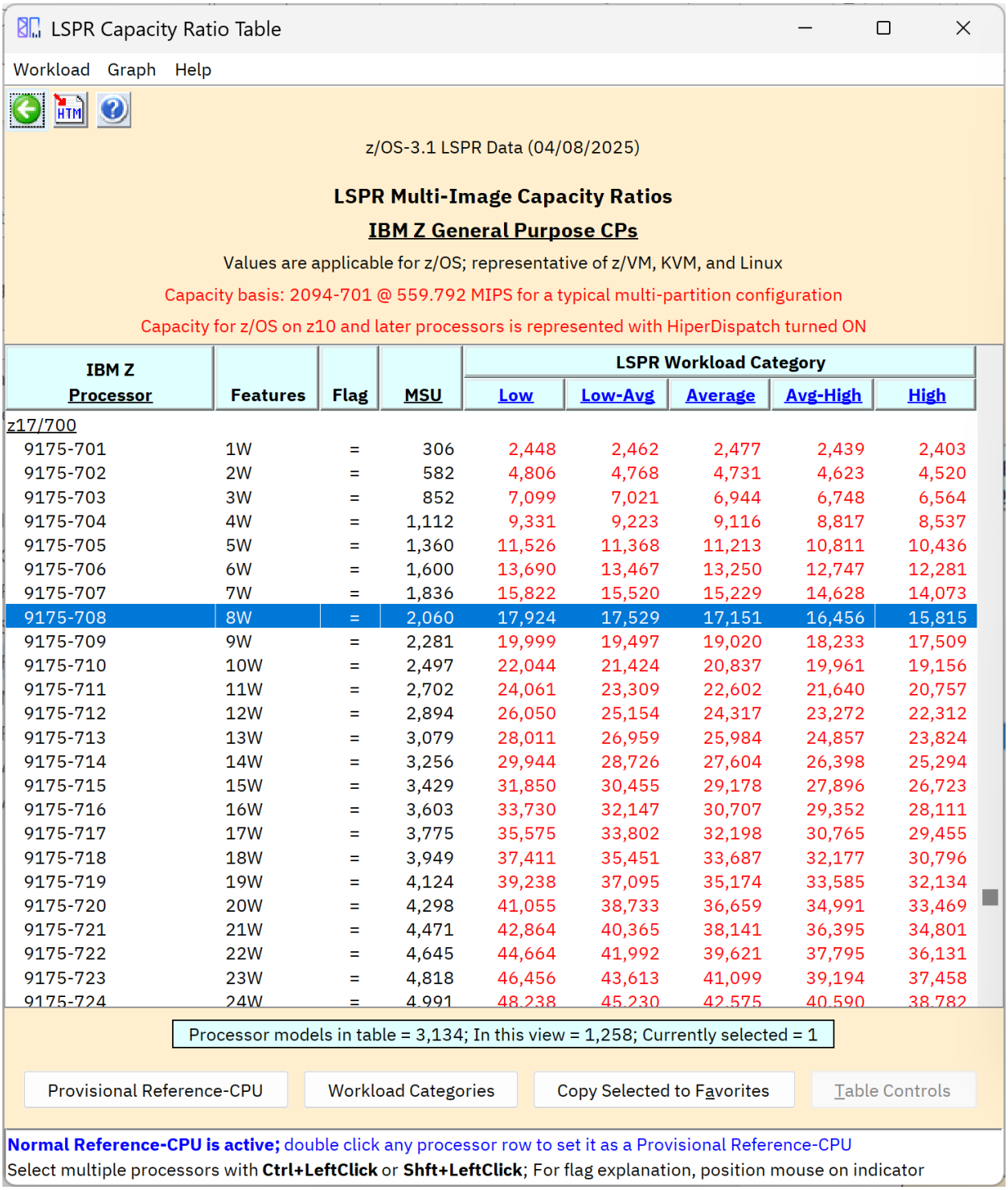
1. Double click  **IBM Z General Purpose CPs** to open the ***LSPR Multi-Image Processor Capacity Ratios*** table.

2. Find the smallest **IBM z17** processor that can provide the required **16,679 MIPS** (tip: right click the table for a list of the ***Families***, select ***Scroll to IBM***, select ***z17 (9175)***, and then select ***z17/700***).

   For the purposes of this exercise, choose the **9175-708**, which appears to have just a bit more capacity than we require, (e.g., **17,151 MIPS** for ***Average***). **Remember that capacity values in the multi-image table represent typical (or average) partition configurations, and therefore are only generalizations of capacity**.

3. Click **Return** to go back to the ***Control Panel*** window.

LSPR Multi-Image Capacity Ratio Table



LSPR Capacity Ratio Table

Workload Graph Help

z/OS-3.1 LSPR Data (04/08/2025)

LSPR Multi-Image Capacity Ratios

IBM Z General Purpose CPs

Values are applicable for z/OS; representative of z/VM, KVM, and Linux

Capacity basis: 2094-701 @ 559.792 MIPS for a typical multi-partition configuration

Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

IBM Z Processor	Features	Flag	MSU	LSPR Workload Category				
				Low	Low-Avg	Average	Avg-High	High
z17/700								
9175-701	1W	=	306	2,448	2,462	2,477	2,439	2,403
9175-702	2W	=	582	4,806	4,768	4,731	4,623	4,520
9175-703	3W	=	852	7,099	7,021	6,944	6,748	6,564
9175-704	4W	=	1,112	9,331	9,223	9,116	8,817	8,537
9175-705	5W	=	1,360	11,526	11,368	11,213	10,811	10,436
9175-706	6W	=	1,600	13,690	13,467	13,250	12,747	12,281
9175-707	7W	=	1,836	15,822	15,520	15,229	14,628	14,073
9175-708	8W	=	2,060	17,924	17,529	17,151	16,456	15,815
9175-709	9W	=	2,281	19,999	19,497	19,020	18,233	17,509
9175-710	10W	=	2,497	22,044	21,424	20,837	19,961	19,156
9175-711	11W	=	2,702	24,061	23,309	22,602	21,640	20,757
9175-712	12W	=	2,894	26,050	25,154	24,317	23,272	22,312
9175-713	13W	=	3,079	28,011	26,959	25,984	24,857	23,824
9175-714	14W	=	3,256	29,944	28,726	27,604	26,398	25,294
9175-715	15W	=	3,429	31,850	30,455	29,178	27,896	26,723
9175-716	16W	=	3,603	33,730	32,147	30,707	29,352	28,111
9175-717	17W	=	3,775	35,575	33,802	32,198	30,765	29,455
9175-718	18W	=	3,949	37,411	35,451	33,687	32,177	30,796
9175-719	19W	=	4,124	39,238	37,095	35,174	33,585	32,134
9175-720	20W	=	4,298	41,055	38,733	36,659	34,991	33,469
9175-721	21W	=	4,471	42,864	40,365	38,141	36,395	34,801
9175-722	22W	=	4,645	44,664	41,992	39,621	37,795	36,131
9175-723	23W	=	4,818	46,456	43,613	41,099	39,194	37,458
9175-724	24W	=	4,991	48,238	45,230	42,575	40,590	38,782

Processor models in table = 3,134; In this view = 1,258; Currently selected = 1

Provisional Reference-CPU | Workload Categories | Copy Selected to Favorites | Table Controls

Normal Reference-CPU is active; double click any processor row to set it as a Provisional Reference-CPU

Select multiple processors with **Ctrl+LeftClick** or **Shft+LeftClick**; For flag explanation, position mouse on indicator

Task-6: **Model the intended z17 upgrade**

Using the current z15 LPAR configuration as a starting point, we will transfer it to the new **IBM z17** processor, making any necessary adjustments to the partition definitions.

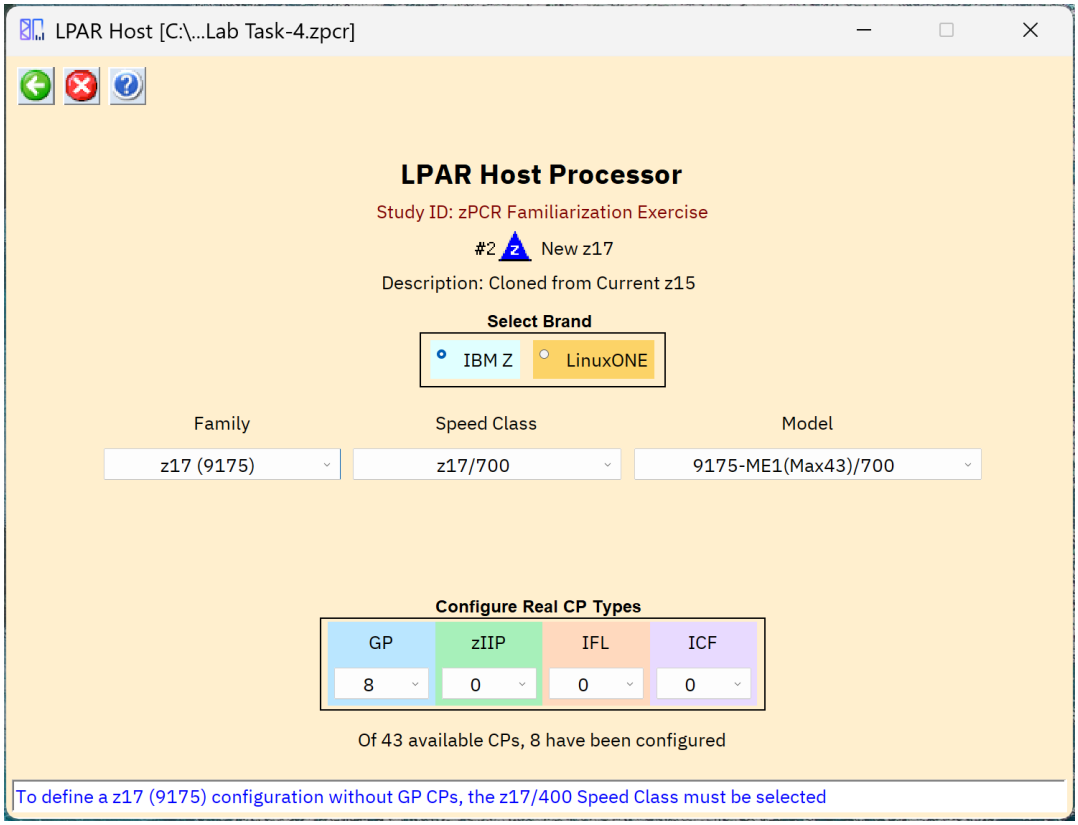
Analysis Steps

1. Single-click **#1 Current z15** on the ***Control Panel*** window to select it.

2. Click the **Clone** toolbar button. **#2** LPAR configuration is created as an exact copy of the 1st. Rename it to **New z17** (see Task 3 if you need be reminded how to rename).

