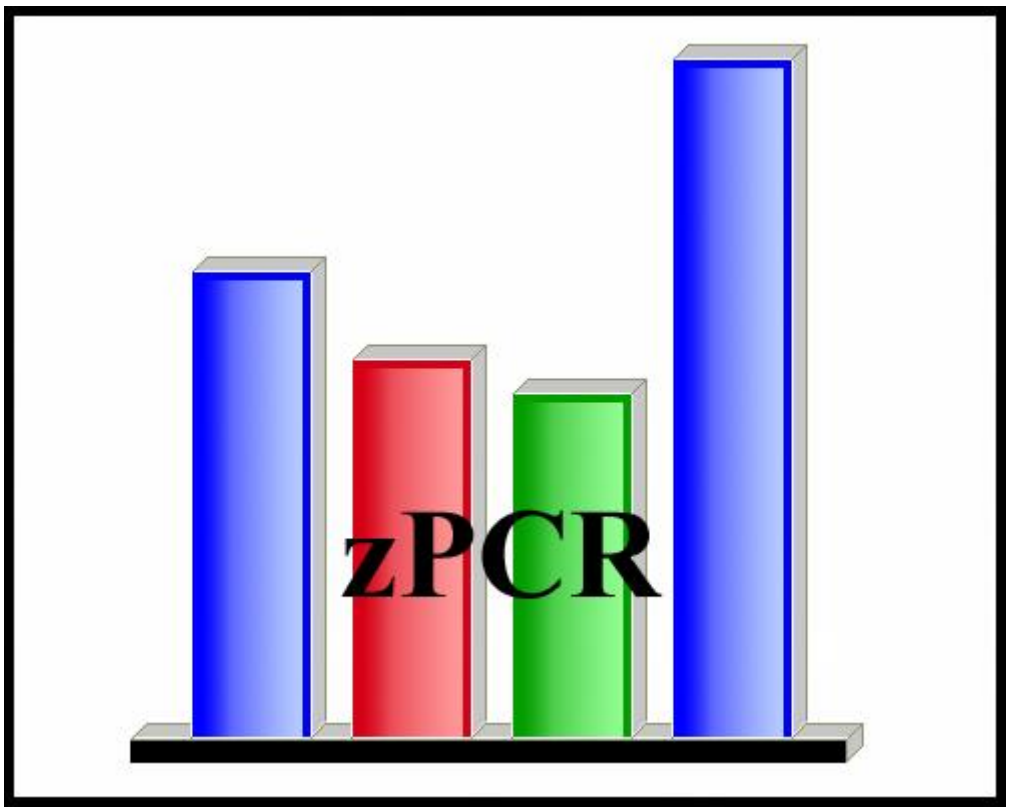
zPCR Familiarization Exercise

zPCR

Processor Capacity Reference
for
IBM Z and IBM LinuxONE



zPCR Version 9.1a
v91a zPCR familiarization Exercise (Mechanics Lab) JF2017d09.docx
August 30, 2017

zPCR Capacity Sizing Exercise

Objective

You will use **zPCR** (in ***Advanced Mode***) to define a customer's 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 **zEC12** (**2827-707**) installed, which based on their last **zPCR** study, as having **8,937 MIPS** of usable capacity. The 2827-707 is currently averaging **100% busy** during peak processing periods. The workload environment includes 8 logical partitions, all running on General Purpose CPs as shown in the table below.

	Partition	LP-mode	LCPs	Weight	Capped	SCP / Workload
1	CICSA	Share	7	340	No	z/OS-2.2 Average
2	BATCHA	Share	7	195	No	z/OS-2.2 Average
3	BATCHB	Share	2	32	No	z/OS-2.2 Average
4	TESTB	Share	2	12	No	z/OS-2.2 Average
5	TESTIMS	Share	5	36	No	z/OS-2.2 Average
6	CICSB	Share	7	297	No	z/OS-2.2 Average
7	IMSA	Share	5	73	No	z/OS-2.2 Average
8	TESTCICS	Share	2	15	No	z/OS-2.2 Average

A plan is being developed to **replace the current zEC12 with a newer technology IBM z14 processor**. The specific model chosen must provide at least **35% additional capacity**, or **12,065 MIPS** (i.e., **8,937 MIPS x 1.35**). The current configuration is to be moved to the new processor with the partitions and their workloads continuing as today. The customer 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 2/03. The data spans from 8:00 AM through 12:00 PM using 15 minute intervals.

The customer would also like to assess a potential z14 replacement that has slower CPs.

In addition the customer is looking at moving some work to an IFL running **Linux on IBM Z** and also adding 2 zIIPs in support of z/OS work. They are considering activating SMT on the z14 for both the IFL and zIIP LCPs.

Task 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 9.1 or later is required for this exercise

- **Task-1**: Initialize zPCR in Advanced-Mode.
- **Task-2**: Load the **EDF** which contains the latest RMF/SMF data including SMF 113 data for the 1st partition.
- **Task-3**: Rename the LPAR configuration.
- **Task-4**: Save the study.
- **Task-5**: Find an appropriate **z14/700** model upgrade.
- **Task-6**: Model the intended **z14/700** processor.
- **Task-7**: Review capacity results and save the study.

Additional Analysis To Try

- **Task-8**: Model a **z14/600** as an alternative and save the study.
- **Task-9**: Add IFL and zIIP CPs to z14 Host and Configure Partitions to Exploit.
  Add an IFL partition to the **z14/700** running **Linux guests under z/VM** and activate SMT.
  Associate a zIIP LCPs with the **CICSA** partition and activate SMT.
  Save the study.

Notes:

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 ***Advanced-Mode Control Panel*** window.

This exercise has been validated with zPCR v9.1, made available 07/17/2017.

Task-1: **Initialize zPCR**

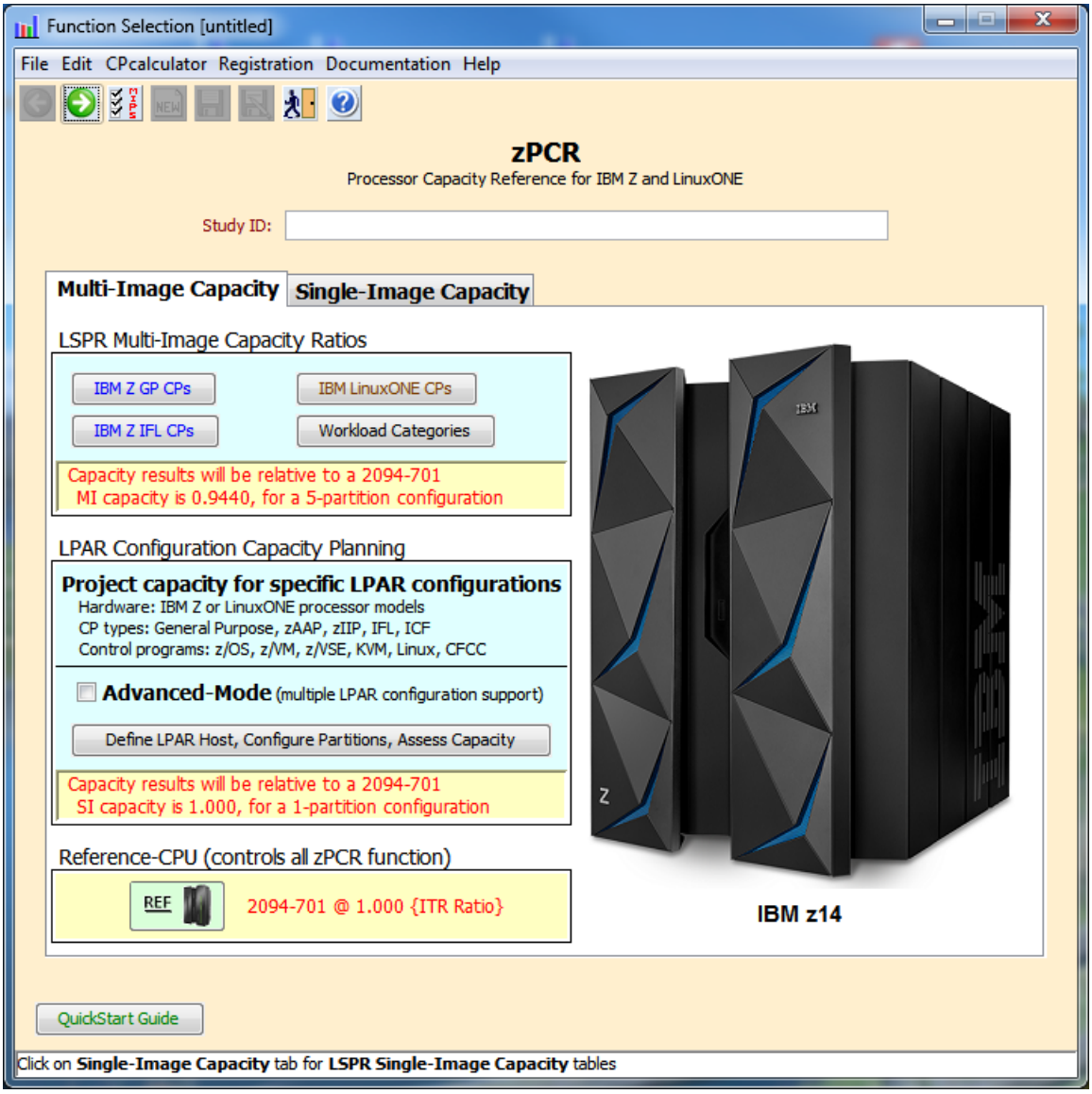
In this task you will set up **zPCR** for this exercise.

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**. After the ***Logo*** window stages, you will be viewing the ***Function Selection*** window, on the ***Multi-Image Capacity*** tab.

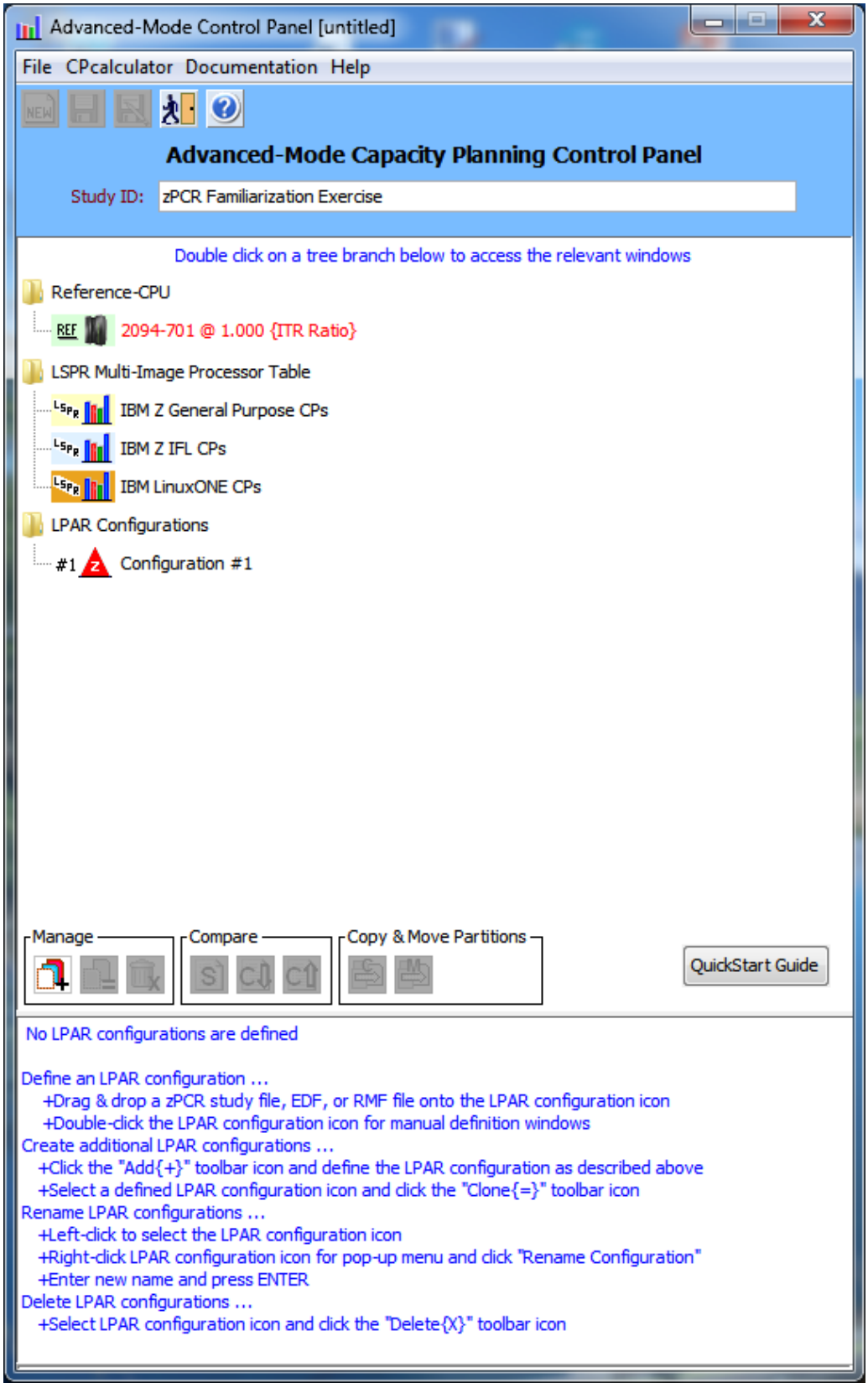
Function Selection Window



2. Select the ***Advanced-Mode*** check box if it is not already checked

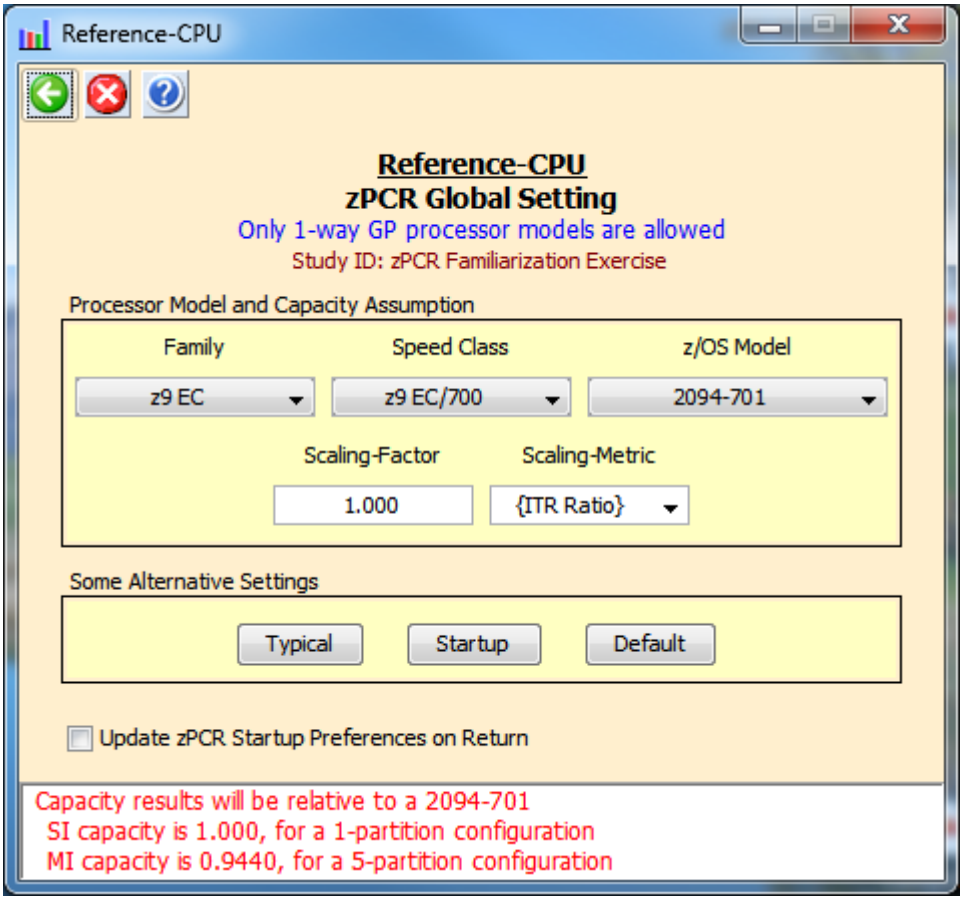
3. Click the **Enter Advanced-Mode** button.

Advanced-Mode Control Panel Window



4. On the ***Advanced-Mode Control Panel*** window, double click

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) Click **Return**.

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

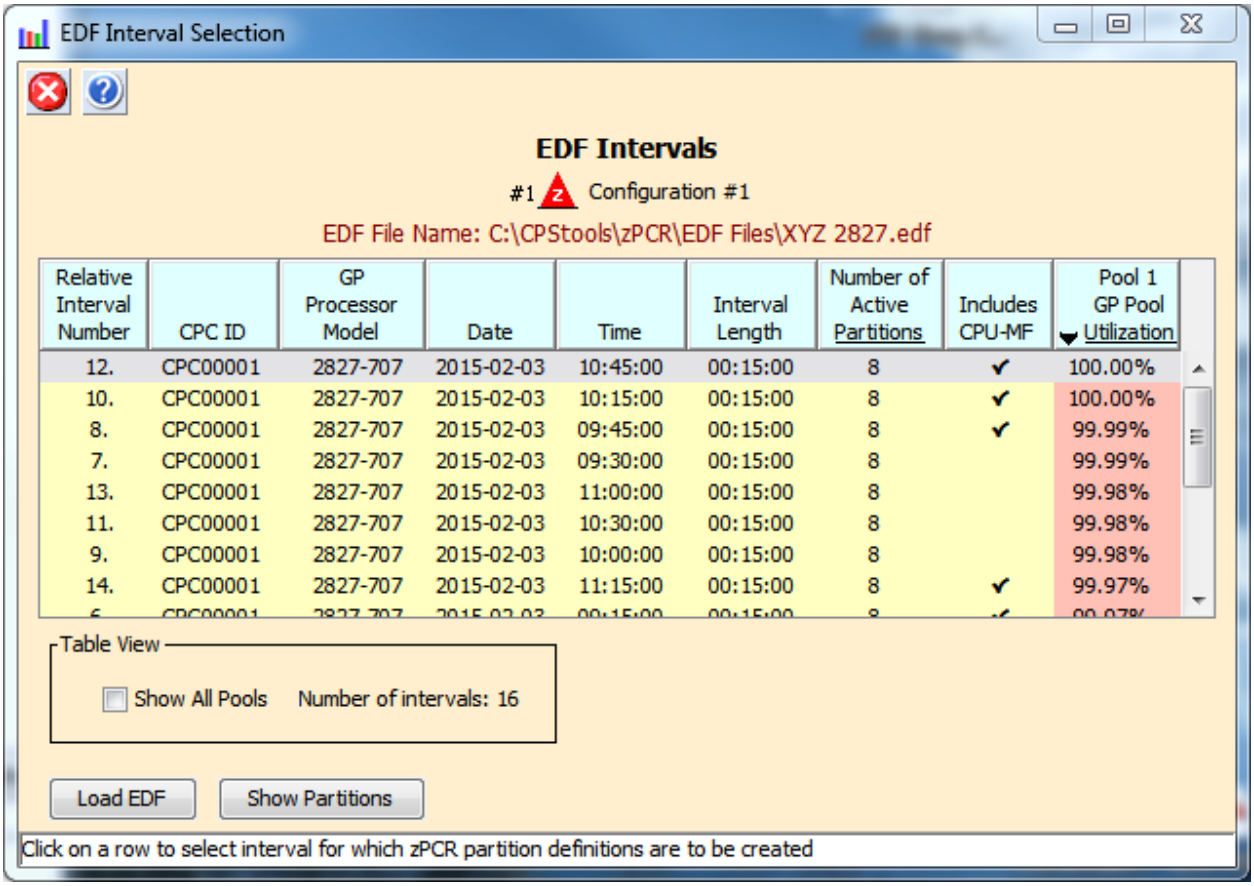
Load the current zEC12 LPAR configuration into **zPCR** using the EDF supplied with the tool.

Analysis Steps

1. Open ***Windows Explorer*** (click "Start", "All Programs", "Accessories", "Windows Explorer"). Then using ***Windows Explorer*** (under ***My Computer\Local Disk (C:)***) select the ***C:\CPSTOOLS\zPCR\EDF Files*** folder, where the **XYZ 2827.edf** file is located and visible. You may need to resize the ***Windows Explorer*** window, such that **zPCR**'s ***Advanced-Mode*** window is also visible.

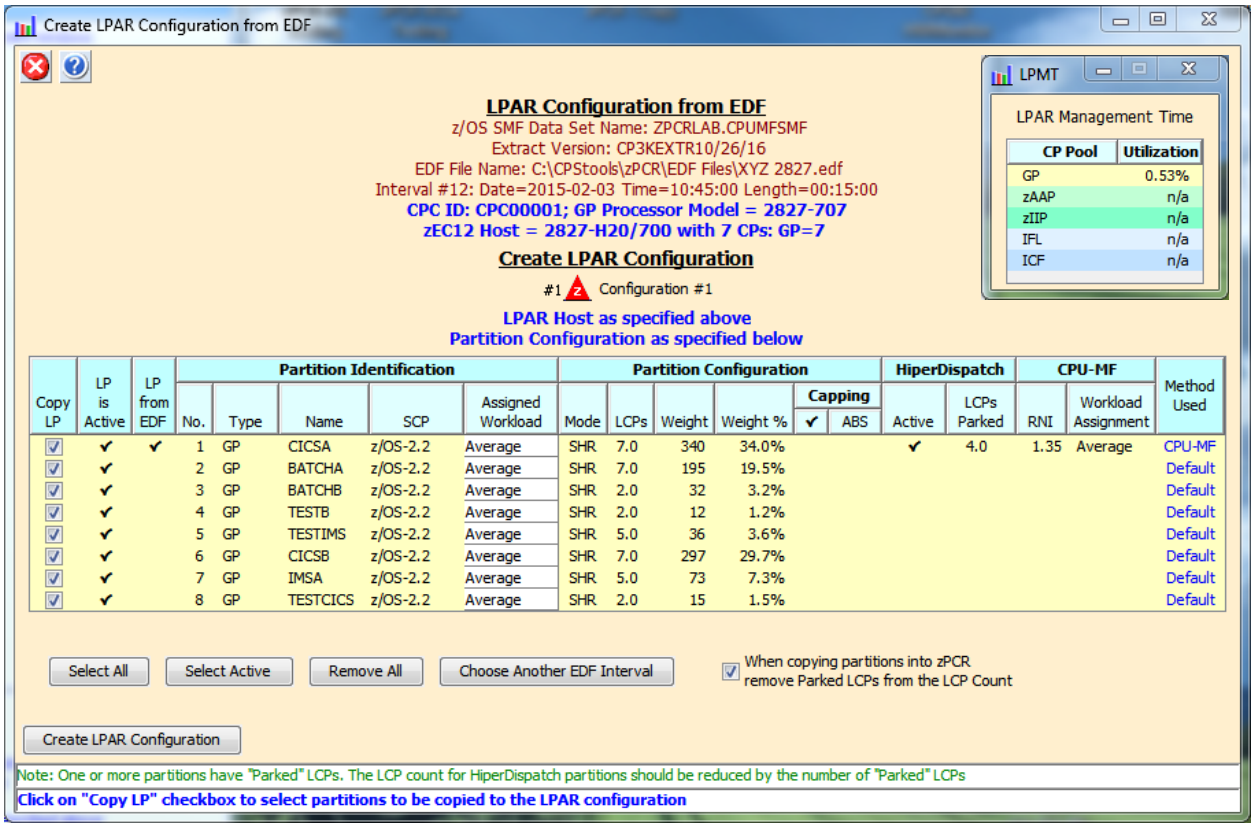
2. Drag the **XYZ 2827.edf** file from the **EDF Files** folder to **#1 Configuration #1**. This will open the ***EDF Interval Selection*** window.

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



4. Select Interval #12 and double click to open the ***Create LPAR Configuration* from EDF** window.

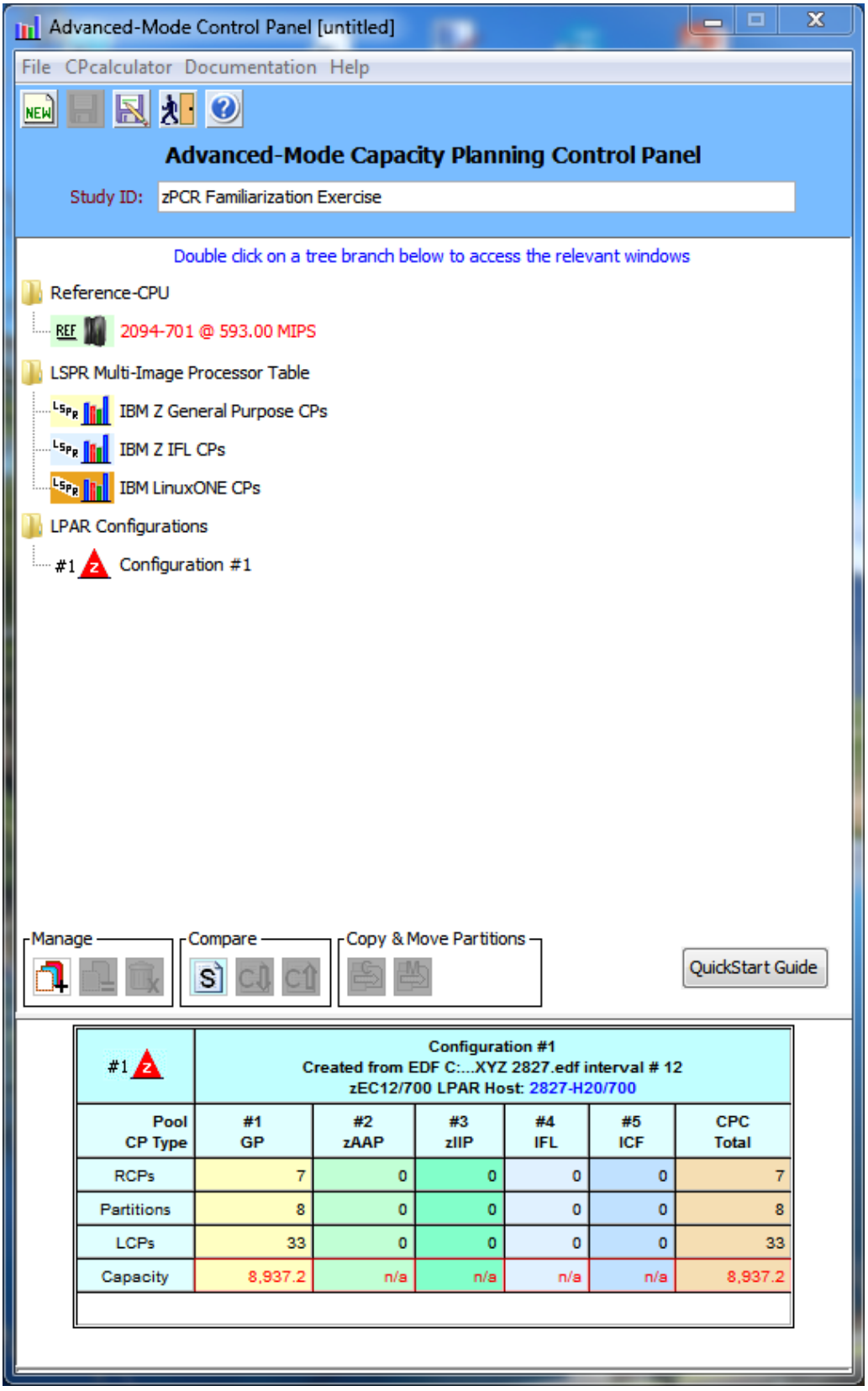
5. Click the **Create LPAR Configuration** button to transfer the LPAR host processor and its 8 GP partitions to the active **zPCR** study.



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

Note: Partition **CICSA** has 7 LCPs defined, but 4 are parked. 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.

Advanced-Mode Control Panel Window



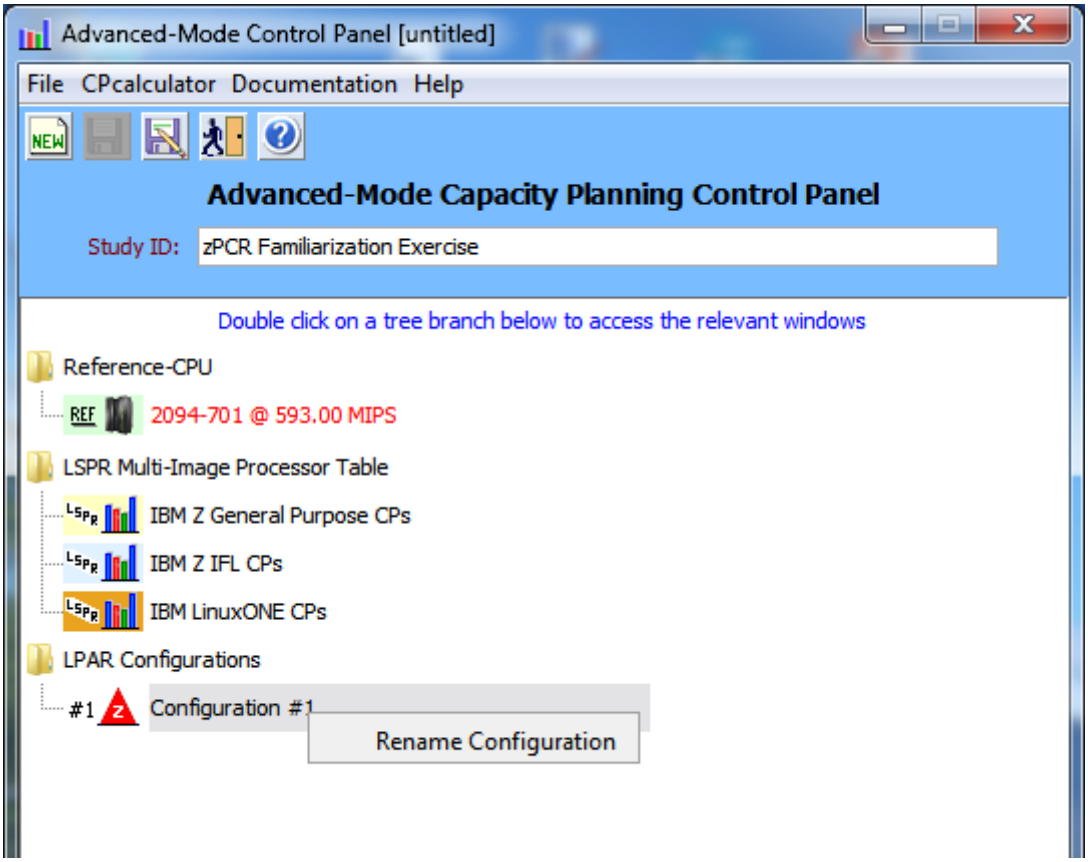
Task-3: **Rename configuration and review capacity**

Rename the LPAR configuration and review the capacity assessment.

Analysis Steps

1. Rename "**Configuration #1**" to "**Current zEC12 2827-707**". On the ***Advanced-Mode 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.