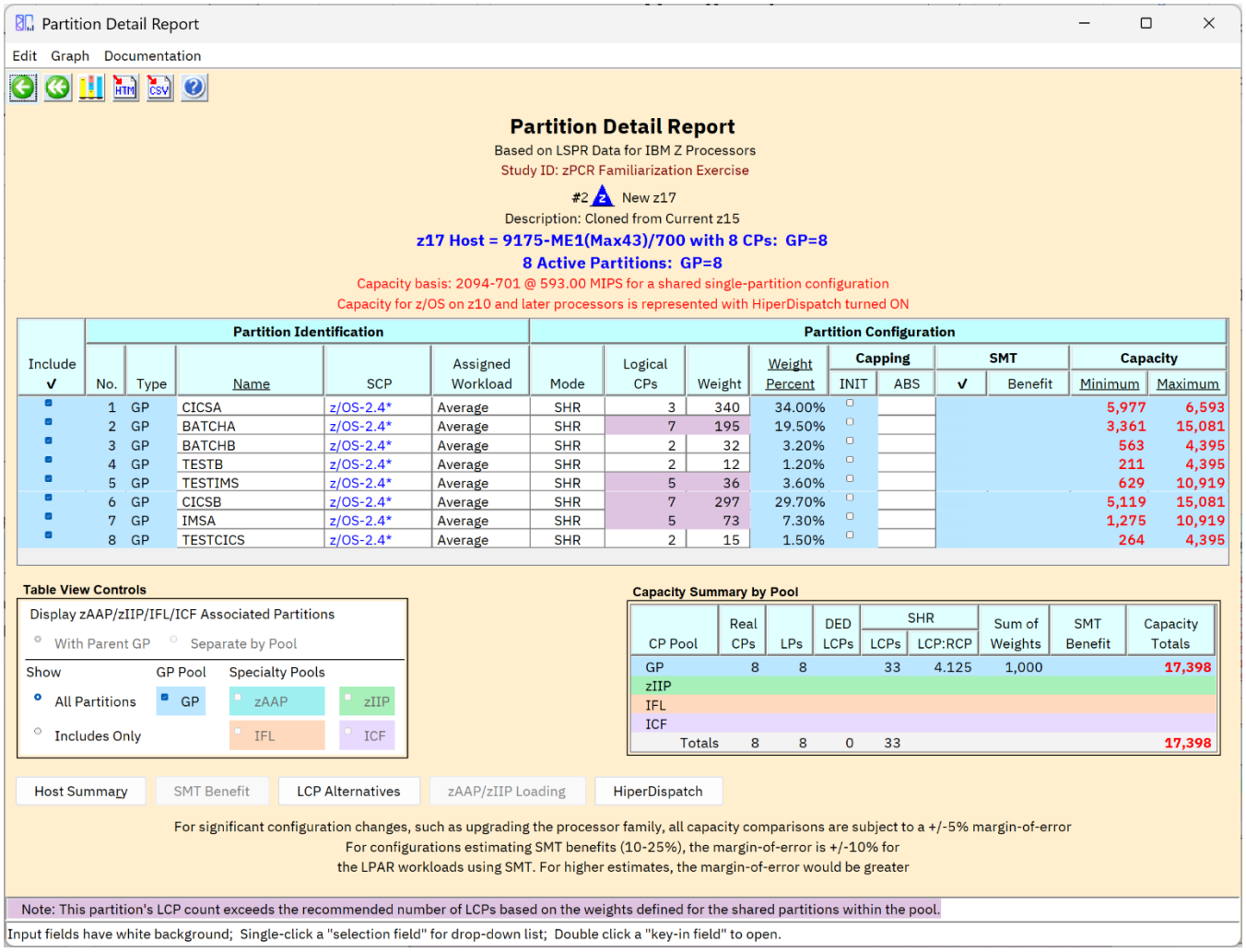
3. Double-click **#2 New z17** to open the ***LPAR Host and Partition Configuration*** window for that LPAR configuration.

4. Click **Specify Host** to open the ***LPAR Host*** window.
   a) In the ***Select Brand*** group box, choose **IBM Z**.
   b) Set the ***Family*** to **z17 (9175)**
   c) Set the ***Speed Class*** to **z17/700**
   d) Set the ***Model*** to **9175-ME1(Max43)/700** (this model has a maximum of 43 CPs).
   e) Set ***General Purpose CPs*** to **8** (recognized as a **9175-708**). There are no other CP types planned at this time.



   f) Click **Return**.

5. Click **Partition Detail** in the **Capacity Reports** group box to view the ***Partition Detail Report*** window for the new z17 LPAR host.



Partition Detail Report

Edit Graph Documentation

Partition Detail Report

Based on LSPR Data for IBM Z Processors

Study ID: zPCR Familiarization Exercise

#2 New z17

Description: Cloned from Current z15

z17 Host = 9175-ME1(Max43)/700 with 8 CPs: GP=8

8 Active Partitions: GP=8

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								
	No.	Type	Name	SCP	Assigned Workload	Mode	Logical CPs	Weight	Weight Percent	Capping INIT	Capping ABS	SMT ✓	SMT Benefit	Capacity Minimum	Capacity Maximum
☑	1	GP	CICSA	z/OS-2.4*	Average	SHR	3	340	34.00%	☐				5,977	6,593
☑	2	GP	BATCHA	z/OS-2.4*	Average	SHR	7	195	19.50%	☐				3,361	15,081
☑	3	GP	BATCHB	z/OS-2.4*	Average	SHR	2	32	3.20%	☐				563	4,395
☑	4	GP	TESTB	z/OS-2.4*	Average	SHR	2	12	1.20%	☐				211	4,395
☑	5	GP	TESTIMS	z/OS-2.4*	Average	SHR	5	36	3.60%	☐				629	10,919
☑	6	GP	CICSB	z/OS-2.4*	Average	SHR	7	297	29.70%	☐				5,119	15,081
☑	7	GP	IMSA	z/OS-2.4*	Average	SHR	5	73	7.30%	☐				1,275	10,919
☑	8	GP	TESTCICS	z/OS-2.4*	Average	SHR	2	15	1.50%	☐				264	4,395

Table View Controls

Display zAAP/zIIP/IFL/ICF Associated Partitions

With Parent GP Separate by Pool

Show: All Partitions / Includes Only

GP Pool: GP

Specialty Pools: zAAP, zIIP, IFL, ICF

Capacity Summary by Pool

CP Pool	Real CPs	LPs	DED LCPs	SHR LCPs	SHR LCP:RCP	Sum of Weights	SMT Benefit	Capacity Totals
GP	8	8		33	4.125	1,000		17,398
zIIP								
IFL								
ICF								
Totals	8	8	0	33				17,398

Host Summary | SMT Benefit | LCP Alternatives | zAAP/zIIP Loading | HiperDispatch

For significant configuration changes, such as upgrading the processor family, all capacity comparisons are subject to a +/-5% margin-of-error

For configurations estimating SMT benefits (10-25%), the margin-of-error is +/-10% for the LPAR workloads using SMT. For higher estimates, the margin-of-error would be greater

Note: This partition's LCP count exceeds the recommended number of LCPs based on the weights defined for the shared partitions within the pool.

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

Task-7: **Review capacity results and save the study**

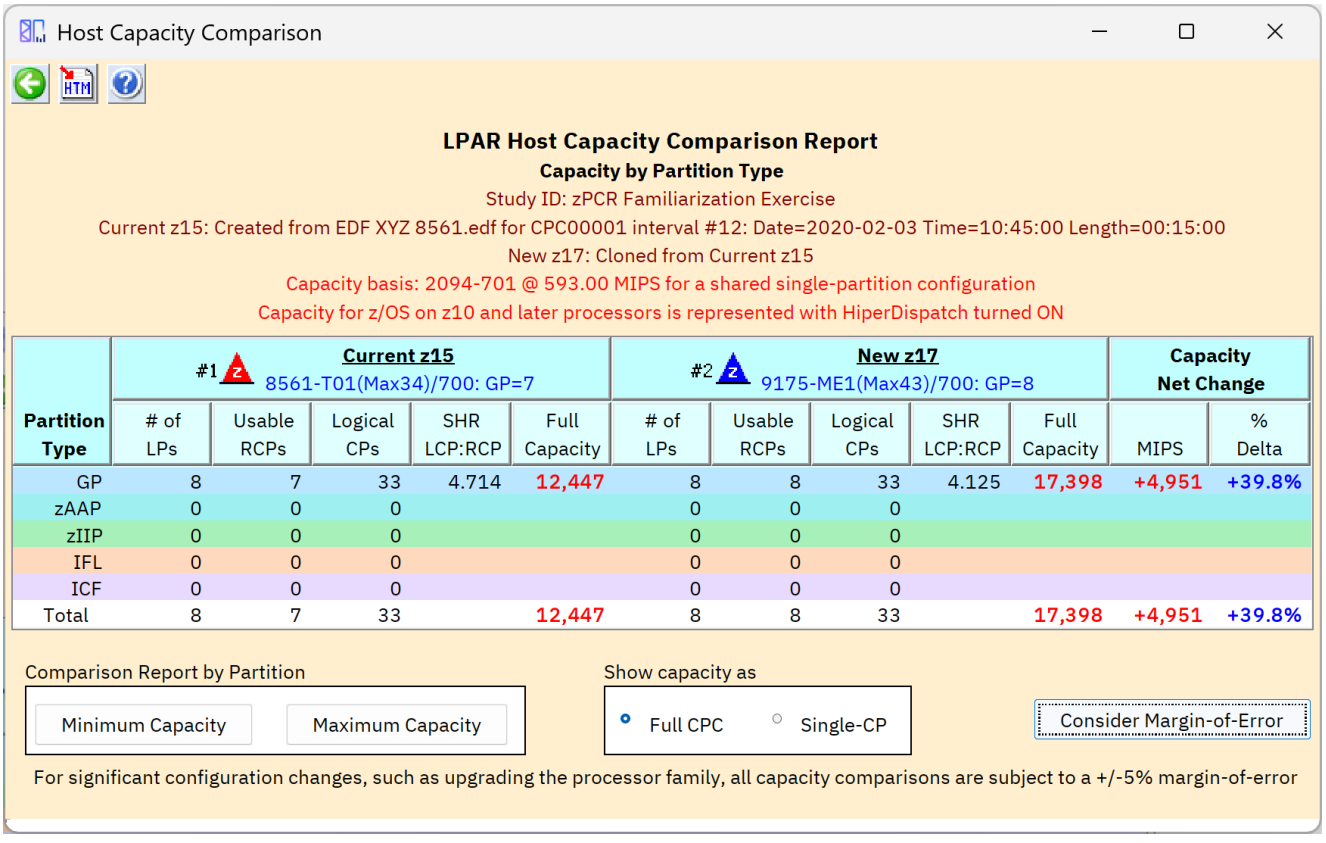
Using the capacity results for this new LPAR host, determine if we realized the desired 34% capacity increase (**16,679 MIPS**), for the overall host and for each individual partition.

Analysis Steps

1. On the ***Partition Detail Report*** window, the overall effective capacity for the **z17 9175-708** is **17,398 MIPS** for this LPAR configuration. The effective capacity for the **z15 8561-707** is **12,447 MIPS** (see Current 8561-707).

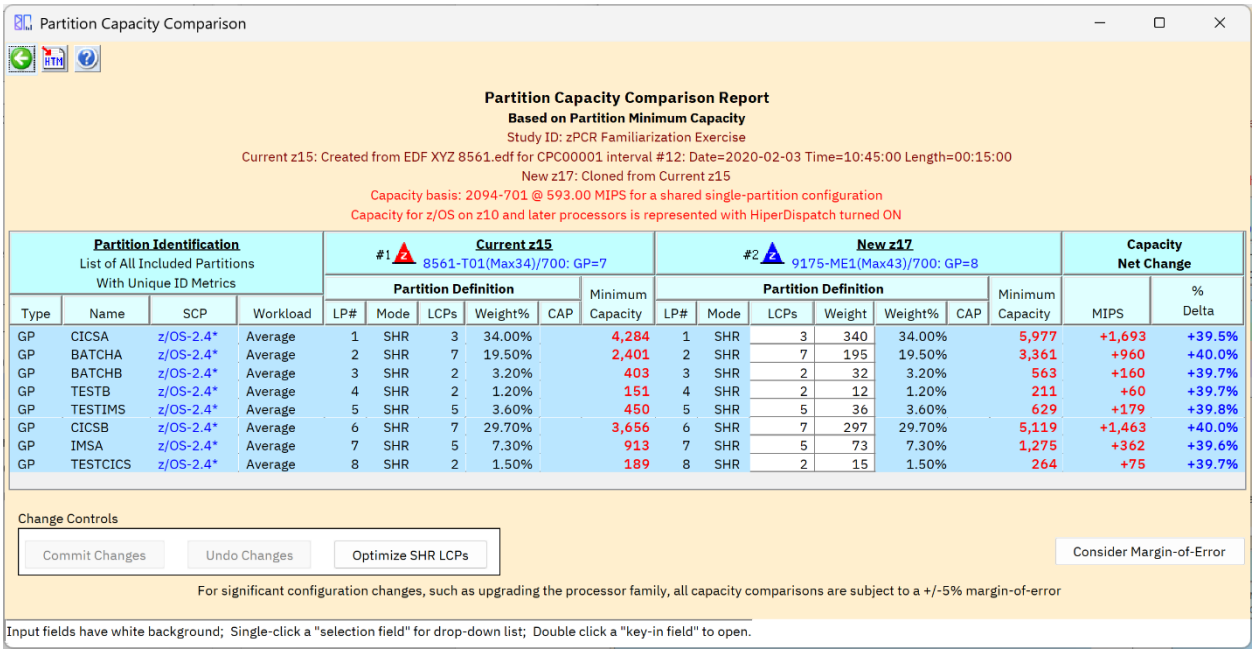
2. Click **Double Return** to close the ***LPAR Configuration*** windows and return to the ***Control Panel*** window.

3. On the ***Control Panel*** window, select the two configurations. Click on one, press the **Ctrl** key (**CMD** on Mac) and click on the other. Then click the **Compare** tool bar icon. The ***Host Capacity Comparison*** window presents a CPC oriented summary of the two LPAR host configurations. The first LPAR host is shown on the left, and the second is shown on the right. The partition types (CP pools) are listed in separate rows; the metrics presented are their combined values representing the number of partitions, the number of RCPs, the number of LCPs and the resulting capacity.

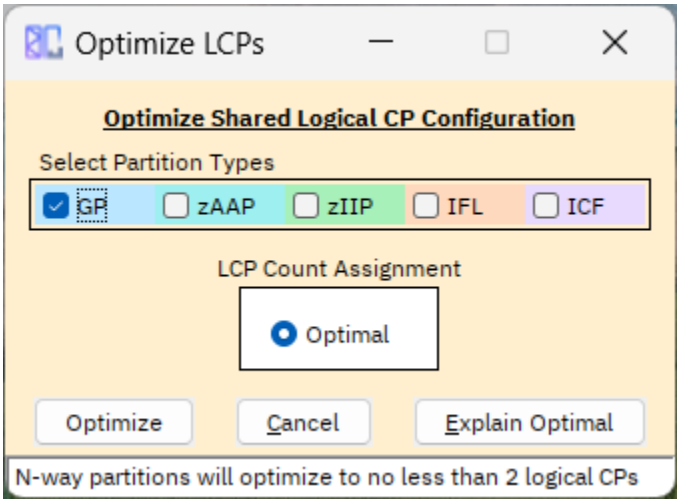


Partition Type	#1 Current z15 8561-T01(Max34)/700: GP=7 # of LPs	Usable RCPs	Logical CPs	SHR LCP:RCP	Full Capacity	#2 New z17 9175-ME1(Max43)/700: GP=8 # of LPs	Usable RCPs	Logical CPs	SHR LCP:RCP	Full Capacity	Capacity Net Change MIPS	% Delta
GP	8	7	33	4.714	12,447	8	8	33	4.125	17,398	+4,951	+39.8%
zAAP	0	0	0			0	0	0				
zIIP	0	0	0			0	0	0				
IFL	0	0	0			0	0	0				
ICF	0	0	0			0	0	0				
Total	8	7	33		12,447	8	8	33		17,398	+4,951	+39.8%

4. Click **Minimum Capacity** in the ***Comparison Report by Partition*** group box. Note that all of the partitions see an increase of 34% or more.



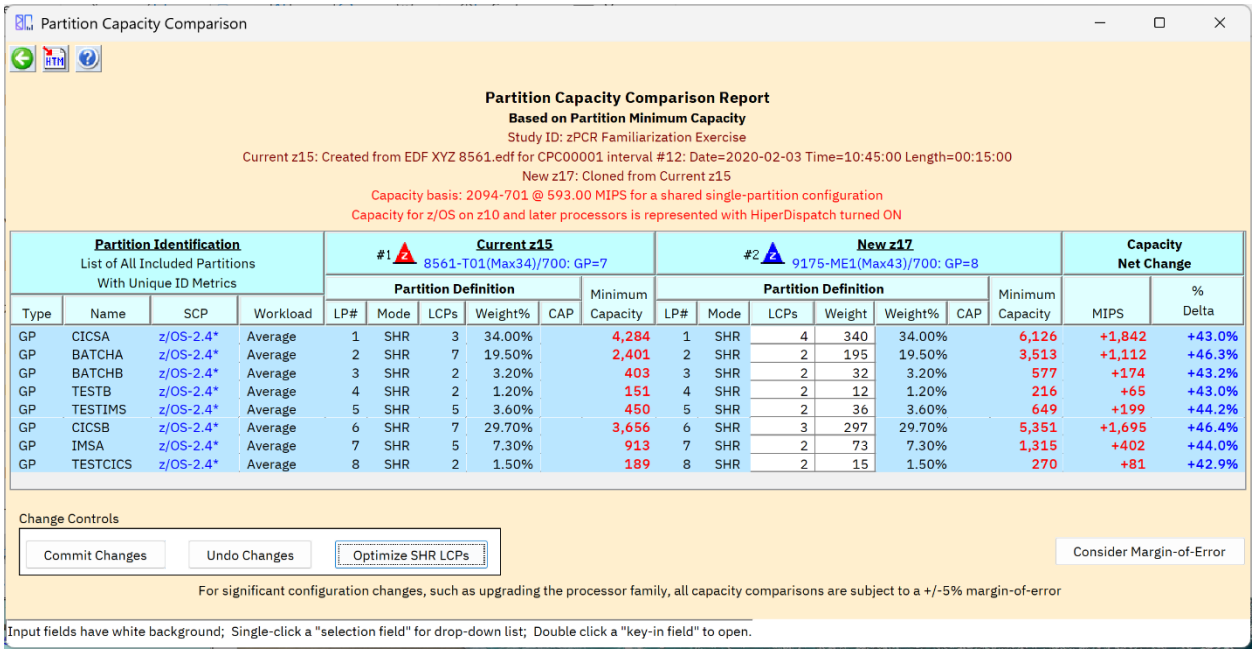
5. Click **Optimize SHR LCPs** in the ***Change Controls*** group box to see if you can improve the results by reducing the number of LCPs assigned to each partition to that required to accommodate its weight.



Using the default setting, **Optimal**, click **Optimize** to reduce the number of logical CPs assigned to each partition. Reducing the number of logical CPs can improve capacity. The partition's weight percent is used to determine the exact number of LCPs (rounded up to the nearest whole number). Click **Cancel** to close the Optimize LCPs window.

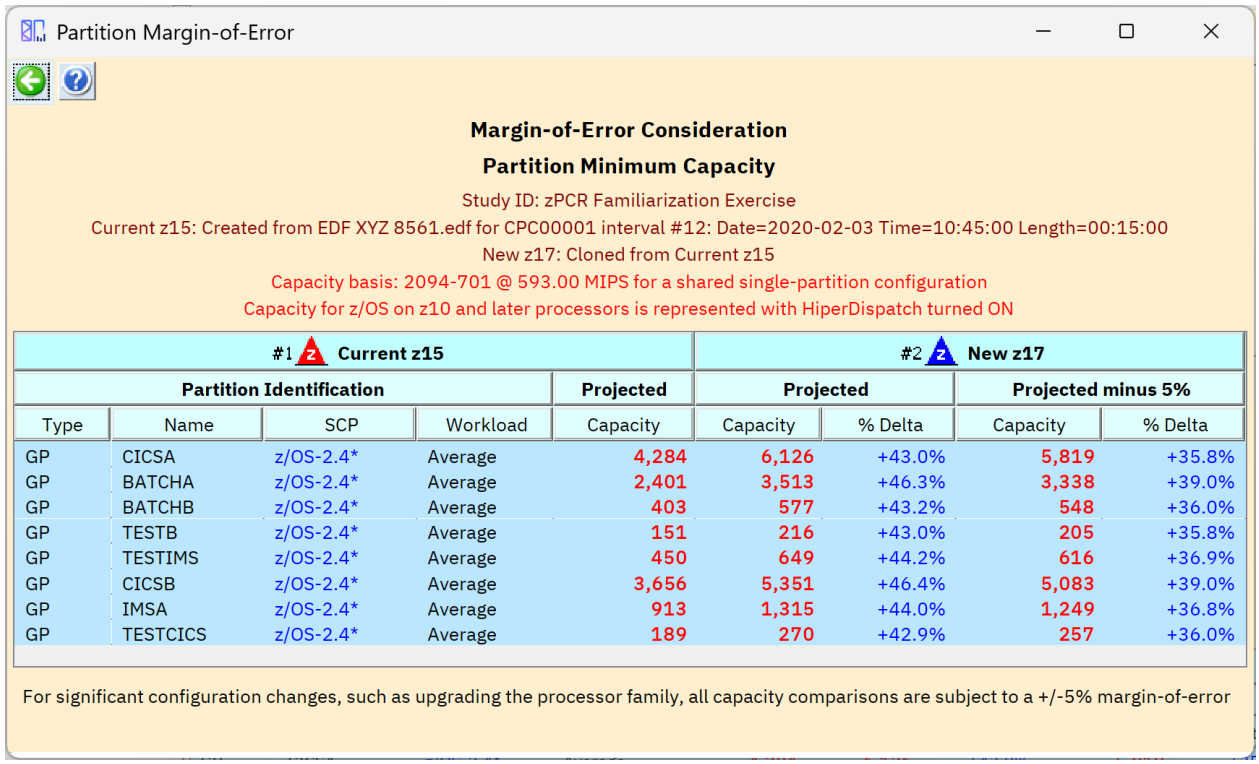
Note: An alternate method to apply these optimization levels is available on the ***Partition Detail Report*** window by using the **LCP Alternatives** button.

For availability purposes, no less than 2 logical CPs will be assigned to N-way partitions.