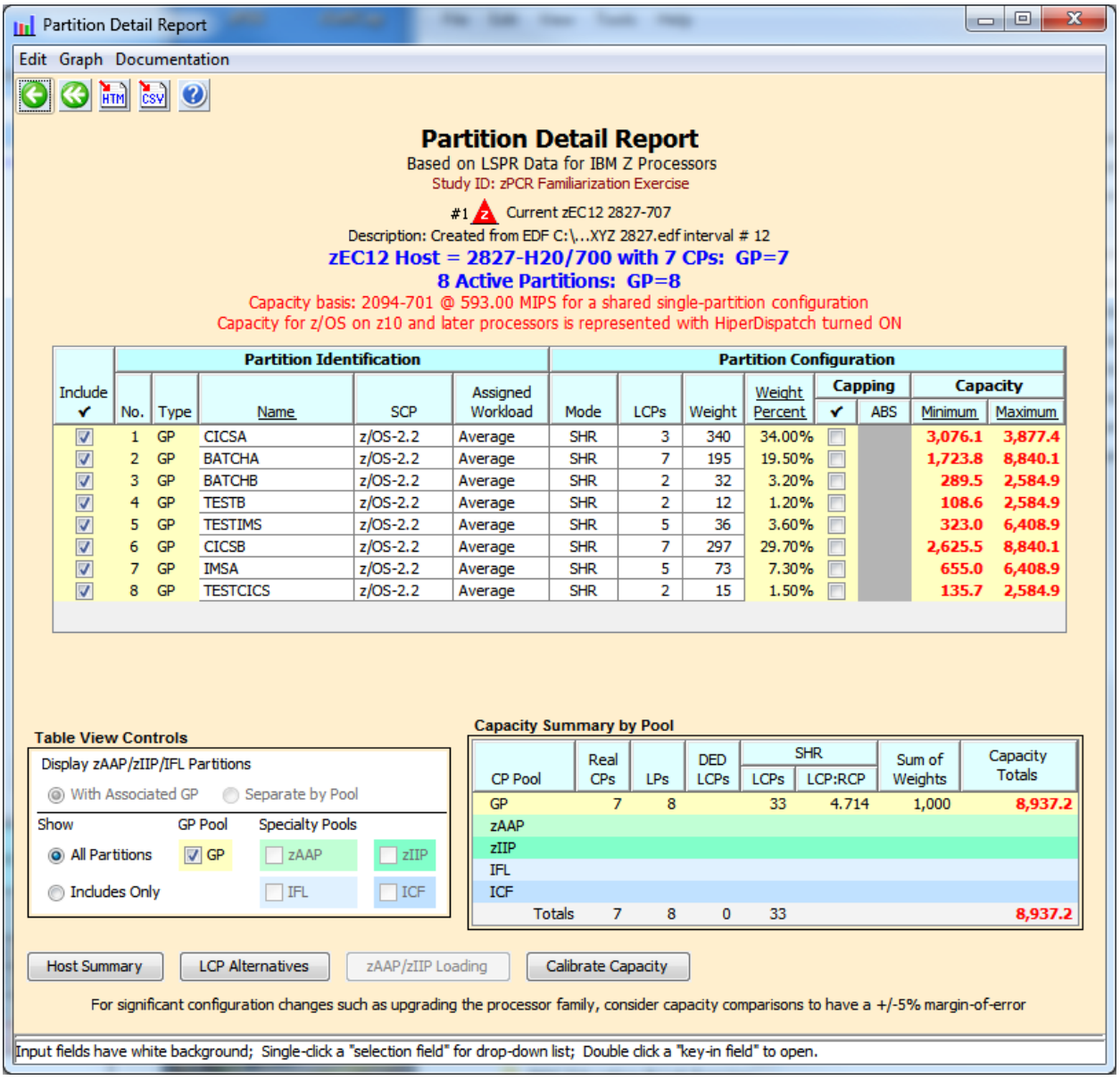


3. Click the **Rename Configuration** button, key in the LPAR configuration name that you wish to use, and press **Enter**.

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

4. Double-click **#1 Current EC12 2827-707** 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 **8,937 MIPS**.



Task-4: **Save the study**

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

Analysis Steps

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

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

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

Browse the ***z/OS-2.2 Multi-Image LSPR Capacity Ratios*** table to find an **IBM z14** processor that can provide the required capacity increment using the Average workload category.

Analysis Steps

From the ***Advanced-Mode*** window

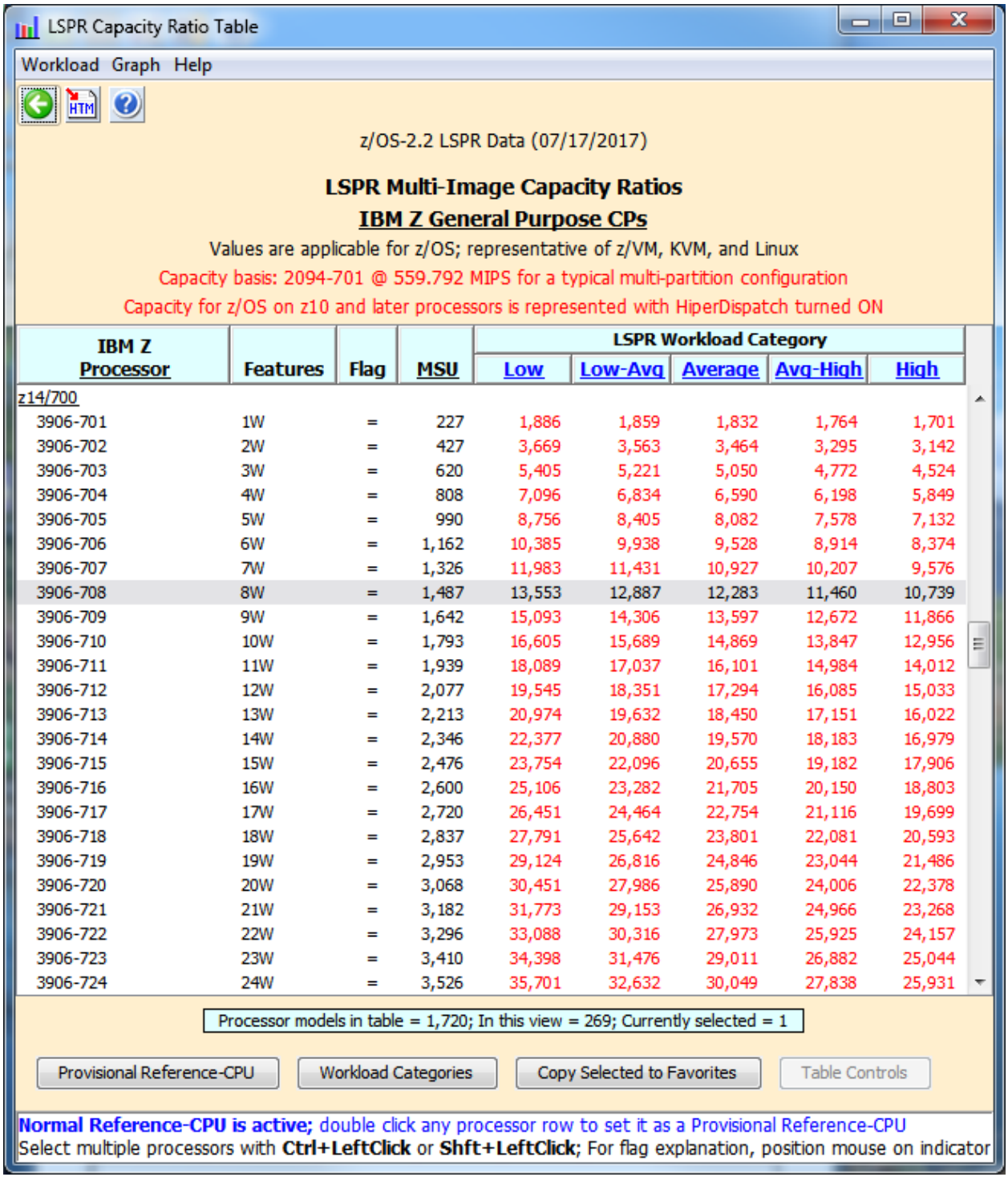
1. Double click **IBM Z General Purpose CPs** to open the ***LSPR Multi-Image Processor Capacity Ratios*** table.

2. Find the smallest **IBM z14** processor that can provide the required **12,065 MIPS** (tip: right click the table for a list of the ***Families***, select ***Scroll to IBM***, select ***z14***, and then select ***z14/700***).

   For the purposes of this exercise, choose the **3906-708**, which appears to have just a bit more capacity than we require, (e.g., **12,283** for ***Average***). **Remember that capacity values in the multi-image table represent typical (or average) partition configurations, and therefore is only a generalization of capacity**.

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

LSPR Multi-Image Capacity Ratio Table



LSPR Capacity Ratio Table

Workload Graph Help

z/OS-2.2 LSPR Data (07/17/2017)

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
z14/700								
3906-701	1W	=	227	1,886	1,859	1,832	1,764	1,701
3906-702	2W	=	427	3,669	3,563	3,464	3,295	3,142
3906-703	3W	=	620	5,405	5,221	5,050	4,772	4,524
3906-704	4W	=	808	7,096	6,834	6,590	6,198	5,849
3906-705	5W	=	990	8,756	8,405	8,082	7,578	7,132
3906-706	6W	=	1,162	10,385	9,938	9,528	8,914	8,374
3906-707	7W	=	1,326	11,983	11,431	10,927	10,207	9,576
3906-708	8W	=	1,487	13,553	12,887	12,283	11,460	10,739
3906-709	9W	=	1,642	15,093	14,306	13,597	12,672	11,866
3906-710	10W	=	1,793	16,605	15,689	14,869	13,847	12,956
3906-711	11W	=	1,939	18,089	17,037	16,101	14,984	14,012
3906-712	12W	=	2,077	19,545	18,351	17,294	16,085	15,033
3906-713	13W	=	2,213	20,974	19,632	18,450	17,151	16,022
3906-714	14W	=	2,346	22,377	20,880	19,570	18,183	16,979
3906-715	15W	=	2,476	23,754	22,096	20,655	19,182	17,906
3906-716	16W	=	2,600	25,106	23,282	21,705	20,150	18,803
3906-717	17W	=	2,720	26,451	24,464	22,754	21,116	19,699
3906-718	18W	=	2,837	27,791	25,642	23,801	22,081	20,593
3906-719	19W	=	2,953	29,124	26,816	24,846	23,044	21,486
3906-720	20W	=	3,068	30,451	27,986	25,890	24,006	22,378
3906-721	21W	=	3,182	31,773	29,153	26,932	24,966	23,268
3906-722	22W	=	3,296	33,088	30,316	27,973	25,925	24,157
3906-723	23W	=	3,410	34,398	31,476	29,011	26,882	25,044
3906-724	24W	=	3,526	35,701	32,632	30,049	27,838	25,931

Processor models in table = 1,720; In this view = 269; 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 LPAR host intended upgrade**

Using the current zEC12 LPAR configuration as a starting point, we will transfer it to the new **IBM z14** processor, making any necessary adjustments to the partition definitions.

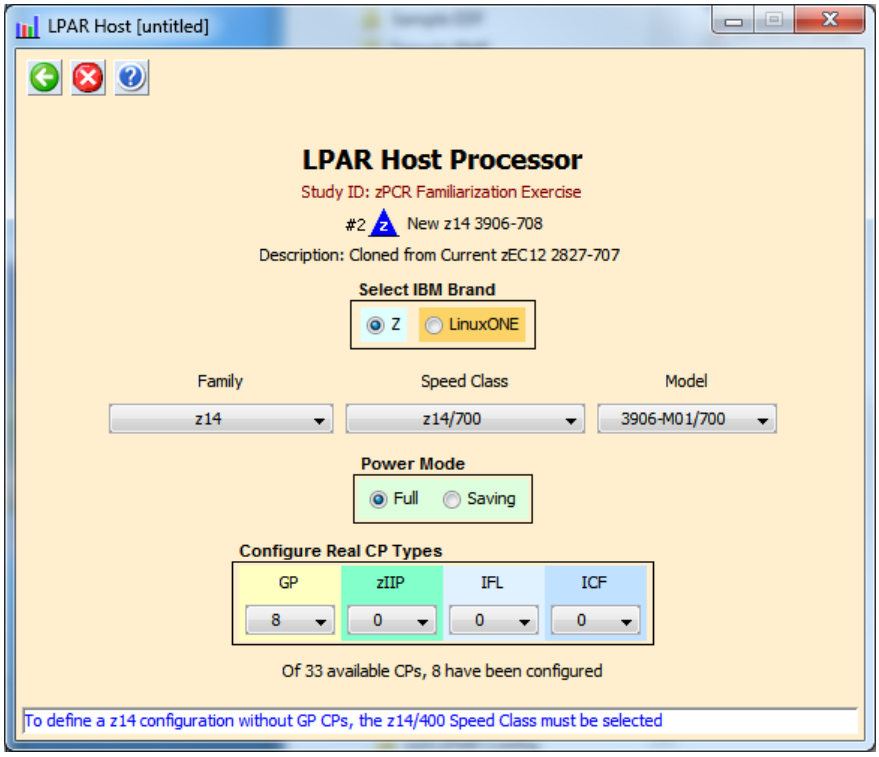
Analysis Steps

1. Single-click **#1 Current zEC12 2827-707** on the ***Advanced-Mode 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 z14 3906-708** (see Task 3 if you need be reminded how to rename).

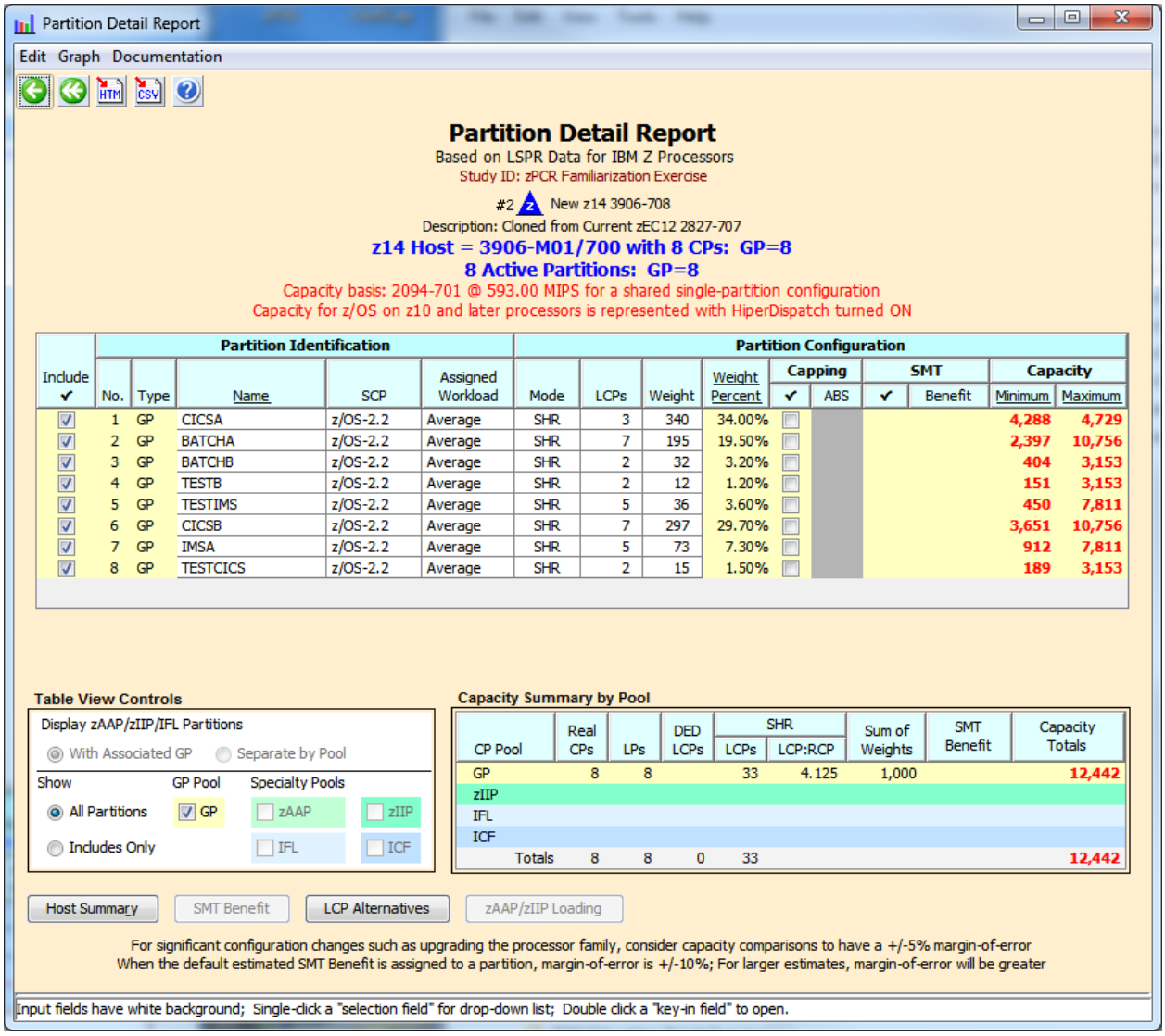
3. Double-click **#2 New z14 3906-708** to open the ***LPAR Host and Partition Configuration*** window for that LPAR configuration.