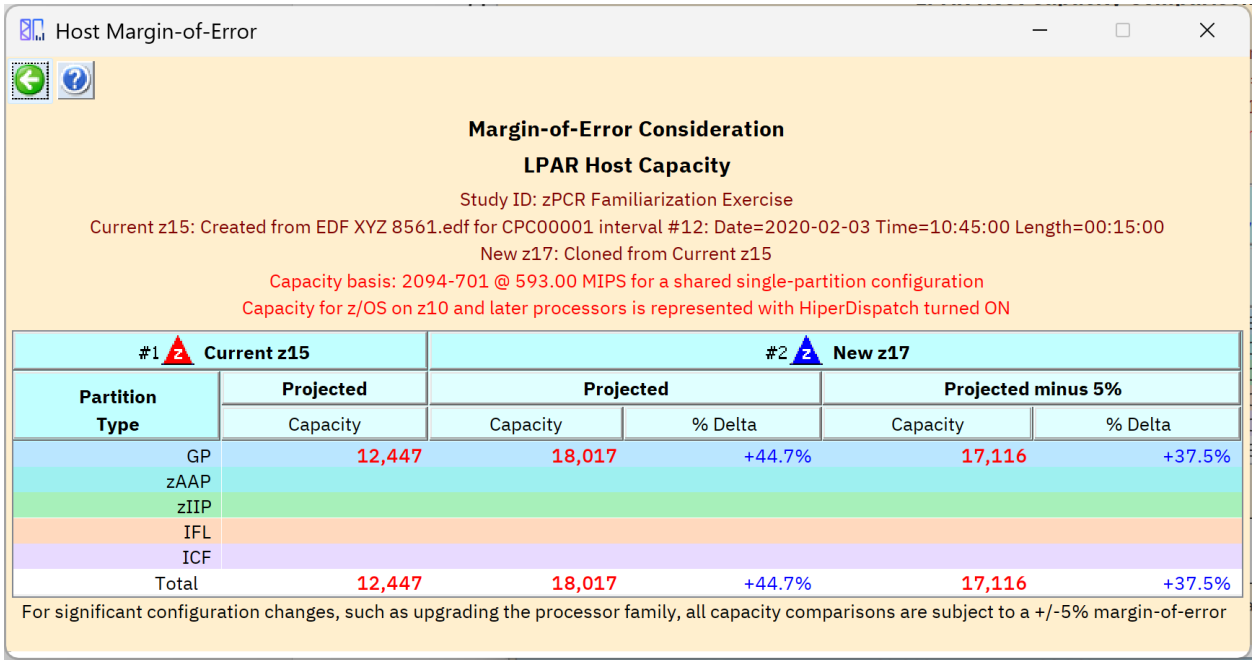
6. Click **Consider Margin-of-Error**

The capacity expectation derived from **zPCR** for a new machine should normally be considered to have up to a ±5% Margin-of-Error. The ±5% Margin-of-Error should be considered whenever the LPAR host processor family is changed, or when very significant changes are made to either the LPAR host CP configuration or to the partition configuration itself. At this point all the partitions realize the intended 34% capacity increase when considering the ±5% Margin-of-Error.



7. Close the ***Partition-Margin-of- Error*** window. Then click **Commit Changes** in the ***Change Controls*** group box to change the LPAR configuration to permanently include the modified metrics (from the **Optimize**).

8. Click **Return** on the ***Partition Capacity Comparison*** window. Then, on the ***Host Capacity Comparison*** window, click **Consider Margin-of-Error**. Note that the ***Host Margin-of-Error*** window now shows we are delivering **18,017 MIPS** (**17,116 MIPS** when considering the ±5% Margin-of-Error), both of which are greater than the **16,679 MIPS** objective.



Host Margin-of-Error

Margin-of-Error Consideration

LPAR Host Capacity

Study ID: zPCR Familiarization Exercise

Current z15: Created from EDF XYZ 8561.edf for CPC00001 interval #12: Date=2020-02-03 Time=10:45:00 Length=00:15:00

New z17: Cloned from Current z15

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

Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

	#1 Current z15	#2 New z17			
Partition Type	Projected	Projected		Projected minus 5%	
	Capacity	Capacity	% Delta	Capacity	% Delta
GP	12,447	18,017	+44.7%	17,116	+37.5%
zAAP					
zIIP					
IFL					
ICF					
Total	12,447	18,017	+44.7%	17,116	+37.5%

For significant configuration changes, such as upgrading the processor family, all capacity comparisons are subject to a +/-5% margin-of-error

9. Close all of the comparison windows by clicking the **Return** toolbar icon on the ***Host Capacity Comparison*** window.

10. From the menu bar on the ***Control Panel*** window click **File→Save as**, and save the complete study which will include both LPAR configurations (e.g., **Lab Task-7.zpcr**).

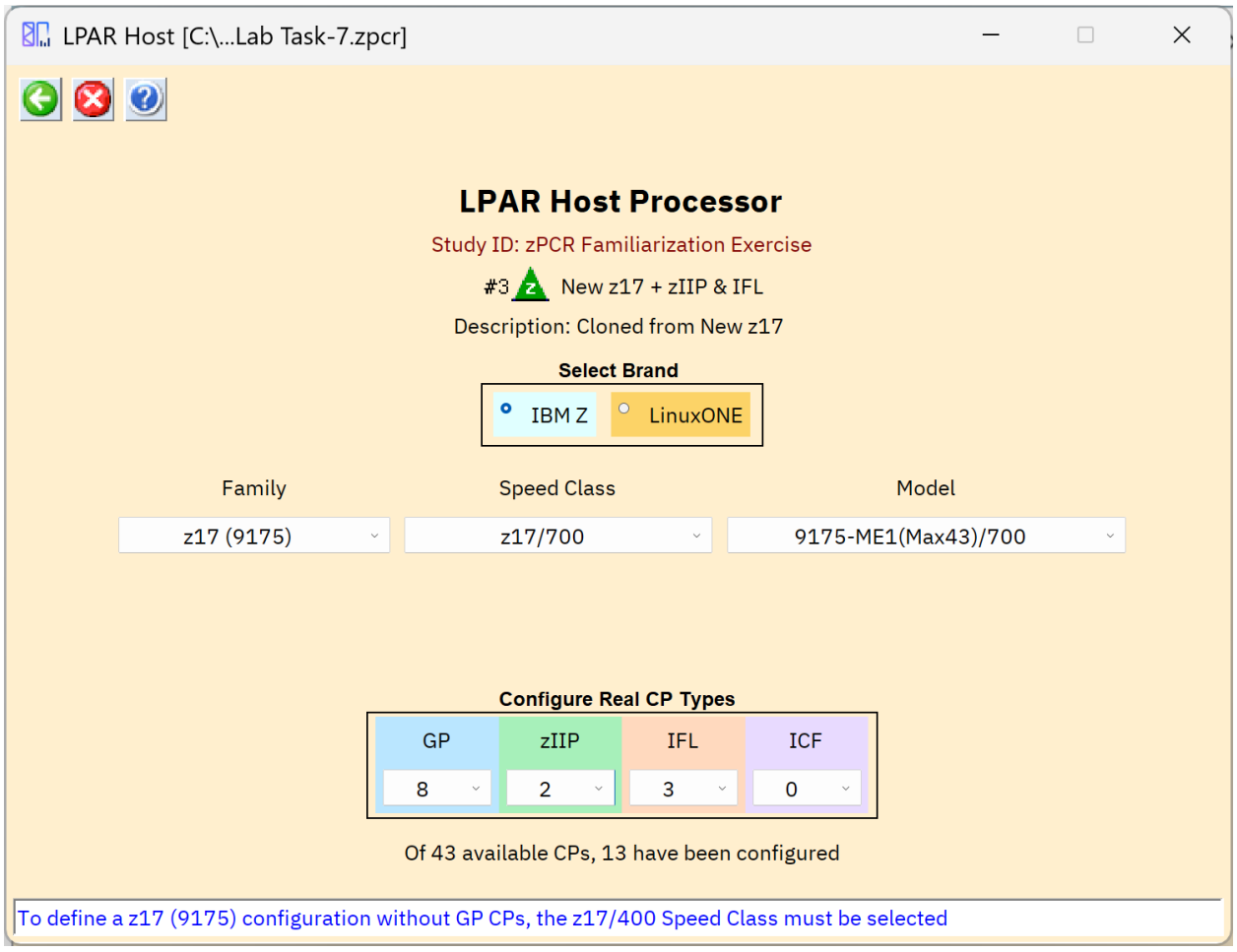
At this point we have met the **16,679 MIPS** overall objective with at least 34% improvement for each partition.

*** End of Tasks-1 through 7 ***

Task-8: **Add zIIP and IFL CPs and configure partitions to exploit them**

Analysis Steps

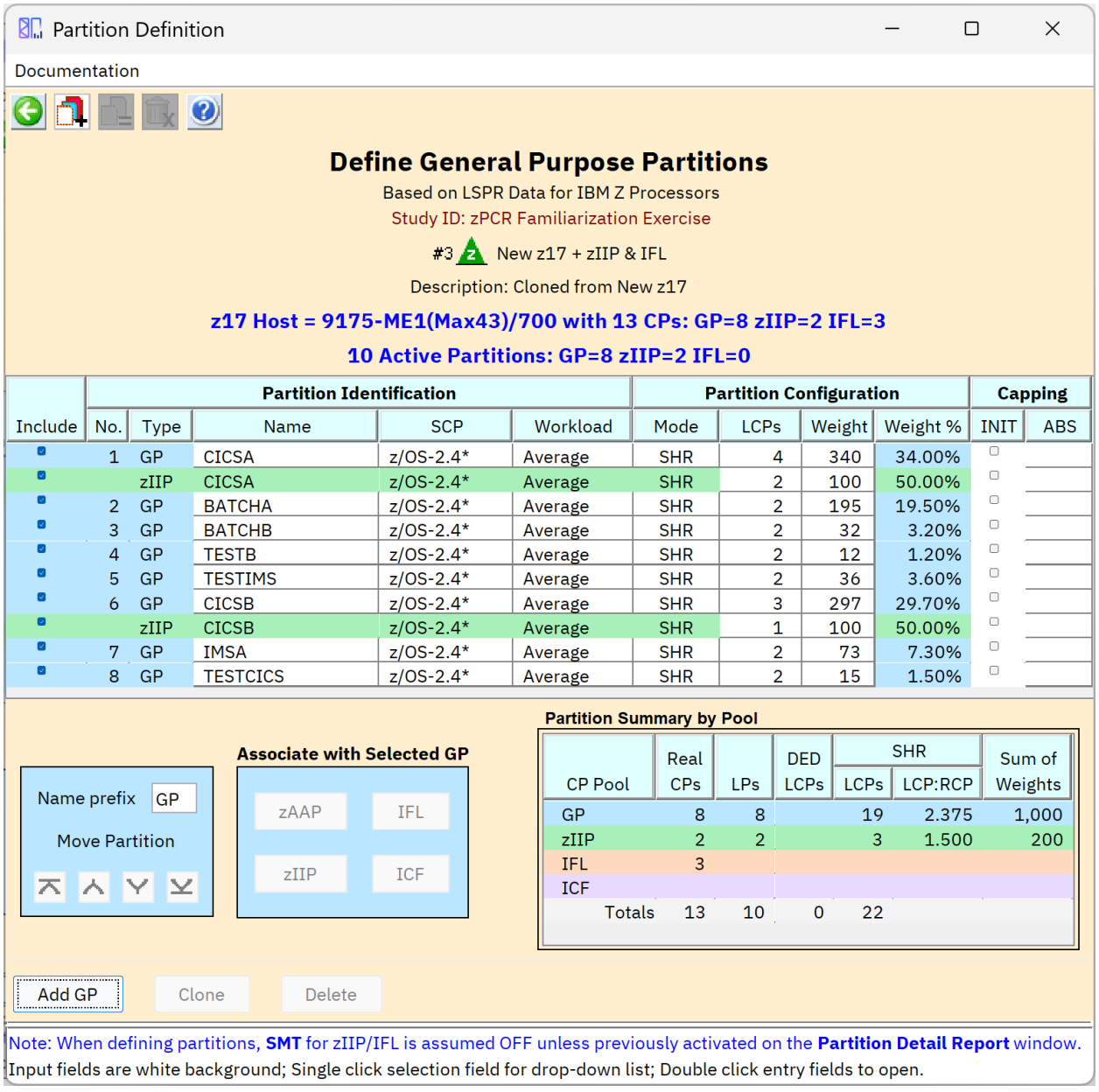
1. Single-click **#2 New z17** on the ***Control Panel*** window to select it.
2. Click the **Clone** toolbar button. #3 LPAR configuration is created as an exact copy of the 2nd. Rename it **New z17 + zIIP & IFL** (see Task 3 if you need be reminded how to rename).
3. Double-click **#3 New z17 + zIIP & IFL** to open the ***LPAR Host and Partition Configuration*** window for that LPAR configuration.
4. In the ***Define LPAR Host Processor*** group box, click **Specify Host**.