4. Click **Specify Host** to open the ***LPAR Host*** window.
   a) In the ***Select IBM Brand*** group box, choose **Z**.
   b) Set the ***Family*** to **z14**.
   c) Set the ***Speed Class*** to **z14/700**.
   d) Set the ***Model*** to **3906-M01/700** (this model has a maximum of 33 CPs).
   e) Leave ***Power Mode*** set to **Full**.
   f) Set ***General Purpose CPs*** to **8** (recognized as a **3906-708**). There are no other CP types planned at this time.



   g) Click **Return**.

5. Click **Partition Detail** in the **Capacity Reports** group box.



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

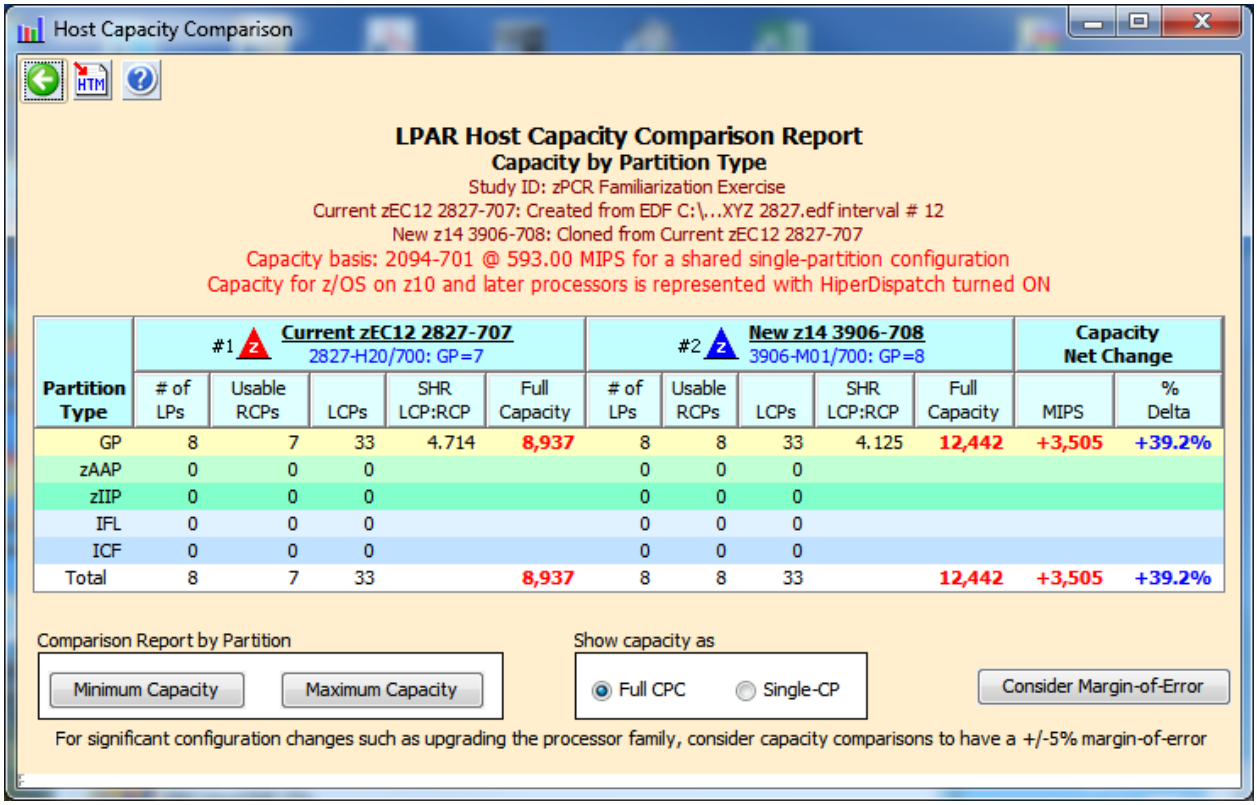
Using the capacity results for this new LPAR host, determine if we realized the desired 35% capacity increase (**12,065 MIPS**), for the overall host and for each individual partition.

Analysis Steps

1. On the ***Partition Detail Report*** window, the overall effective capacity for the **z14 3906-708** is **12,442 MIPS** for this LPAR configuration. The effective capacity for the **zEC12 2827-707** was **8,937 MIPS** (see Current 2827-707).

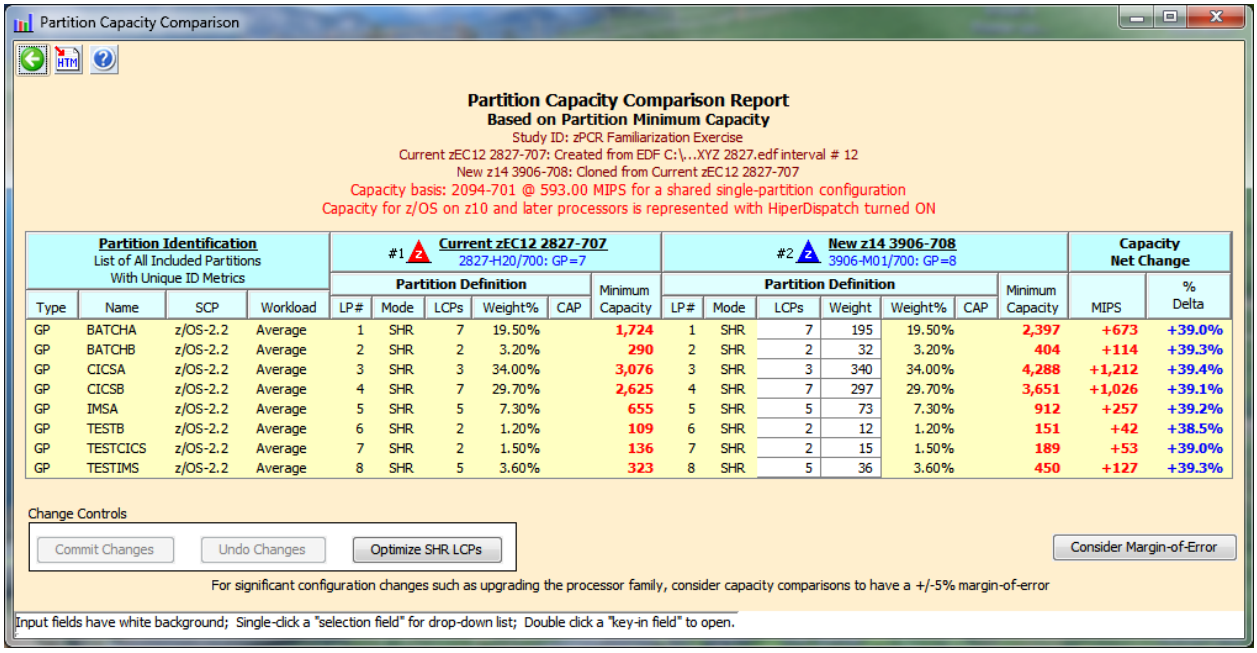
2. Click **Double Return** to close the ***LPAR Configuration*** windows and return to the ***Advanced-Mode Control Panel*** window.

3. On the ***Advanced-Mode Control Panel*** window, select the two configurations. Click on one, press the **Ctrl** key 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.

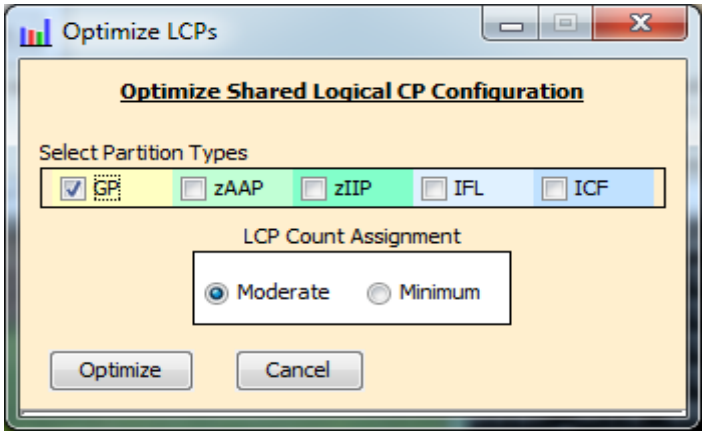


Partition Type	#1 Current zEC12 2827-707 2827-H20/700: GP=7 # of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	#2 New z14 3906-708 3906-M01/700: GP=8 # of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	Capacity Net Change MIPS	% Delta
GP	8	7	33	4.714	8,937	8	8	33	4.125	12,442	+3,505	+39.2%
zAAP	0	0	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		8,937	8	8	33		12,442	+3,505	+39.2%

4. Click **Minimum Capacity** in the ***Comparison Report by Partition*** group box. Note that all of the partitions see an increase of 35% or more.

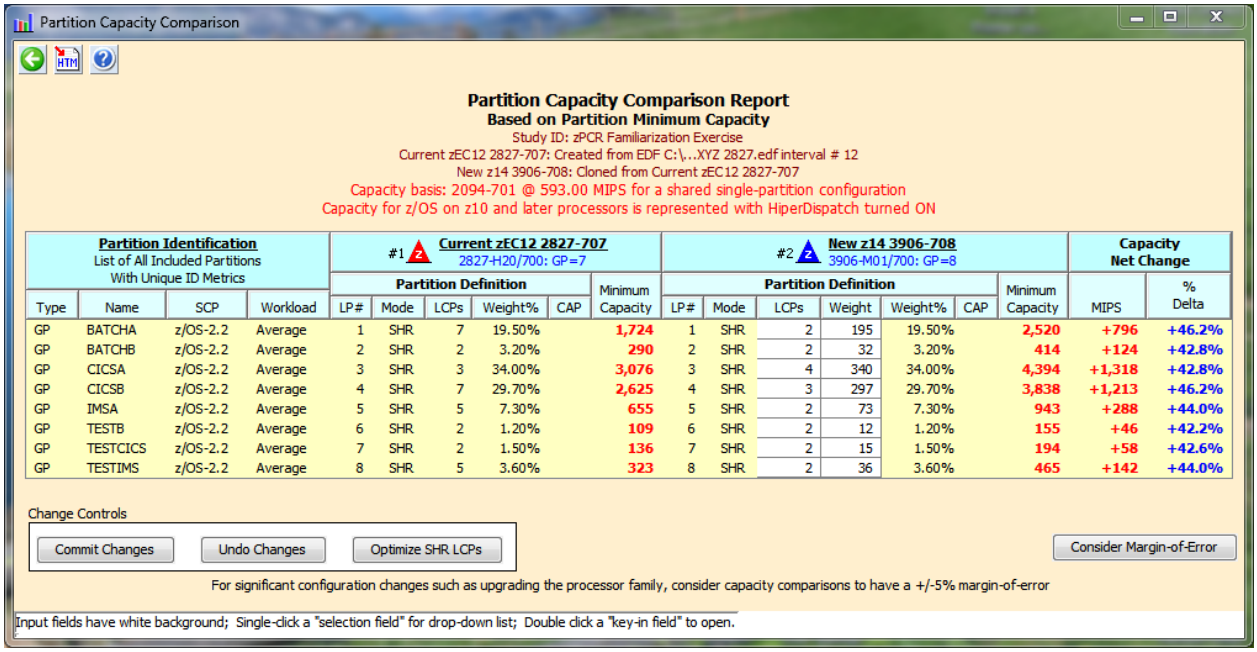


5. Click **Optimize SHR LCPs** in the ***Change Controls*** group box to see if you can improve the results by reducing the number of LCPs assigned to each partition to that required to accommodate its weight.



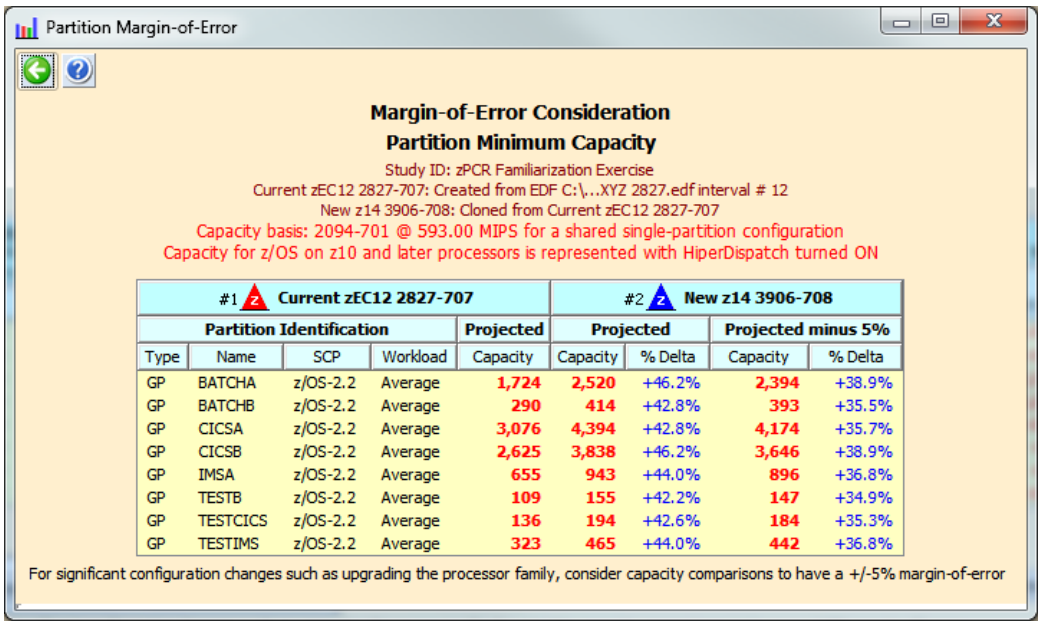
6. Using the default setting, **Moderate**, click **Optimize** to reduce the number of logical CPs assigned to each partition. Reducing the number of logical CPs can improve capacity. The partition's weight percent is used to determine the exact number of LCPs (rounded up to the nearest whole number).

   Note: For availability purposes, no less than 2 logical CPs will ever be assigned.