5. Add 2 zIIP real CPs and 3 IFL CPs to the configuration.
6. Click **Return**.

Define zIIP partitions to be associated with GP partitions

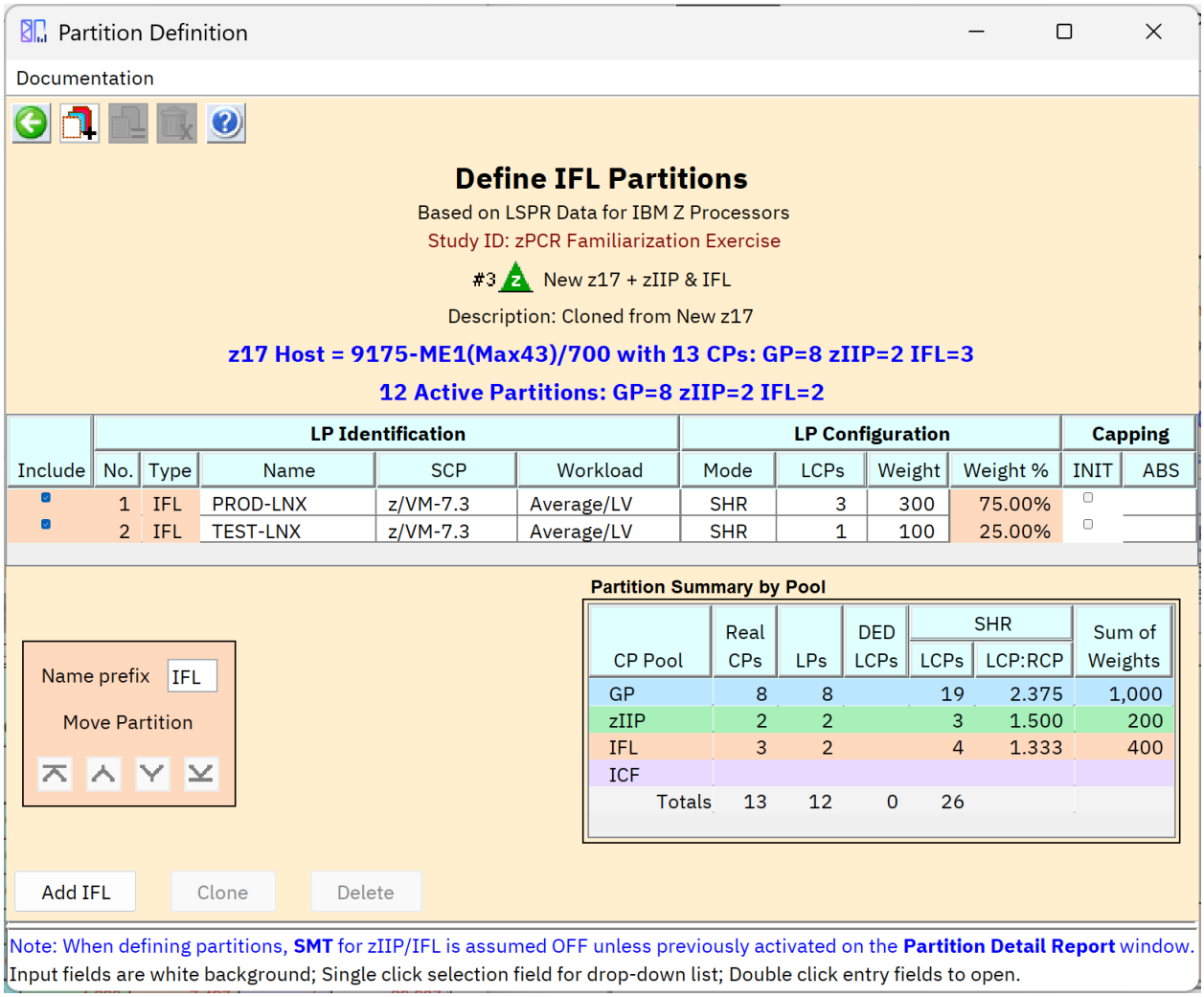
1. From the ***LPAR Host and Partition Configuration*** window, click **GP / zIIP** in the ***Define Partitions*** group box.
2. From the ***LPAR Partition Definition*** select the **CICSA** partition, then click on **zIIP** in the ***Associate with Selected GP*** group box. This will create the associated zIIP partition for **CICSA**. Assign **2** LCPs to this zIIP partition.
3. Select the **CICSB** partition, then click on **zIIP** in the ***Associate with Selected GP*** group box. This will create the associated zIIP partition for **CICSB**. Assign **1** LCP to this zIIP partition.



4. Click **Return**.

Define IFL partitions to run z/VM with Linux guests

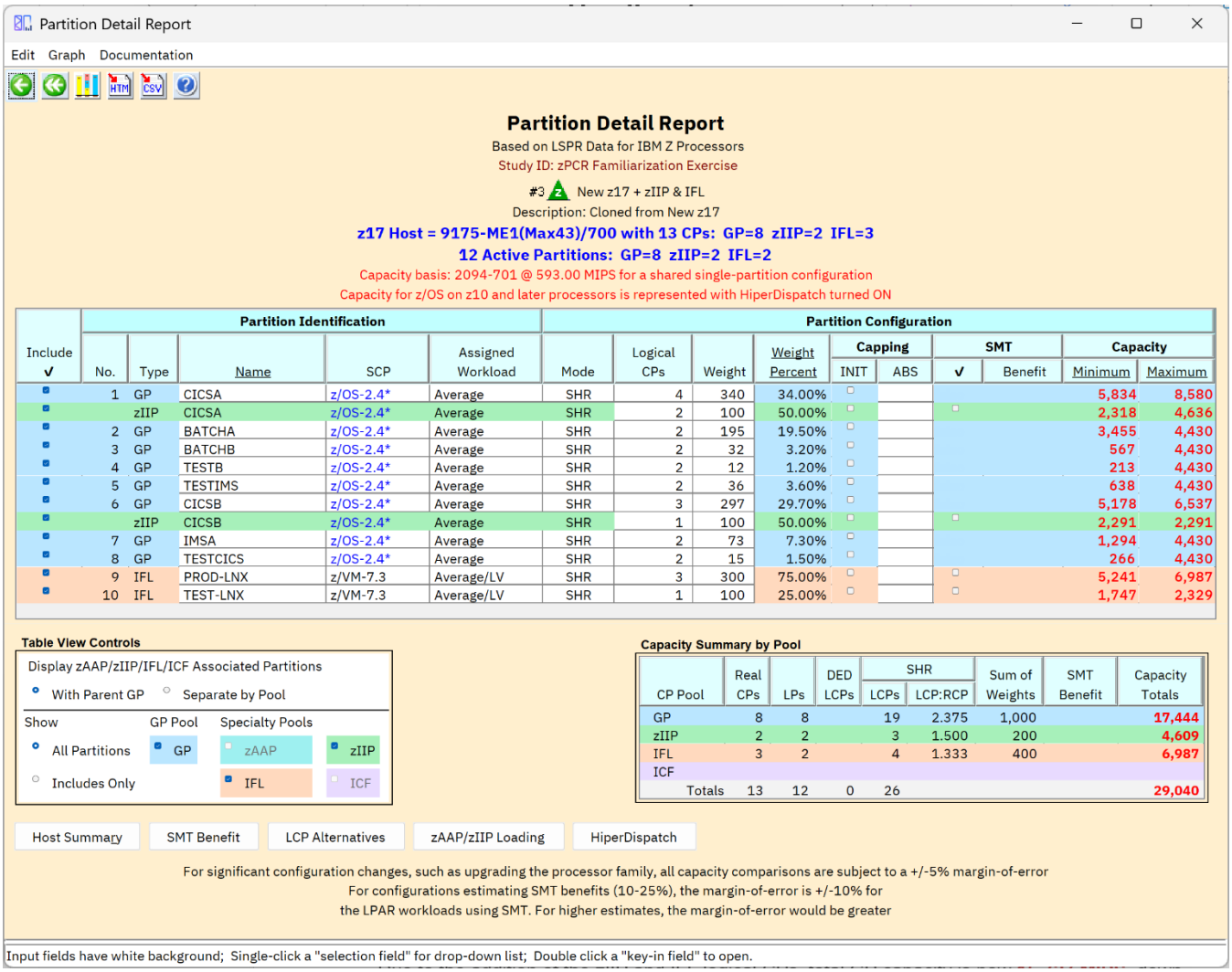
1. From the ***LPAR Host and Partition Configuration*** window, click **IFL** in the ***Define Partitions*** group box.
2. From the ***LPAR Partition Definition*** window, edit the partition name (from IFL-01) by double-clicking the name field to open it and entering the text "**PROD-LNX**", and hitting enter. Set the partition's LCPs to **3**. The SCP will be z/VM running Linux guest(s).
3. Change the weight for the **PROD-LNX** partition to 300.
4. Click **Add IFL** at the bottom of the window. Change the added partition's name to "**TEST-LNX**" and leave LCPs set to 1. The SCP will be z/VM running Linux guest(s).



5. Click **Return**.

Evaluate the effect on capacity for the enhanced configuration

From the ***LPAR Host and Partition Configuration*** window, click **Partition Detail** in the **Capacity *Reports*** group box. The **Partition *Detail Report*** window opens, revealing the new capacity picture.



The 2 zIIP partitions are providing an additional **4,609 MIPS** to the overall configuration.