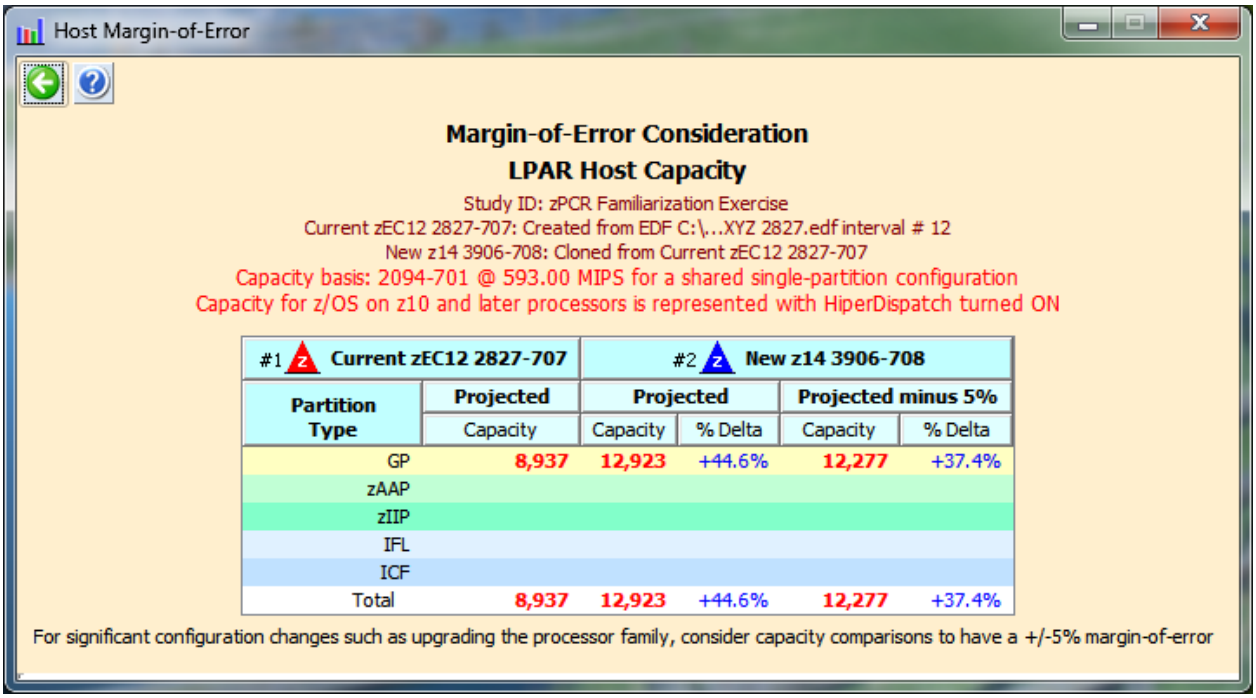
7. Click **Consider Margin-of-Error**

   The capacity expectation derived from **zPCR** for a new machine should normally be considered to have up to a ±5% Margin-of-Error. The full ±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 of the partitions realize the intended 35% capacity increase (rounded to a whole percent) when considering the ±5% Margin-of-Error.



8. 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**).

9. 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 **12,923 MIPS** (**12,277 MIPS** when considering the ±5% Margin-of-Error), both of which are greater than the **12,065 MIPS** objective.



#1 Current zEC12 2827-707		#2 New z14 3906-708			
Partition Type	Projected Capacity	Projected Capacity	% Delta	Projected minus 5% Capacity	% Delta
GP	8,937	12,923	+44.6%	12,277	+37.4%
zAAP					
zIIP					
IFL					
ICF					
Total	8,937	12,923	+44.6%	12,277	+37.4%

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

11. From the menu bar on the ***Advanced-Mode 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 **12,065 MIPS** overall objective and 35% improvement for each partition even when considering a potential ±5% Margin-of-Error.

*** End of Task-1 through 7 ***

Additional Analysis to Try

Task-8: **Evaluate a z14/600 (slower GP CPs) as an alternative**

Browsing the ***z/OS-2.2 Multi-Image LSPR Capacity Ratios*** table, find the **IBM z14/600** processor that can provide the required capacity increment using the z/OS Average workload.

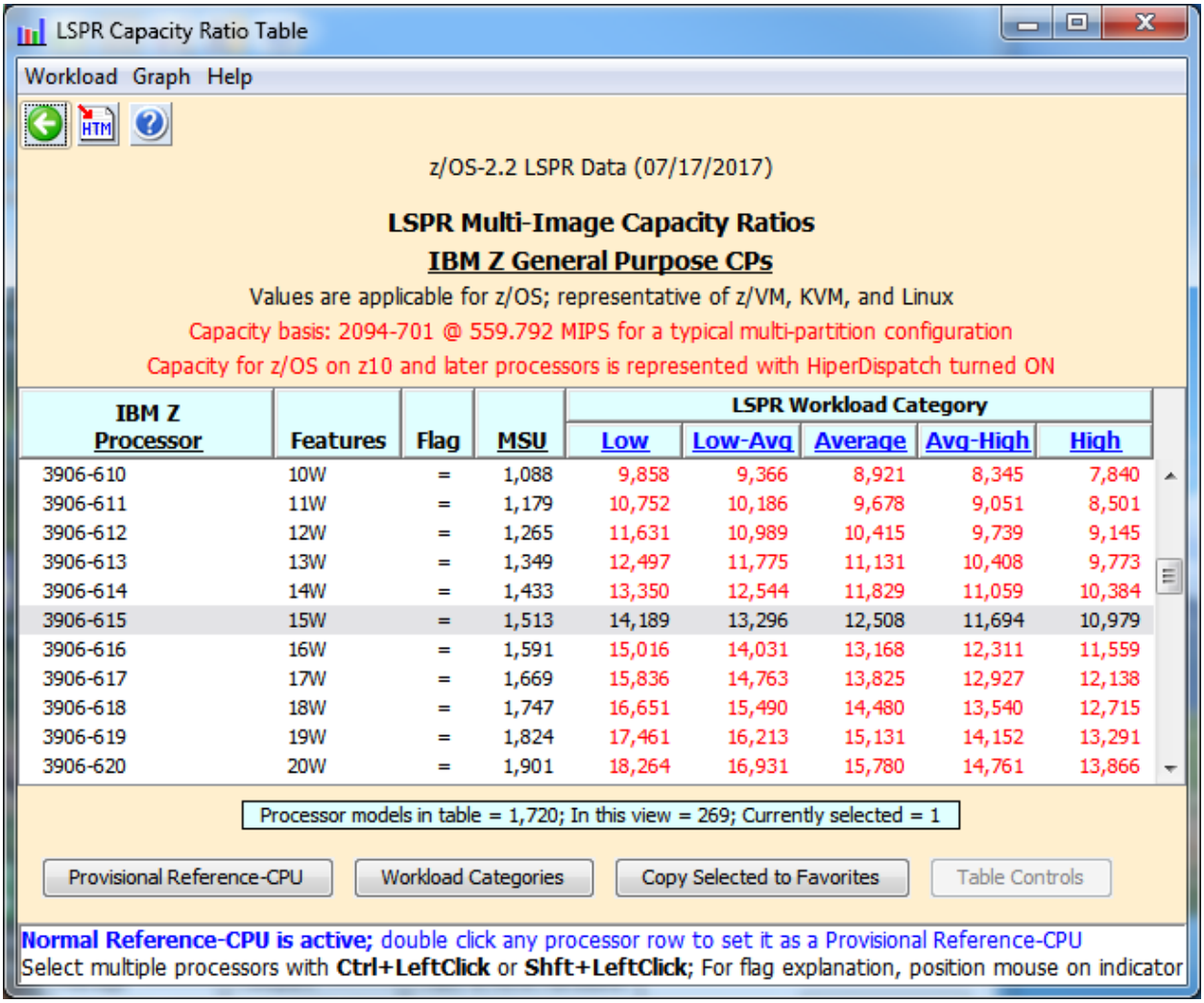
Determine the intended LPAR host

From the ***Advanced-Mode*** window,

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

2. Find an **IBM z14/600** processor that can provide the required **12,065 MIPS** (right click for a list of the Families, then select via **Scroll to IBM**, **z14**, **z14/600**)

For the purposes of this exercise, choose the **3906-615**, which appears to have a bit more capacity than we require, (e.g., **12,508 MIPS** for ***Average***). **Remember that capacity values in the multi-image table represent typical (or average) partition configurations, and therefore is only a generalization of capacity**.



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

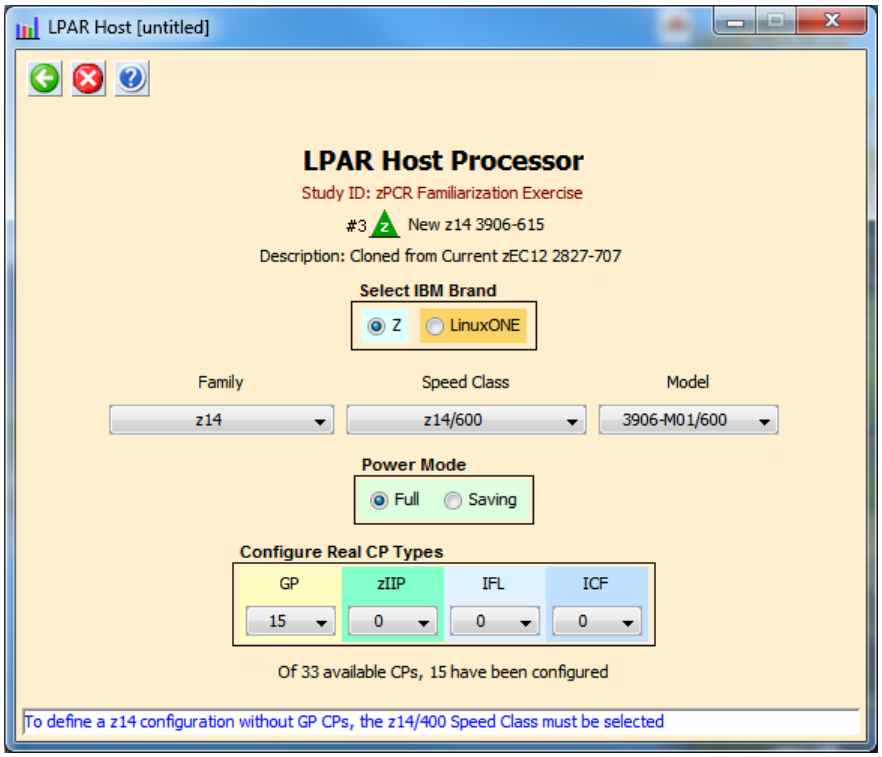
Define new LPAR host

4. Single-click **#1 Current zEC12 2827-707** on the ***Advanced-Mode Control Panel*** window to select it.

5. Click the **Clone** toolbar button. #3 LPAR configuration is created as an exact copy of the 1st. Rename it to **New z14 3906-615 (see Task 3 if you need be reminded how to rename).**

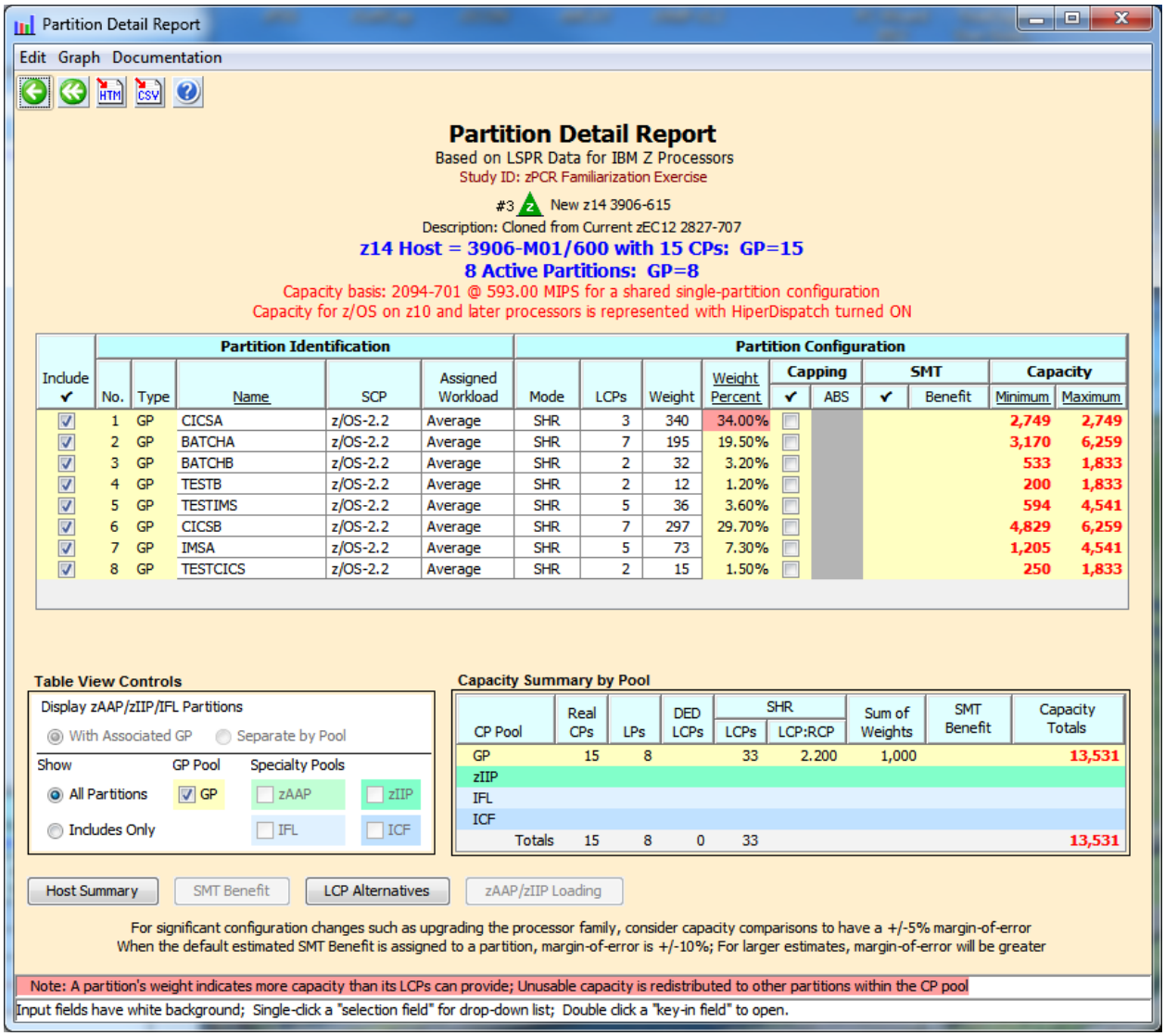
6. Double-click **#3 New z14 3906-615** to open the ***LPAR Host and Partition Configuration*** window for that LPAR configuration.

7. Click **Specify Host** to open the ***LPAR Host*** window.
   a) In the ***Select IBM Brand*** group box, choose **Z**.
   b) Set the ***Family*** to **z14**.
   c) Set the ***Speed Class*** to **z14/600**.
   d) Set the ***Model*** to **3906-M01/600** (this model has a maximum of 33 CPs).
   e) Leave ***Power Mode*** set to **Full**.
   f) Set ***General Purpose CPs*** to **15** (recognized as a **3906-615**).



   g) Click **Return**

8. On the ***LPAR Host and Partition Configuration*** window, in the ***Capacity Reports*** group box, click **Partition Detail**. Using the ***Partition Detail Report*** window, review the capacity values for the General Purpose CP pool.