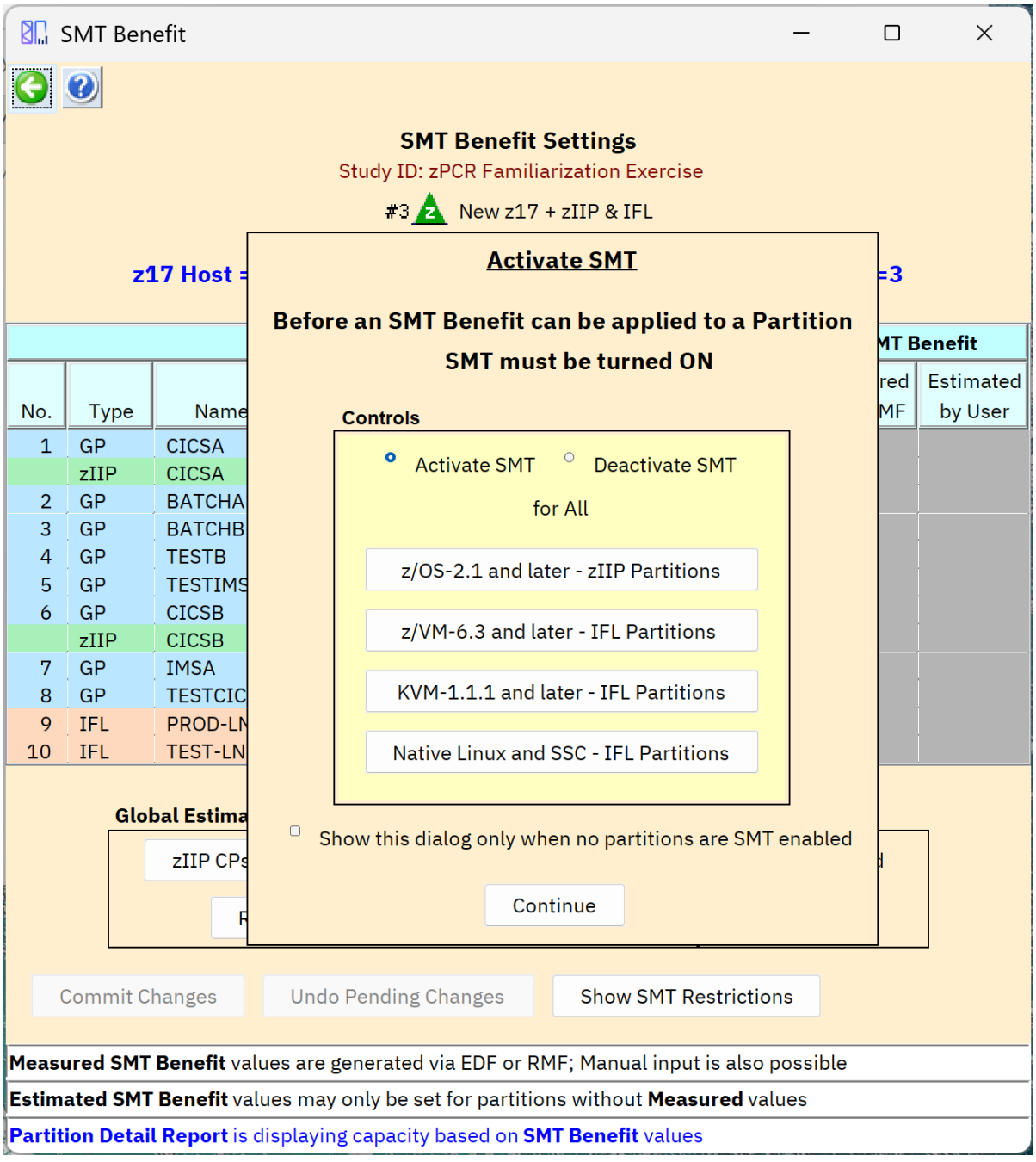
The 2 IFL partitions are providing an additional **6,987 MIPS** to the overall configuration.

Due to the addition of the zIIP and IFL logical CPs, total GP capacity is now **17,444 MIPS**, down ~3.2% from the previous **18,017 MIPS**. GP capacity is reduced due to z/OS having to support the associated zIIP LCPs. However, zIIPs associated with the CICSA and CICSB partitions are expected to take on some portion of the GP workload.

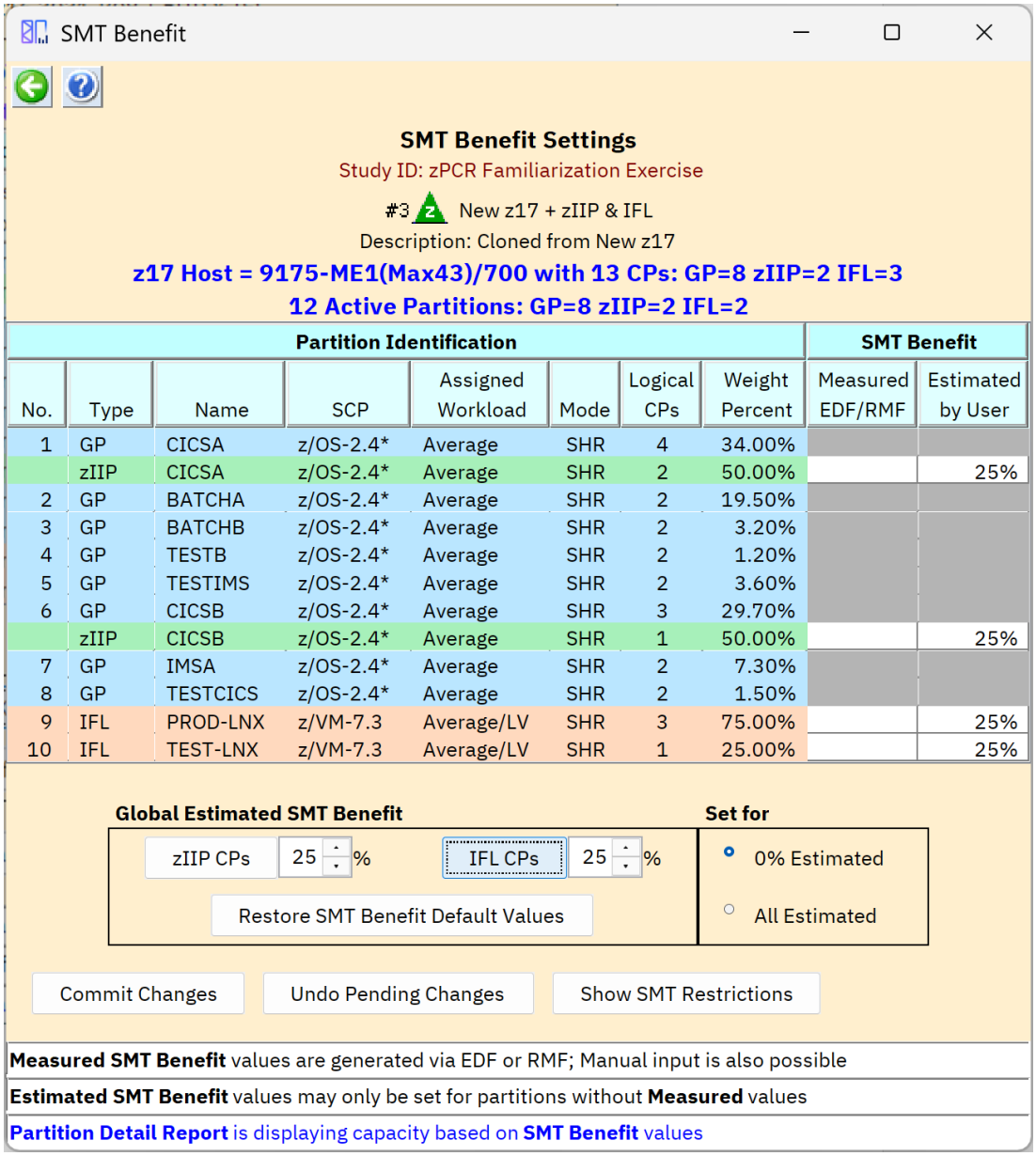
The overall z17 capacity is now **29,040 MIPS**.

Task-9: **Activate SMT for zIIP and IFL logical CPs**

1. From the ***Partition Detail Report*** window, click the **SMT Benefit** button to open the ***SMT Benefit*** window. zIIP and IFL zIIP partitions must have SMT activated in order to define an estimated SMT benefit. On the ***Activate SMT*** pop-up, click the buttons that will activate SMT for the zIIP and for the IFL partitions that were previously defined. Then click **Continue**.



2. On the ***SMT Benefit*** window, you'll note that the ***Global Estimated SMT Benefit*** defaults to **25% for zIIPs** and **IFLs**. In this case since the corporation has no experience with SMT we'll use the defaults. In the ***Global Estimated SMT Benefit*** group box, click **zIIP CPs** and click **z/VM, KVM & Linux IFLs**.



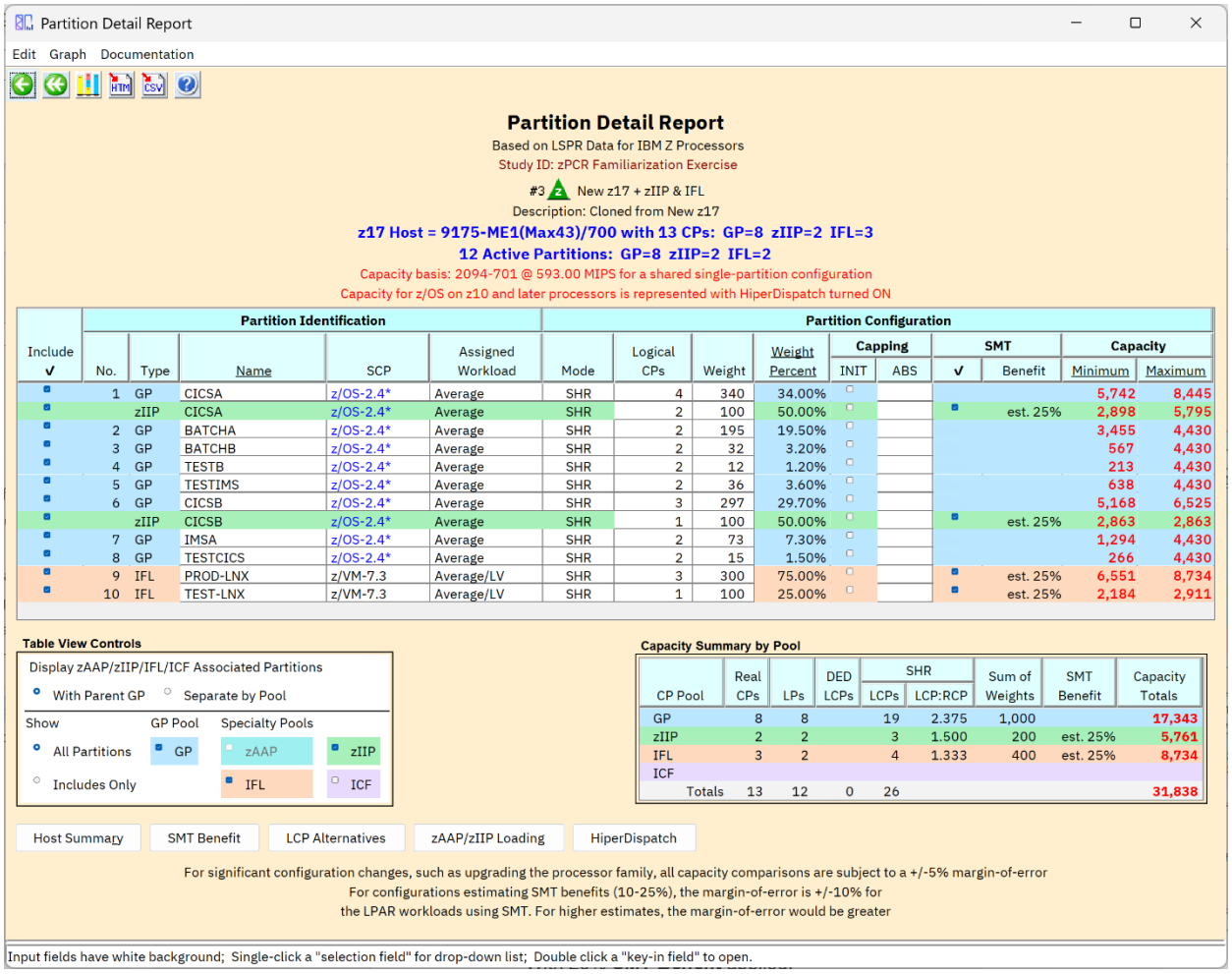
Note: The estimated SMT benefit values can be set to between 0% and 60% by clicking on the field and using the spin button that appears. For this exercise we will leave all the values at 25%.

3. Click **Commit Changes** to permanently apply the estimated ***SMT Benefit*** to the ***Minimum*** and ***Maximum Capacity*** result for the zIIP and IFL partitions.

4. Click **Return**.

Task-10: **Review final z17 capacity results**

1. View the ***Partition Detail Report*** for **#3 New z17 + zIIP & IFL**.



Partition Detail Report

Edit Graph Documentation

Partition Detail Report

Based on LSPR Data for IBM Z Processors

Study ID: zPCR Familiarization Exercise

#3 New z17 + zIIP & IFL

Description: Cloned from New z17

z17 Host = 9175-ME1(Max43)/700 with 13 CPs: GP=8 zIIP=2 IFL=3

12 Active Partitions: GP=8 zIIP=2 IFL=2

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								
									Capping		SMT		Capacity	
✓	No.	Type	Name	SCP	Assigned Workload	Mode	Logical CPs	Weight	Weight Percent	INIT	ABS	✓	Benefit	Minimum	Maximum
■	1	GP	CICSA	z/OS-2.4*	Average	SHR	4	340	34.00%					5,742	8,445
■		zIIP	CICSA	z/OS-2.4*	Average	SHR	2	100	50.00%			■	est. 25%	2,898	5,795
■	2	GP	BATCHA	z/OS-2.4*	Average	SHR	2	195	19.50%					3,455	4,430
■	3	GP	BATCHB	z/OS-2.4*	Average	SHR	2	32	3.20%					567	4,430
■	4	GP	TESTB	z/OS-2.4*	Average	SHR	2	12	1.20%					213	4,430
■	5	GP	TESTIMS	z/OS-2.4*	Average	SHR	2	36	3.60%					638	4,430
■	6	GP	CICSB	z/OS-2.4*	Average	SHR	3	297	29.70%					5,168	6,525
■		zIIP	CICSB	z/OS-2.4*	Average	SHR	1	100	50.00%			■	est. 25%	2,863	2,863
■	7	GP	IMSA	z/OS-2.4*	Average	SHR	2	73	7.30%					1,294	4,430
■	8	GP	TESTCICS	z/OS-2.4*	Average	SHR	2	15	1.50%					266	4,430
■	9	IFL	PROD-LNX	z/VM-7.3	Average/LV	SHR	3	300	75.00%			■	est. 25%	6,551	8,734
■	10	IFL	TEST-LNX	z/VM-7.3	Average/LV	SHR	1	100	25.00%			■	est. 25%	2,184	2,911

Table View Controls

Display zAAP/zIIP/IFL/ICF Associated Partitions

With Parent GP Separate by Pool

Show: All Partitions / Includes Only

GP Pool: GP

Specialty Pools: zAAP, zIIP, IFL, ICF

Capacity Summary by Pool

CP Pool	Real CPs	LPs	DED LCPs	SHR LCPs	SHR LCP:RCP	Sum of Weights	SMT Benefit	Capacity Totals
GP	8	8		19	2.375	1,000		17,343
zIIP	2	2		3	1.500	200	est. 25%	5,761
IFL	3	2		4	1.333	400	est. 25%	8,734
ICF								
Totals	13	12	0	26				31,838

Host Summary | SMT Benefit | LCP Alternatives | zAAP/zIIP Loading | HiperDispatch

For significant configuration changes, such as upgrading the processor family, all capacity comparisons are subject to a +/-5% margin-of-error

For configurations estimating SMT benefits (10-25%), the margin-of-error is +/-10% for the LPAR workloads using SMT. For higher estimates, the margin-of-error would be greater

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

With 25% ***SMT Benefit*** applied:

- zIIP capacity has increased by 25%, from **4,609 MIPS** to **5,761 MIPS**.
- IFL capacity has increased by 25% from **6,987 MIPS** to **8,734 MIPS**.
- Total capacity has increased by ~10% from **29,040 MIPS** to **31,838 MIPS**.

GP capacity decreased by ~0.6% from **17,444 MIPS** to **17,343 MIPS**. While the use of SMT significantly benefits zIIP and IFL capacity, it has negligible effect on GP capacity.

Even with the zIIP and IFL LCPs configured, **17,343 MIPS** GP capacity exceeds the original **16,679 MIPS** requirement that was established.

2. Click **Double Return** to close the ***LPAR Configuration*** windows and return to the ***Control Panel*** window.

3. On the ***Control Panel*** window, select both **#1 Current z15** and **#3 New z17 + zIIP & IFL**. Click on one, press the **Ctrl** key (**CMD** on Mac) and click on the other. Then click the **Compare** tool bar icon. Click on **Minimum Capacity**, and then click **Consider Margin-of-Error** to see the ***Partition Margin-of-Error*** window.

Partition Margin-of-Error

Margin-of-Error Consideration

Partition Minimum Capacity

Study ID: zPCR Familiarization Exercise

Current z15: Created from EDF XYZ 8561.edf for CPC00001 interval #12: Date=2020-02-03 Time=10:45:00 Length=00:15:00

New z17 + zIIP & IFL: Cloned from New z17

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

Capacity for z/OS on z10 and later processors is represented with HiperDispatch turned ON

#1 Current z15					#3 New z17 + zIIP & IFL			
Partition Identification				Projected	Projected		Projected minus 5%	
Type	Name	SCP	Workload	Capacity	Capacity	% Delta	Capacity	% Delta
GP	CICSA	z/OS-2.4*	Average	4,284	5,742	+34.0%	5,455	+27.3%
GP	BATCHA	z/OS-2.4*	Average	2,401	3,455	+43.9%	3,283	+36.7%
GP	BATCHB	z/OS-2.4*	Average	403	567	+40.7%	539	+33.7%
GP	TESTB	z/OS-2.4*	Average	151	213	+41.1%	202	+33.8%
GP	TESTIMS	z/OS-2.4*	Average	450	638	+41.8%	606	+34.7%
GP	CICSB	z/OS-2.4*	Average	3,656	5,168	+41.4%	4,909	+34.3%
GP	IMSA	z/OS-2.4*	Average	913	1,294	+41.7%	1,229	+34.6%
GP	TESTCICS	z/OS-2.4*	Average	189	266	+40.7%	253	+33.9%
zIIP	CICSA	z/OS-2.4*	Average		2,898		2,753	
zIIP	CICSB	z/OS-2.4*	Average		2,863		2,720	
IFL	PROD-LNX	z/VM-7.3	Average/LV		6,551		6,223	
IFL	TEST-LNX	z/VM-7.3	Average/LV		2,184		2,074	

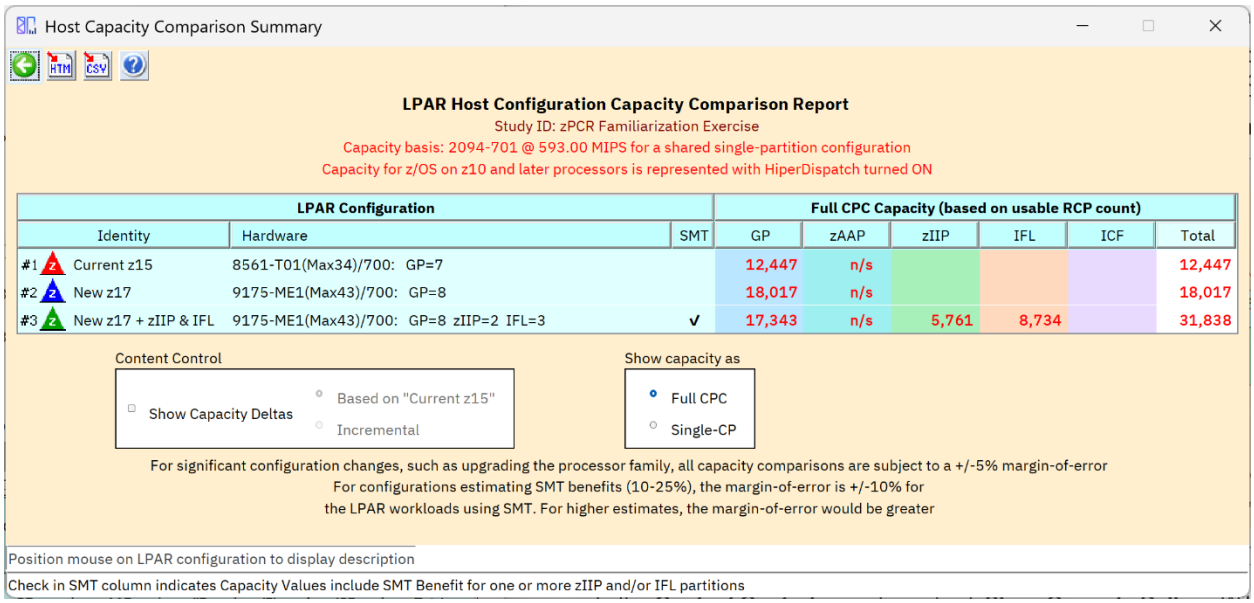
For significant configuration changes, such as upgrading the processor family, all capacity comparisons are subject to a +/-5% margin-of-error

For configurations estimating SMT benefits (10-25%), the margin-of-error is +/-10% for the LPAR workloads using SMT. For higher estimates, the margin-of-error would be greater

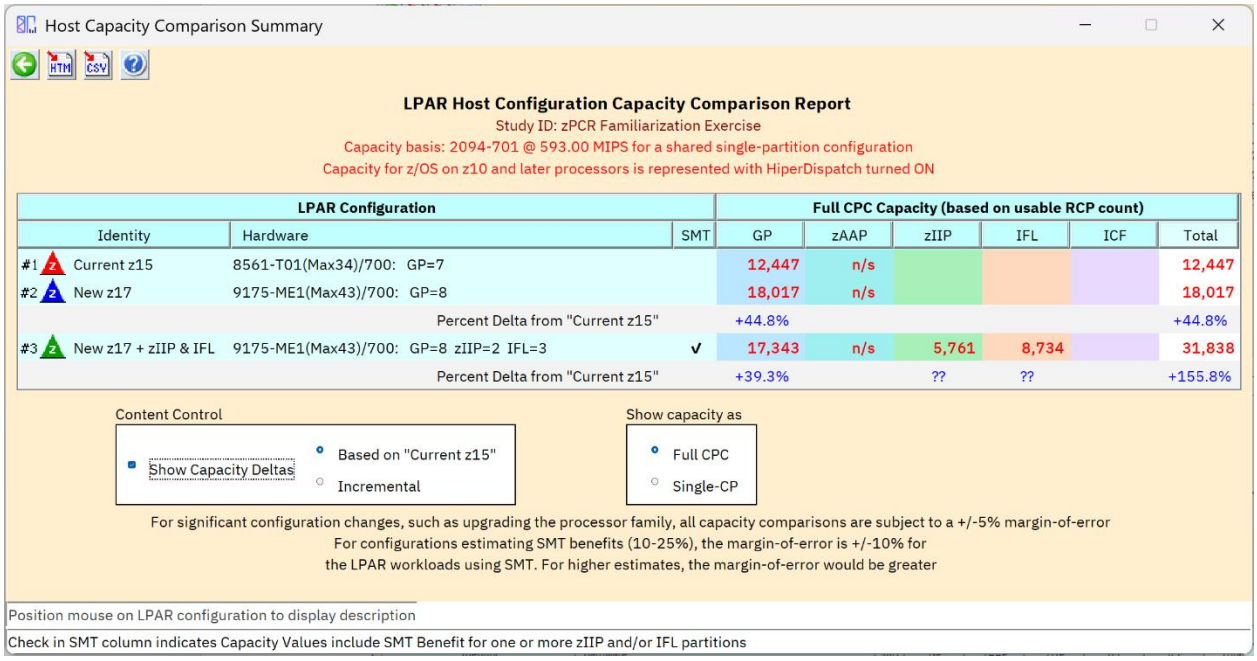
New z17 + zIIP & IFL Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

Verify that the z17 partitions will still meet our objective of 34% improvement when the additional zIIP and IFL partitions are included. The exception is the **CICSA** partition, which is only reaching 27.3% capacity improvement. However, since we expect this partition to start routing zIIP eligible work to the zIIP LCPs, 27.3% is likely acceptable (depends on the percent of the workload that is zIIP eligible).