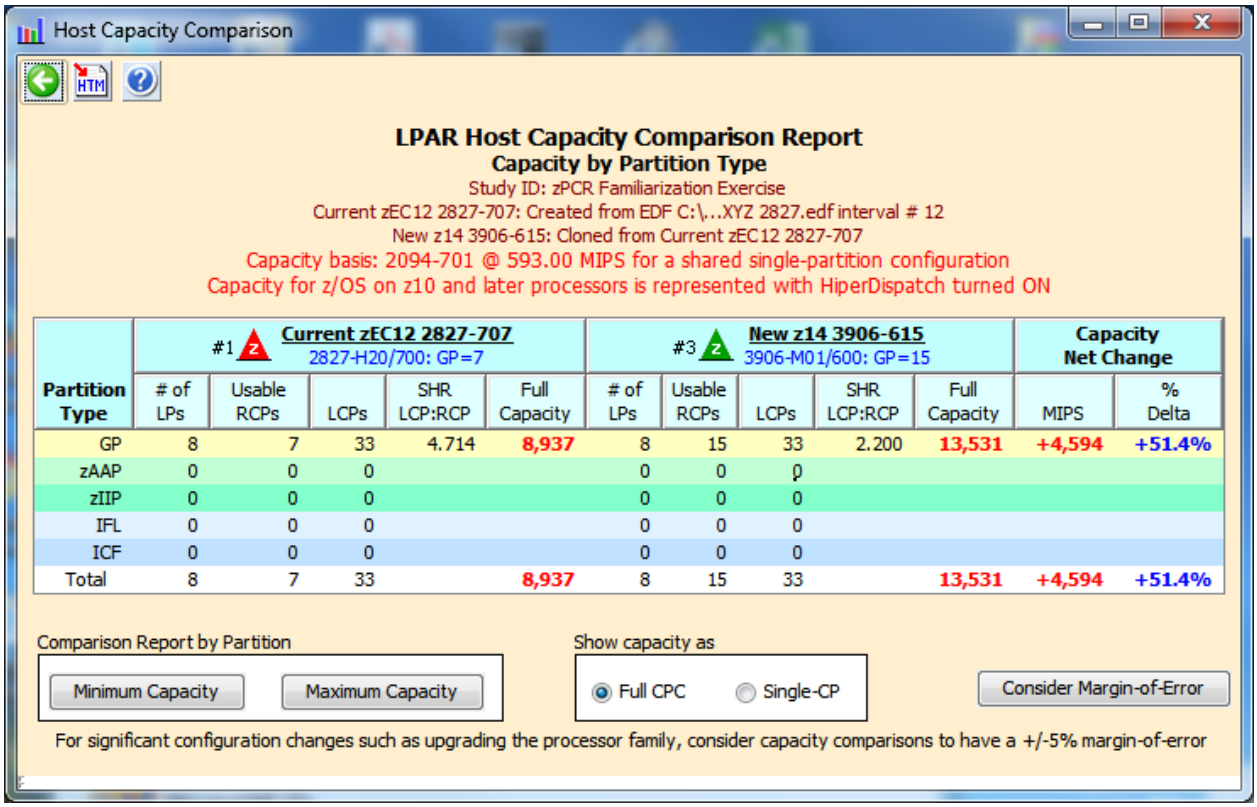


The 1st partition, **CICSA**, has an insufficient number of LCPs to satisfy its relative weight assignment. This will be corrected with the **Optimize** in step 12 below.

Note that the total capacity of **13,531 MIPS** exceeds the **12,065 MIPS** requirement.

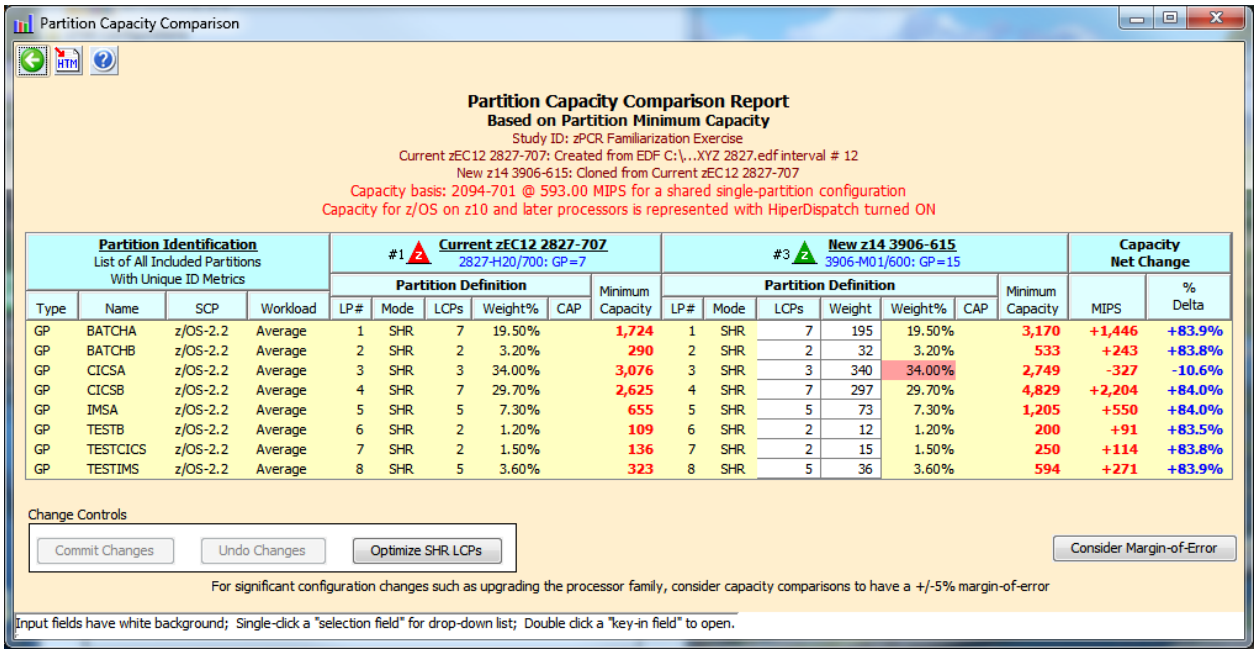
9. Click **Double Return** to close the ***LPAR Configuration*** windows and return to the ***Advanced-Mode Control Panel*** window.

10. Select both **#1 Current zEC12 2827-707** and **#3 New z14 3906-615**. Click on one, press the **Ctrl** key and click on the other. Then click **Compare** icon on the ***Advanced-Mode Control Panel*** window.



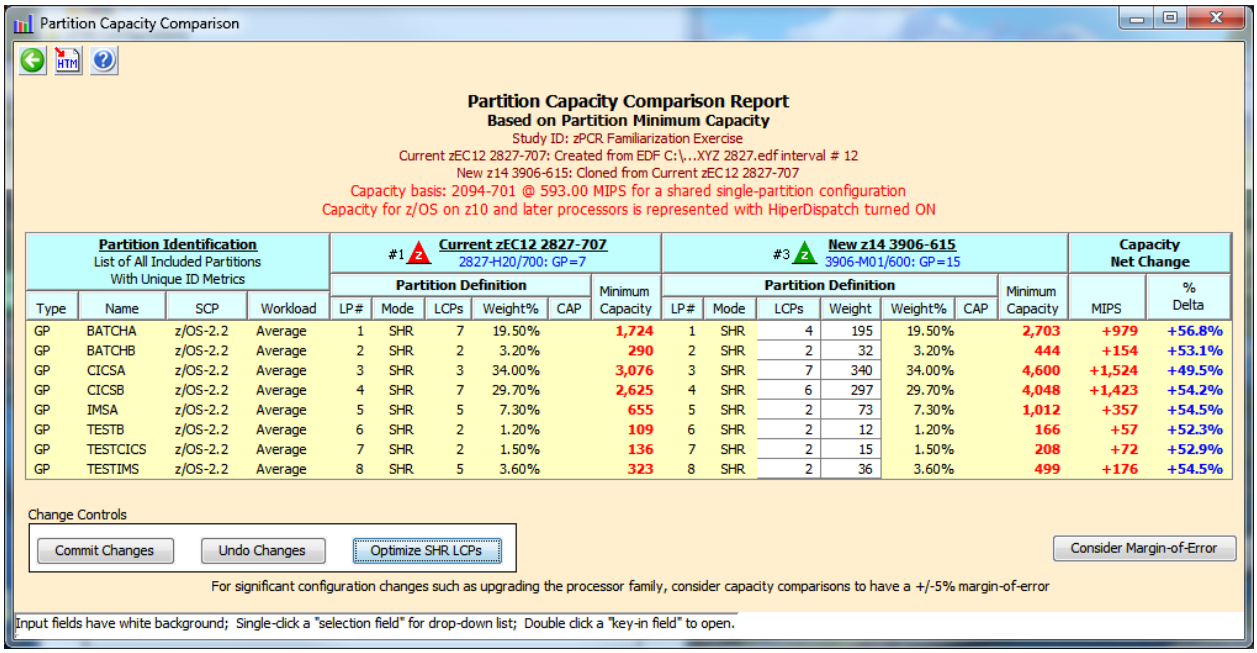
Partition Type	#1 Current zEC12 2827-707 2827-H20/700: GP=7 # of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	#3 New z14 3906-615 3906-M01/600: GP=15 # of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	Capacity Net Change MIPS	% Delta
GP	8	7	33	4.714	8,937	8	15	33	2.200	13,531	+4,594	+51.4%
zAAP	0	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		8,937	8	15	33		13,531	+4,594	+51.4%

11. Click **Minimum Capacity**. Note that now every partition except for **CICSA** sees more than the required 35% capacity increase over that of the current 2827-707 configuration.



Partition Identification List of All Included Partitions With Unique ID Metrics Type	Name	SCP	Workload	#1 Current zEC12 2827-707 2827-H20/700: GP=7 Partition Definition LP#	Mode	LCPs	Weight%	CAP	Minimum Capacity	#3 New z14 3906-615 3906-M01/600: GP=15 Partition Definition LP#	Mode	LCPs	Weight	Weight%	CAP	Minimum Capacity	Capacity Net Change MIPS	% Delta
GP	BATCHA	z/OS-2.2	Average	1	SHR	7	19.50%		1,724	1	SHR	7	195	19.50%		3,170	+1,446	+83.9%
GP	BATCHB	z/OS-2.2	Average	2	SHR	2	3.20%		290	2	SHR	2	32	3.20%		533	+243	+83.8%
GP	CICSA	z/OS-2.2	Average	3	SHR	3	34.00%		3,076	3	SHR	3	340	34.00%		2,749	-327	-10.6%
GP	CICSB	z/OS-2.2	Average	4	SHR	7	29.70%		2,625	4	SHR	7	297	29.70%		4,829	+2,204	+84.0%
GP	IMSA	z/OS-2.2	Average	5	SHR	5	7.30%		655	5	SHR	5	73	7.30%		1,205	+550	+84.0%
GP	TESTB	z/OS-2.2	Average	6	SHR	2	1.20%		109	6	SHR	2	12	1.20%		200	+91	+83.5%
GP	TESTCICS	z/OS-2.2	Average	7	SHR	2	1.50%		136	7	SHR	2	15	1.50%		250	+114	+83.8%
GP	TESTIMS	z/OS-2.2	Average	8	SHR	5	3.60%		323	8	SHR	5	36	3.60%		594	+271	+83.9%

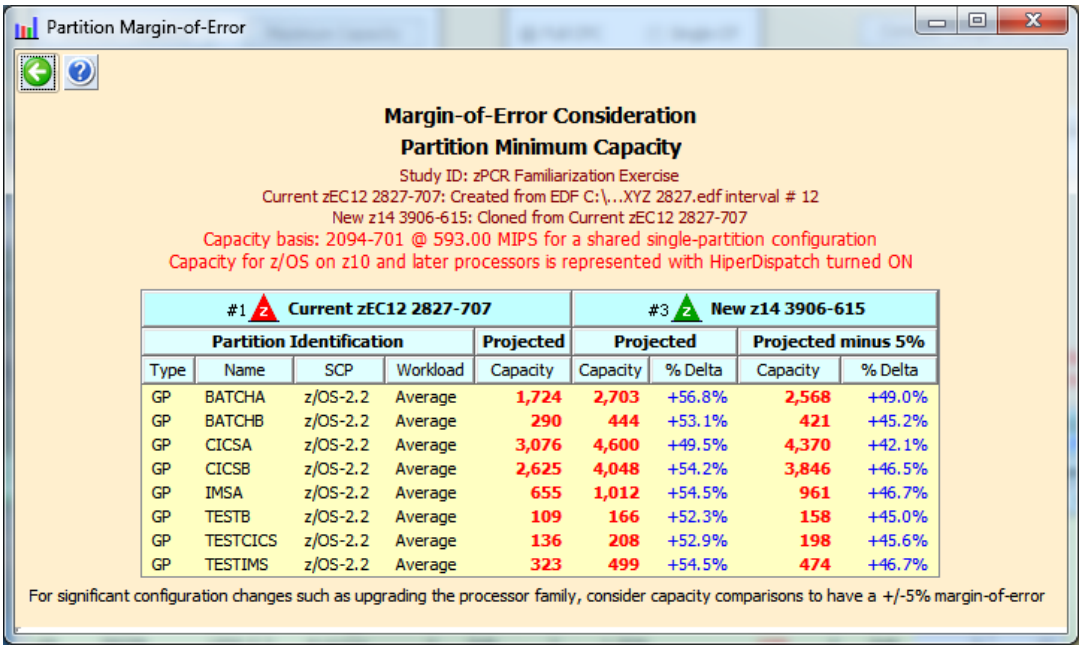
12. Click **Optimize SHR LCPs** for GPs in the ***Change Controls*** group box to see if you can improve the results by reducing (or increasing) the number of LCPs assign to each partition to that required to accommodate its weight. Click **Optimize** with the **Moderate** option.



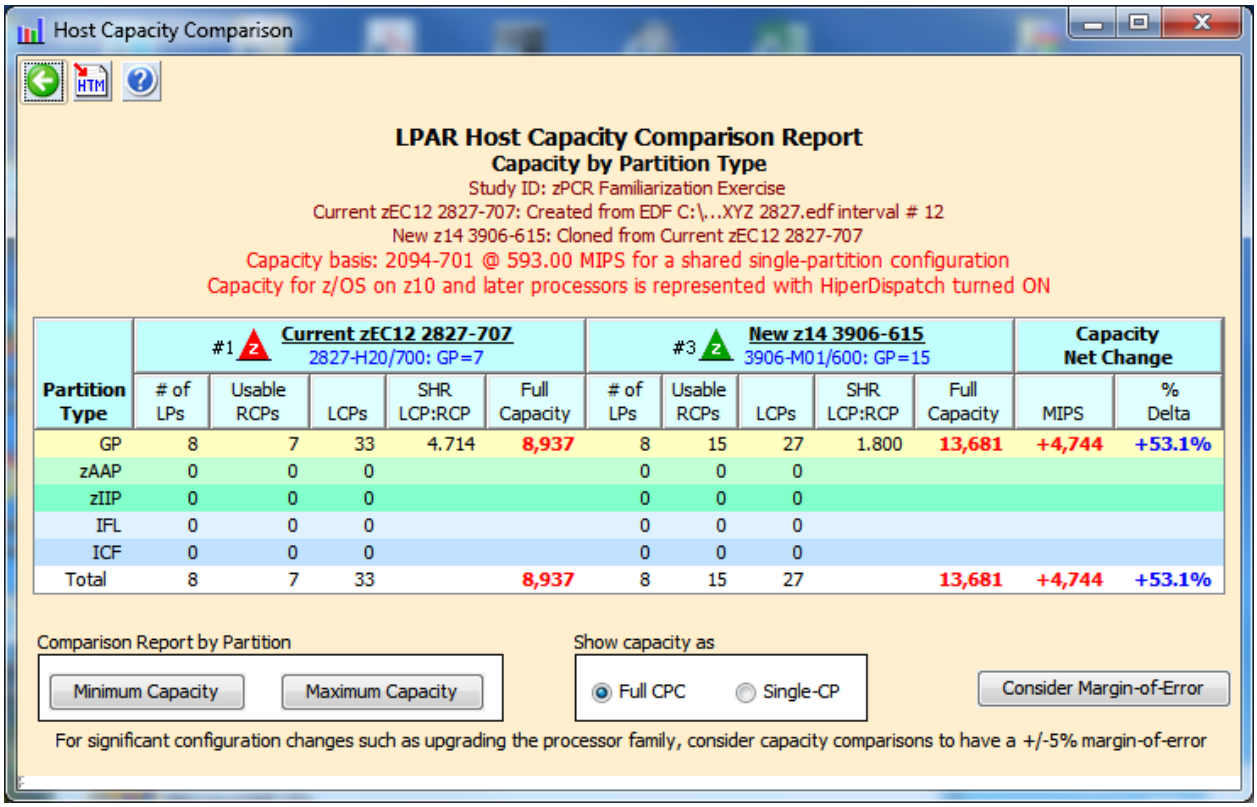
The **CICSA** partition now has 49.5% more capacity and we have more than met our 36% objective for all partitions. For availability reasons, **Optimize** will always provide at least a minimum of 2 LCPs for GP partitions.

Note that the Optimize operation increased the number of LCPs for CICSA from 3 to 7. This change now allows its assigned relative weight to be met.

13. Click on **Consider Margin of Error**. We also want to validate that all of the partitions have enough capacity to ensure they cover the -5% Margin-of-Error. We can see that all partitions are greater than the desired 35% delta on the **Projected minus 5%**.capacity.



14. First 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***). Note that the ***Host Capacity Comparison*** window now shows we are delivering **13,681 MIPS**, which is more than the **12,065 MIPS** objective.



Partition Type	#1 Current zEC12 2827-707 2827-H20/700: GP=7 # of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	#3 New z14 3906-615 3906-M01/600: GP=15 # of LPs	Usable RCPs	LCPs	SHR LCP:RCP	Full Capacity	Capacity Net Change MIPS	% Delta
GP	8	7	33	4.714	**8,937**	8	15	27	1.800	**13,681**	**+4,744**	**+53.1%**
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		**8,937**	8	15	27		**13,681**	**+4,744**	**+53.1%**

15. Click two **Return** buttons to close the comparison windows.

16. From the menu bar on the ***Advanced-Mode Control Panel*** window click **File→Save as**, and save the complete study which will include both LPAR configurations (e.g., **Lab Task-8.zpcr**).

While we won't execute the following in this lab, there are some things to consider since this **z14 3906-615** has considerable more capacity than is required. Perhaps a **z14 3906-614** could be an option, although getting 35% more capacity for each partition with a ±5% Margin-of-Error is unlikely. If the partitions have **zIIP/zAAP eligible workload content**, perhaps a smaller GP configuration would satisfy the overall capacity requirement.

In addition, this sub-capacity model has "more & slower" engines than the **zEC12 2827-707** and the **z14 3906-707** option (which will be shown and briefly discussed at the end of the lab).

In summary there are many additional "real world" considerations when utilizing **zPCR** to analyze **IBM Z** configuration alternatives to achieve desired capacity.

*** End of Additional Analysis Task-8 ***

Task-9: **Add IFL and zIIP CPs to z14 Host and Configure Partitions to Exploit**

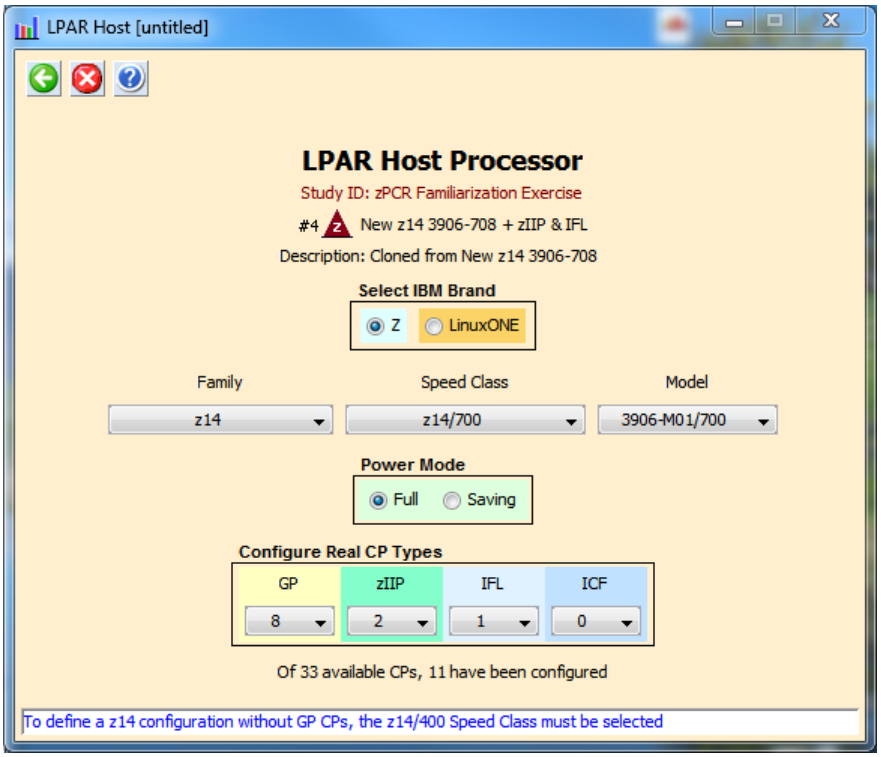
Analysis Steps

1. Single-click **#2 New z14 3906-708** on the ***Advanced-Mode Control Panel*** window to select it.

2. Click the **Clone** toolbar button. #4 LPAR configuration is created as an exact copy of the 2nd. Rename it **New z14 3906-708 + zIIP & IFL** (see Task 3 if you need be reminded how to rename).

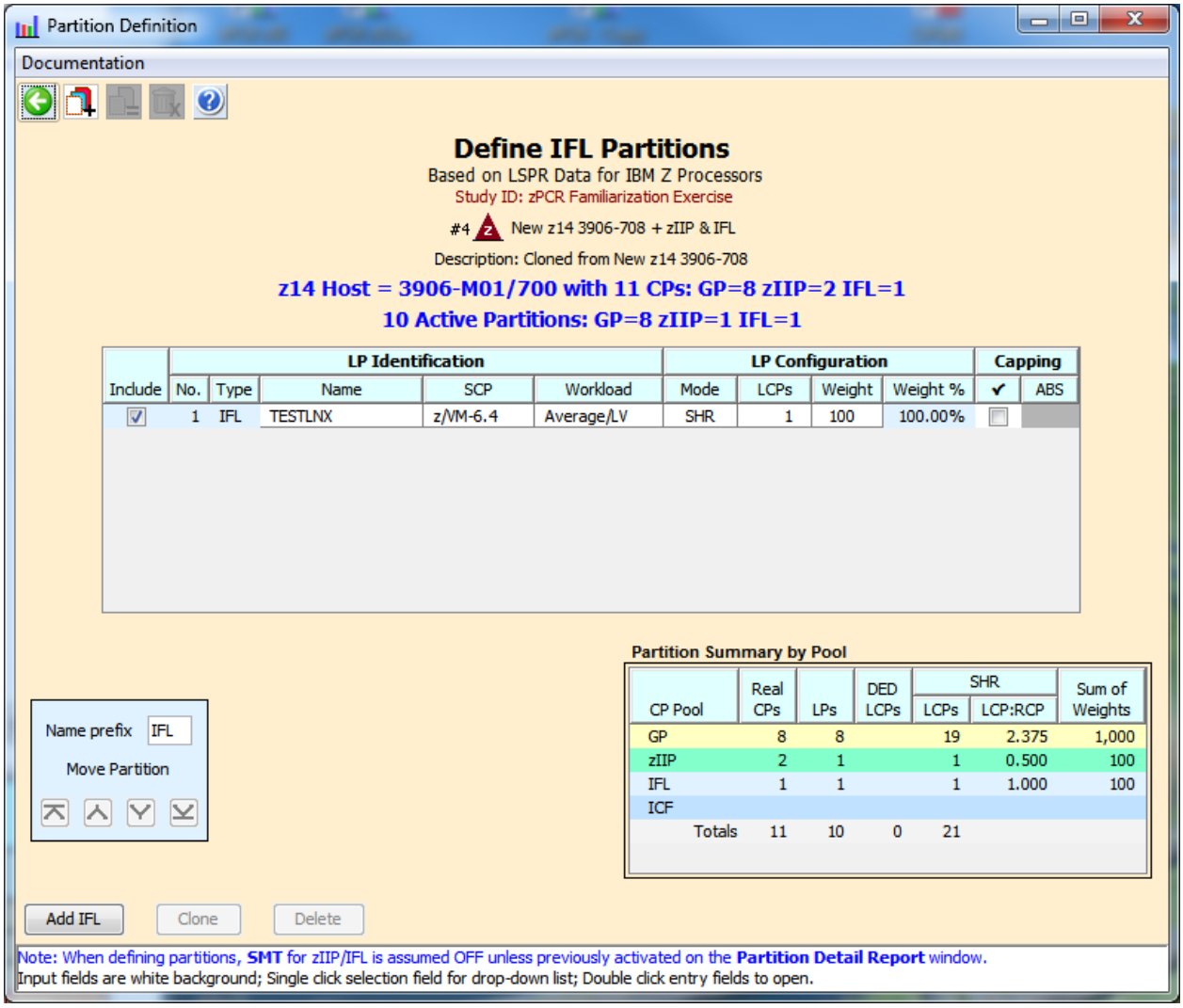
3. Double-click **#4 New z14 3906-708 + zIIP & IFL** to open the ***LPAR Host and Partition Configuration*** window for that LPAR configuration.

a) In the ***Define LPAR Host Processor*** group box, click **Specify Host**. Add 1 IFL CP and 2 zIIP CPs to the configuration.



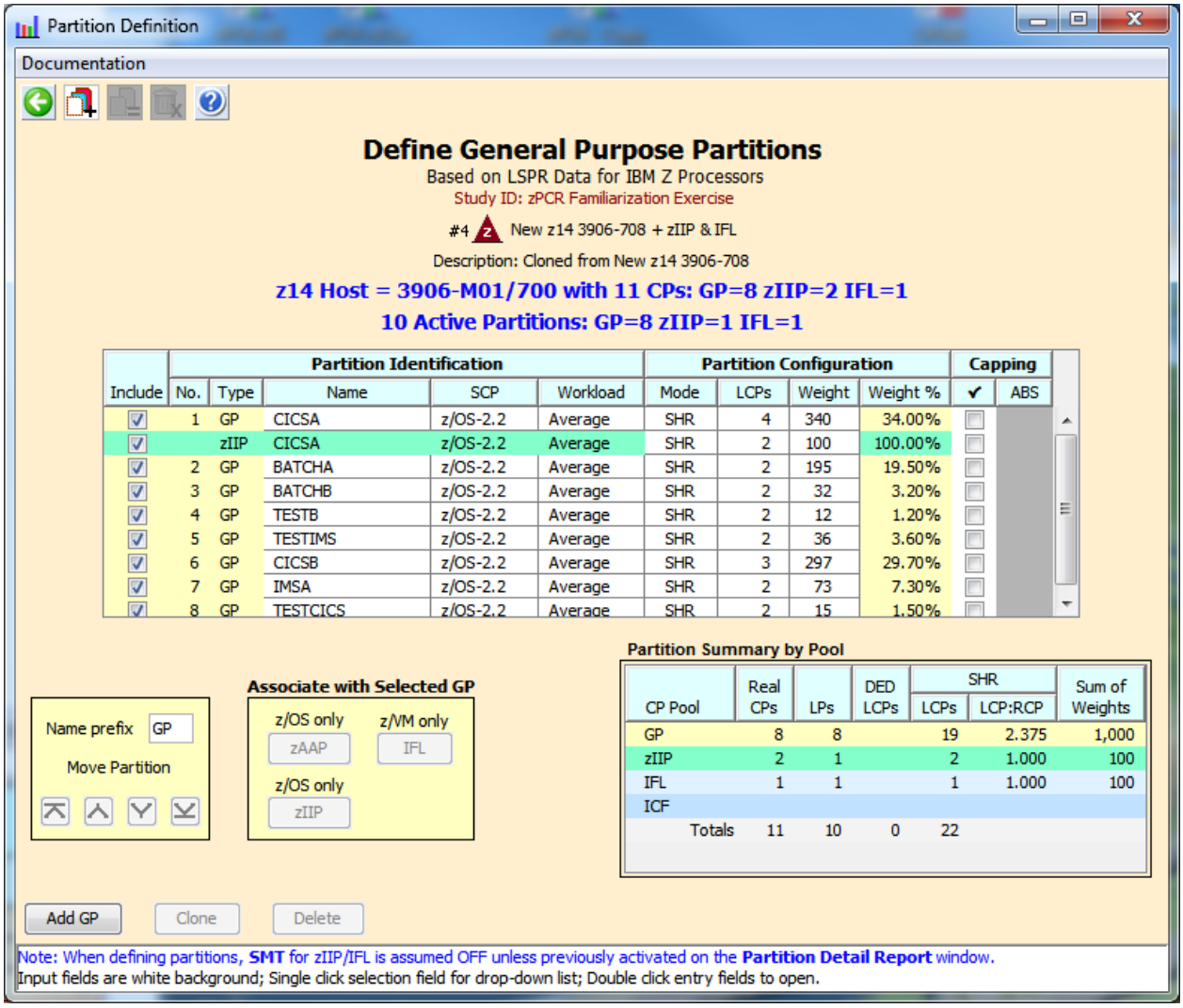
b) Click **Return**.

4. From the ***LPAR Host and Partition Configuration*** window, click **IFL** in the ***Define Partitions*** group box.
5. 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 "**TESTLNX**", and hitting enter. Leave the partition's LCPs set to **1**.



6. Click **Return**.

7. From the ***LPAR Host and Partition Configuration*** window, click **GP / zIIP** in the ***Define Partitions*** group box.
8. From the ***LPAR Partition Definition*** select the **CICSA** partition, then click on the z/OS only **zIIP** in the ***Associate with Selected GP*** group box. This will create the associated zIIP partition for **CICSA**. Assign **2** LCPs to the zIIP partition.