4. Close all the comparison windows. On the ***Control Panel*** window, make sure that no LPAR configurations are selected. In the ***Compare*** group box, click the  tool bar icon to present the ***Host Capacity Comparison Summary*** window. This window relates the capacity projections for each defined LPAR configuration by CP pool. The sum of the individual pool capacity values is shown as a total for the entire CPC on the right.



- In the ***Content Control*** group box, check **Show Capacity Deltas**. With this view one can easily see the degree to which capacity changes for each successive configuration.

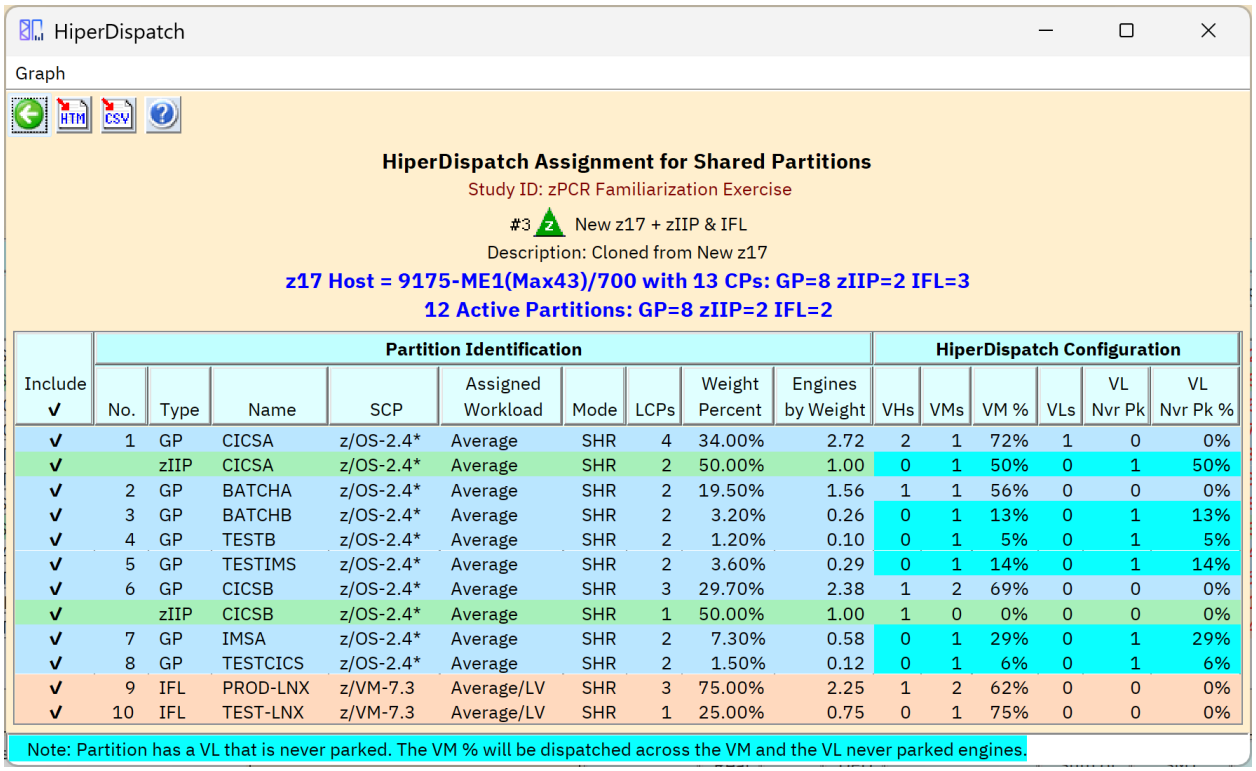


- From the menu bar on the ***Control Panel*** window click **File→Save as**, and save the complete study which will include both LPAR configurations (e.g., **Lab Task-10.zpcr**).

*** End of Task-8 through 10 ***

Task-11: **Review additional z17 perspectives**

On the ***Partition Detail Report*** for **#3 New z17 + zIIP & IFL**, click the **HiperDispatch** button to view the ***HiperDispatch*** window.



HiperDispatch

Graph

HiperDispatch Assignment for Shared Partitions

Study ID: zPCR Familiarization Exercise

#3 New z17 + zIIP & IFL

Description: Cloned from New z17

z17 Host = 9175-ME1(Max43)/700 with 13 CPs: GP=8 zIIP=2 IFL=3

12 Active Partitions: GP=8 zIIP=2 IFL=2

Include	Partition Identification									HiperDispatch Configuration					
✓	No.	Type	Name	SCP	Assigned Workload	Mode	LCPs	Weight Percent	Engines by Weight	VHs	VMs	VM %	VLs	VL Nvr Pk	VL Nvr Pk %
✓	1	GP	CICSA	z/OS-2.4*	Average	SHR	4	34.00%	2.72	2	1	72%	1	0	0%
✓		zIIP	CICSA	z/OS-2.4*	Average	SHR	2	50.00%	1.00	0	1	50%	0	1	50%
✓	2	GP	BATCHA	z/OS-2.4*	Average	SHR	2	19.50%	1.56	1	1	56%	0	0	0%
✓	3	GP	BATCHB	z/OS-2.4*	Average	SHR	2	3.20%	0.26	0	1	13%	0	1	13%
✓	4	GP	TESTB	z/OS-2.4*	Average	SHR	2	1.20%	0.10	0	1	5%	0	1	5%
✓	5	GP	TESTIMS	z/OS-2.4*	Average	SHR	2	3.60%	0.29	0	1	14%	0	1	14%
✓	6	GP	CICSB	z/OS-2.4*	Average	SHR	3	29.70%	2.38	1	2	69%	0	0	0%
✓		zIIP	CICSB	z/OS-2.4*	Average	SHR	1	50.00%	1.00	1	0	0%	0	0	0%
✓	7	GP	IMSA	z/OS-2.4*	Average	SHR	2	7.30%	0.58	0	1	29%	0	1	29%
✓	8	GP	TESTCICS	z/OS-2.4*	Average	SHR	2	1.50%	0.12	0	1	6%	0	1	6%
✓	9	IFL	PROD-LNX	z/VM-7.3	Average/LV	SHR	3	75.00%	2.25	1	2	62%	0	0	0%
✓	10	IFL	TEST-LNX	z/VM-7.3	Average/LV	SHR	1	25.00%	0.75	0	1	75%	0	0	0%

Note: Partition has a VL that is never parked. The VM % will be dispatched across the VM and the VL never parked engines.

This window relates all the defined partitions to how HiperDispatch is expected to manage their logical CPs.

HiperDispatch supports shared logical CPs running:

- z/OS (v1.7 and later) in a GP partition. zAAP and zIIP shared logical CPs associated with the z/OS partition are similarly affected.
- z/VM (v6.3 and later) in a GP or IFL partition. IFL shared logical CPs associated with the z/VM partition are similarly affected.

The **HiperDispatch** function projects the way logical CPs of these partitions will be distributed in three categories:

1. **Vertical High** (**VH**) LCPs are essentially dedicated to the partition. They do not service other partitions. They are fully assigned to that partition's workload demand.
2. **Vertical Medium** (**VM**) LCPs are shared among partitions. The percent of time that a partition is entitled to have their services is depicted on the charts.
3. **Vertical Low** (**VL**) LCPs have 0% share but are available to a partition in the event other partitions do not require the level of service specified by their weight. Vertical Lows are provided so a partition may use GP LCP capacity above the amount guaranteed by its LPAR weight. If there is no available GP LCP capacity above the weight, then Vertical Lows are parked.

There is a special kind of Vertical Low processor which is never parked. These are typically used to assure that small partitions always have a second logical engine available. The following note will apply.

Note: Partition has a **VL** that is never parked. The **VM %** will be dispatched across the **VM** and the **VL** engines.

The ***HiperDispatch*** window reiterates most of the **Partition Identification** information from the ***Partition Detail Report*** window. The following columns are unique.

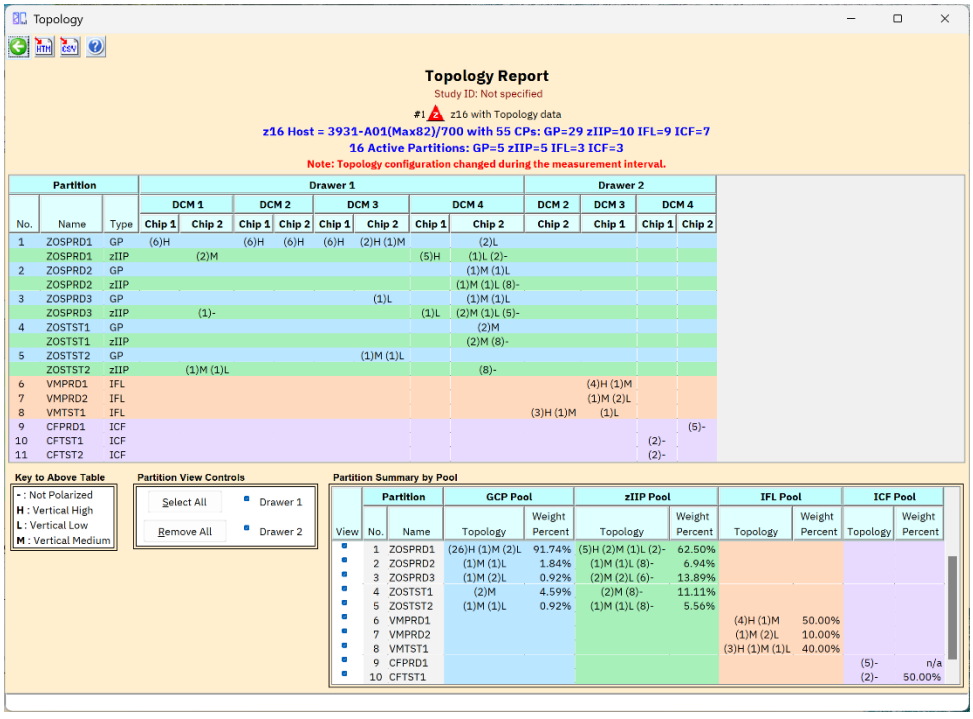
- **Engines by Weight**: Partition Weight % times the number of real CPs in the pool.
- **VHs**: Number of LCPs categorized as **Vertical High**.
- **VMs**: Number of LCPs categorized as **Vertical Medium.**
- **VM %**: Percent of time the partition's **Vertical Medium** LCPs are committed.
- **VLs**: Number of LCPs categorized as **Vertical Low**.
- **VL Nvr Pk**: Number of LCPs categorized as **Vertical Low Never Parked**.
- **VL Nvr Pk%:** Percent of time the partition's **Vertical Low Never Parked** LCPs are committed.

As input fields are modified on the ***Partition Detail Report*** window, results shown on the ***HiperDispatch*** window will be updated accordingly. Note that when exiting the ***HiperDispatch*** window, any changes made to the ***Partition Detail Report*** window are not automatically reset.

For GP or IFL partitions where HiperDispatch is not supported, only the **VMs** and **VM %** columns apply. For ICF partitions, none of the HiperDispatch columns apply.

Note: Starting with the z16, a new ***Topology*** window is available. To view this window, a z16 or later configuration must have been generated via EDF for a system with topology data present in the SMF Type 70 records. The ***Topology*** window portrays how the partition's logical CPs and their classification are distributed on RCPs:

- Across the installed drawers (maximum of 4)
- Across the 4 Dual Chip Modules (DCMs) on each drawer
- Across the 2 chips on each DCM



*** End of IBM zPCR lab ***