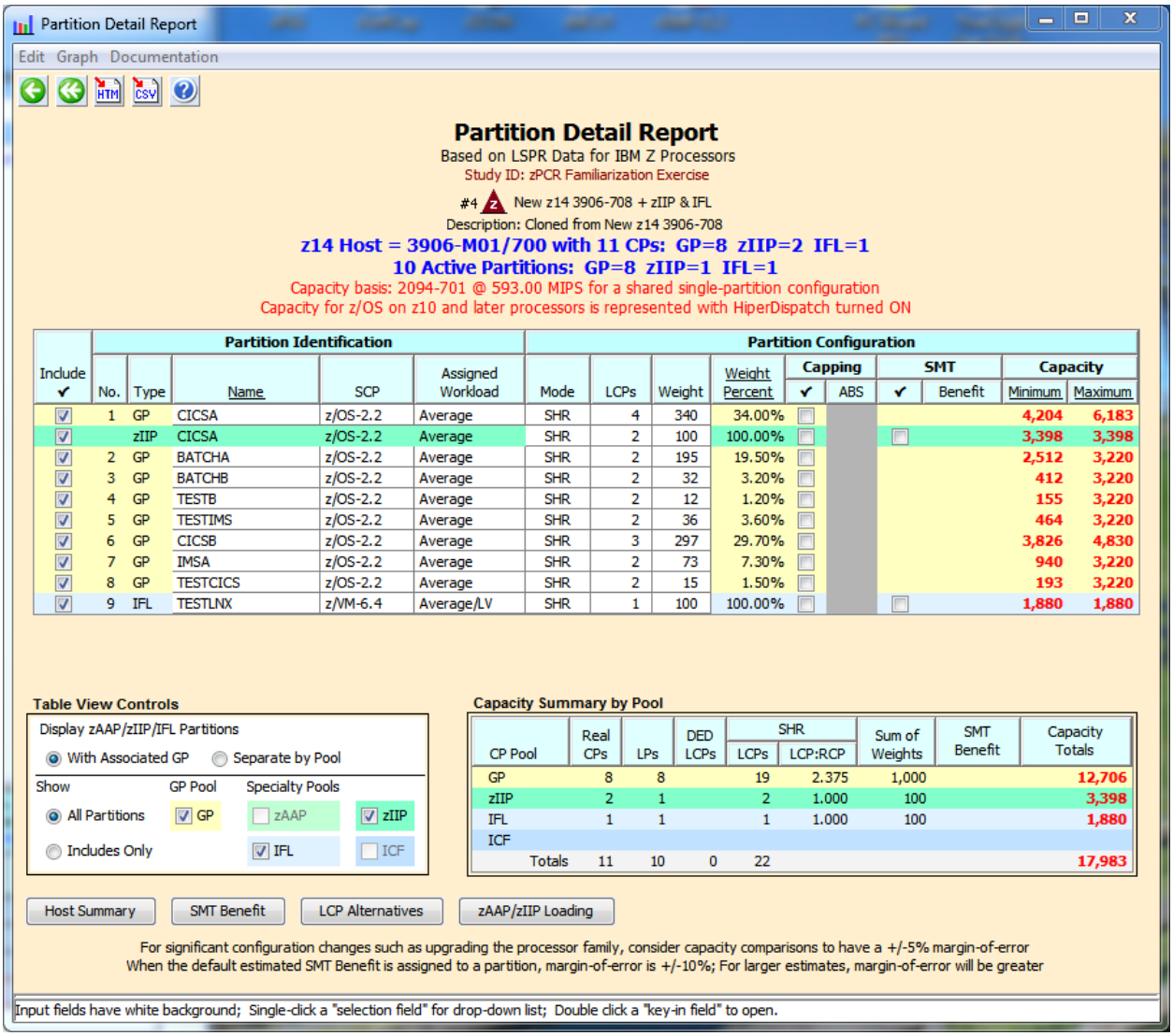


Include	Partition Identification No.	Type	Name	SCP	Workload	Partition Configuration Mode	LCPs	Weight	Weight %	Capping ✔	ABS
☑	1	GP	CICSA	z/OS-2.2	Average	SHR	4	340	34.00%	☐	
☑		zIIP	CICSA	z/OS-2.2	Average	SHR	2	100	100.00%	☐	
☑	2	GP	BATCHA	z/OS-2.2	Average	SHR	2	195	19.50%	☐	
☑	3	GP	BATCHB	z/OS-2.2	Average	SHR	2	32	3.20%	☐	
☑	4	GP	TESTB	z/OS-2.2	Average	SHR	2	12	1.20%	☐	
☑	5	GP	TESTIMS	z/OS-2.2	Average	SHR	2	36	3.60%	☐	
☑	6	GP	CICSB	z/OS-2.2	Average	SHR	3	297	29.70%	☐	
☑	7	GP	IMSA	z/OS-2.2	Average	SHR	2	73	7.30%	☐	
☑	8	GP	TESTCICS	z/OS-2.2	Average	SHR	2	15	1.50%	☐	

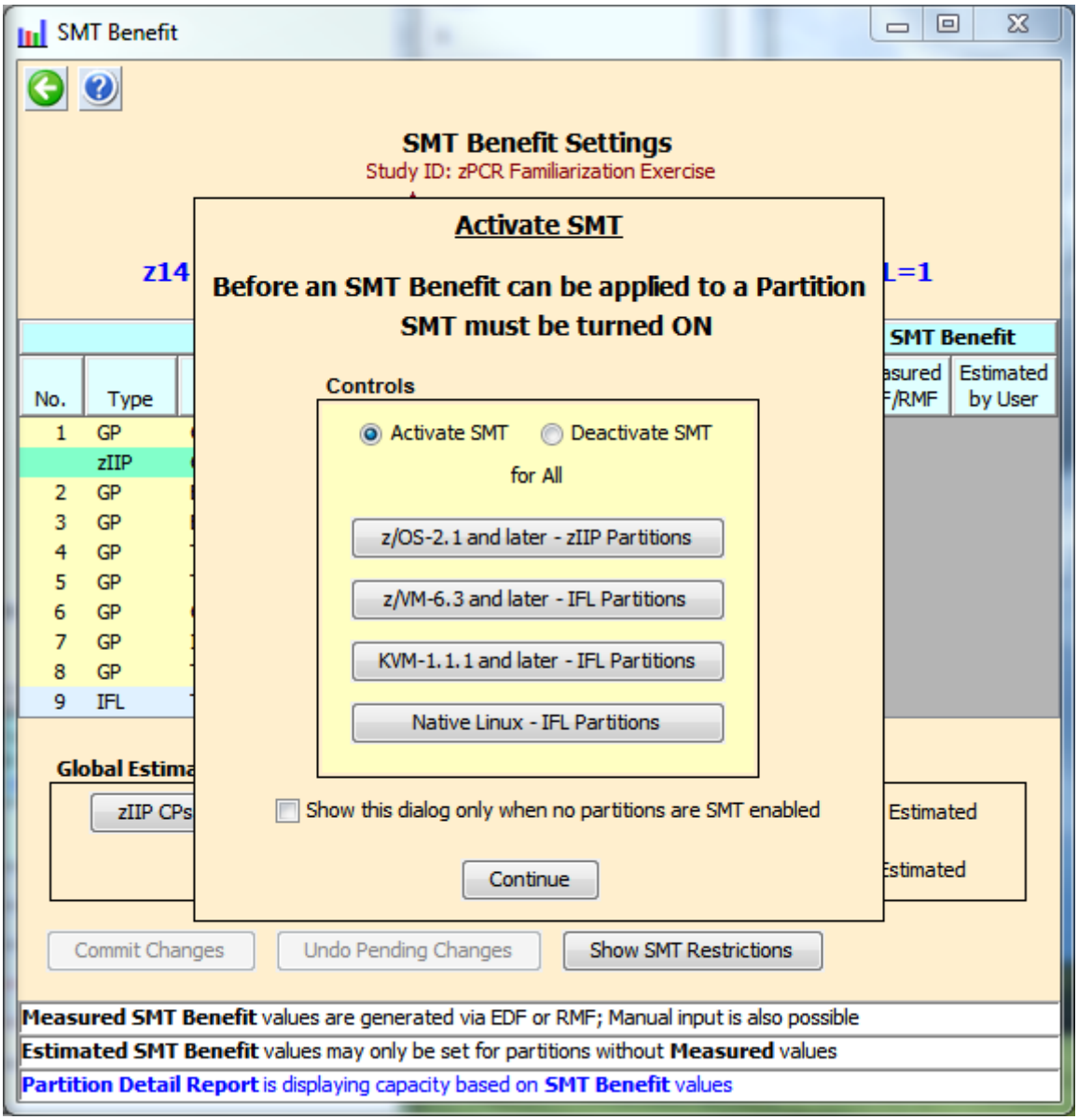
CP Pool	Real CPs	LPs	DED LCPs	SHR LCPs	SHR LCP:RCP	Sum of Weights
GP	8	8		19	2.375	1,000
zIIP	2	1		2	1.000	100
IFL	1	1		1	1.000	100
ICF						
Totals	11	10	0	22		

9. Click **Return**.

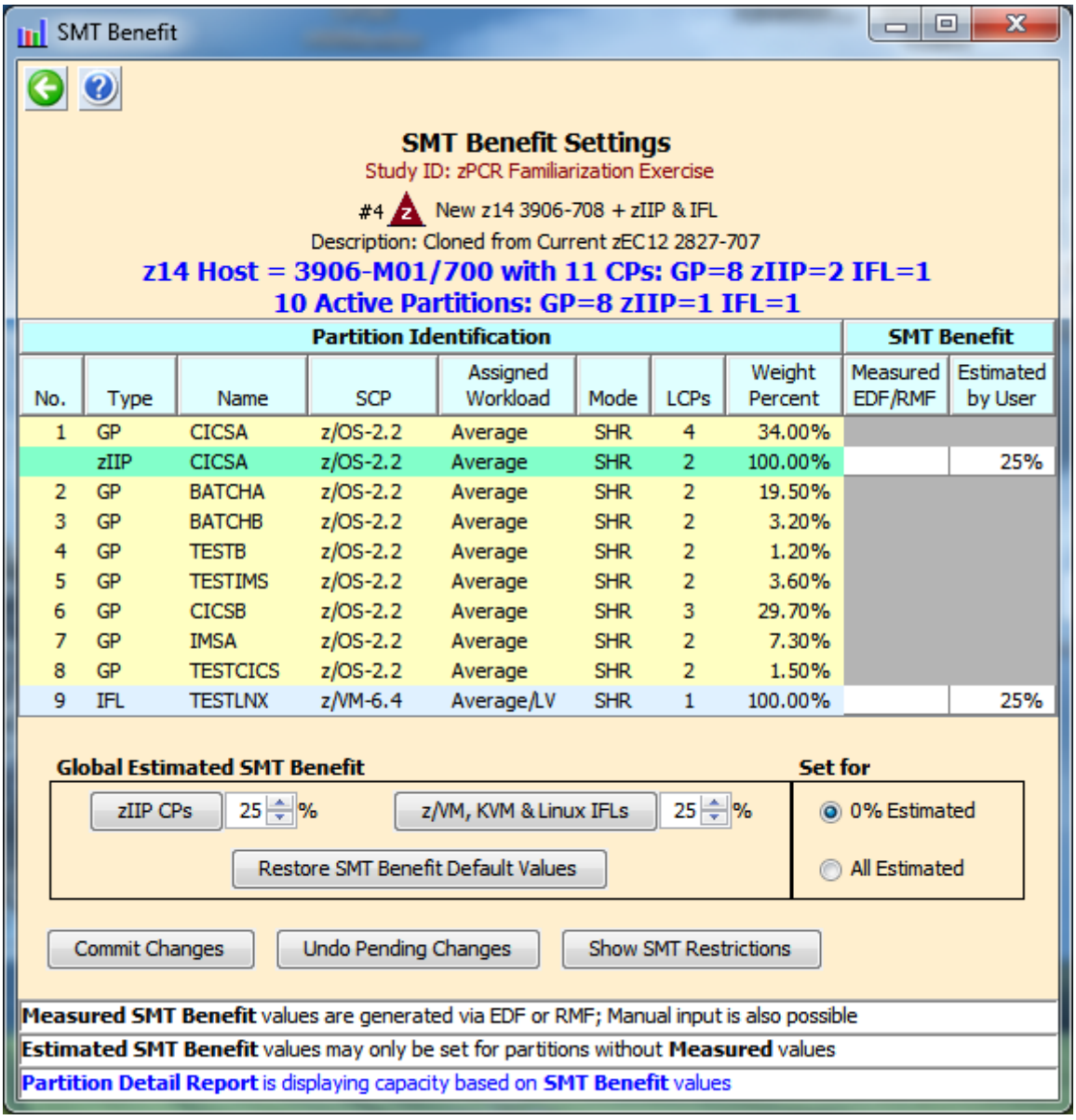
10. From the ***LPAR Host and Partition Configuration*** window, click **Partition Detail** in the **Capacity *Reports*** group box. The **Partition *Detail Report*** window opens, revealing the new capacity picture. The overall capacity has increased to **17,591 MIPS** due to the addition of the IFL and zIIP CPs.



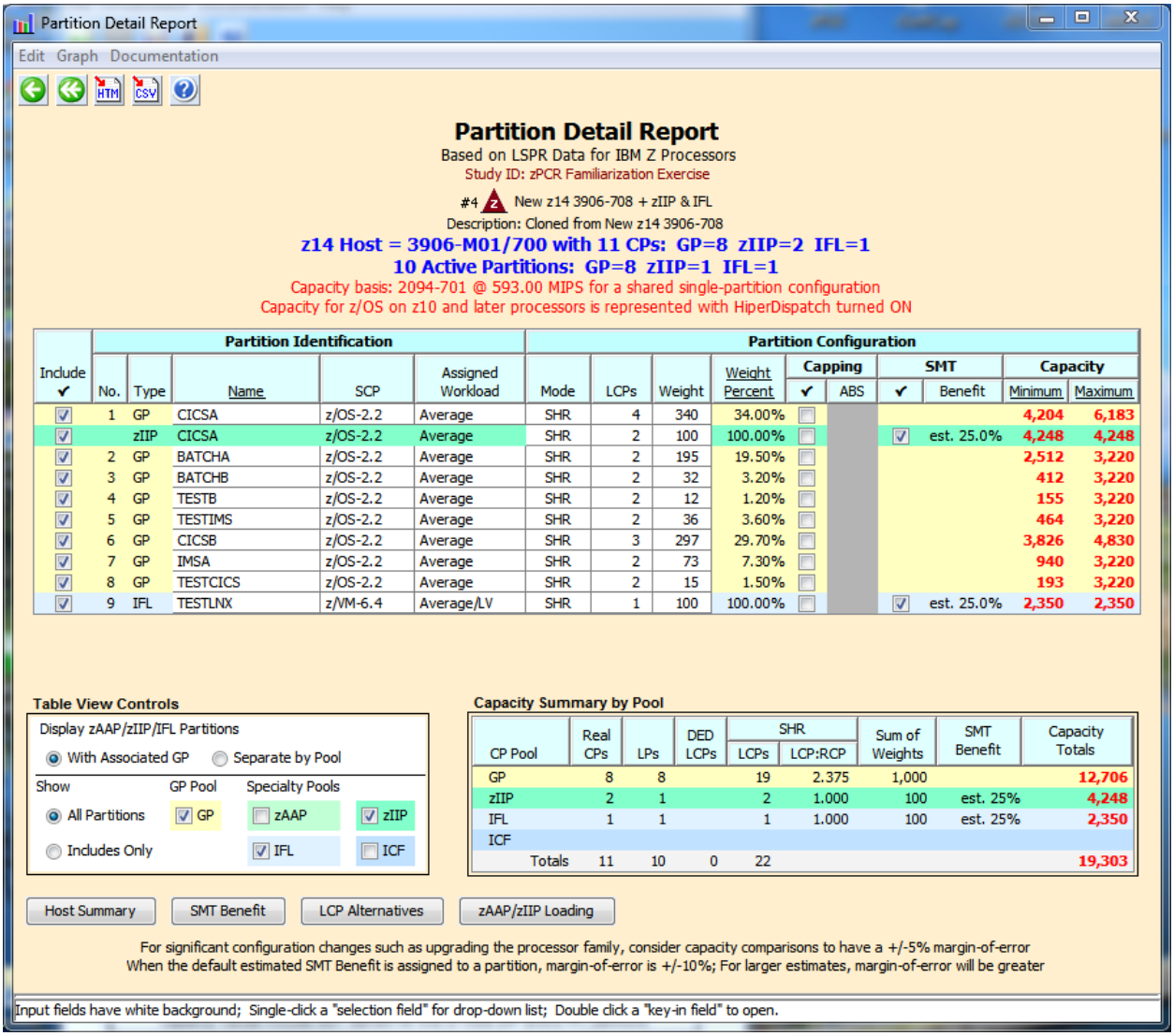
11. From the ***Partition Detail Report*** window, click the **SMT Benefit** button to open the ***SMT Benefit*** window. zIIP and IFL zIIP partitions must have SMT activated in order to define an estimated SMT benefit. On the ***Activate SMT*** pop-up, click the buttons that will activate SMT for the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



12. On the ***SMT Benefit*** window, you'll note that the ***Global Estimated SMT Benefit*** defaults to **25% for zIIPs** and **20% for IFLs**. In this case since the customer has no experience with SMT we'll use the defaults. In the ***Global Estimated SMT Benefit*** group box, click **zIIP CPs** and **z/VM IFL CPs**.



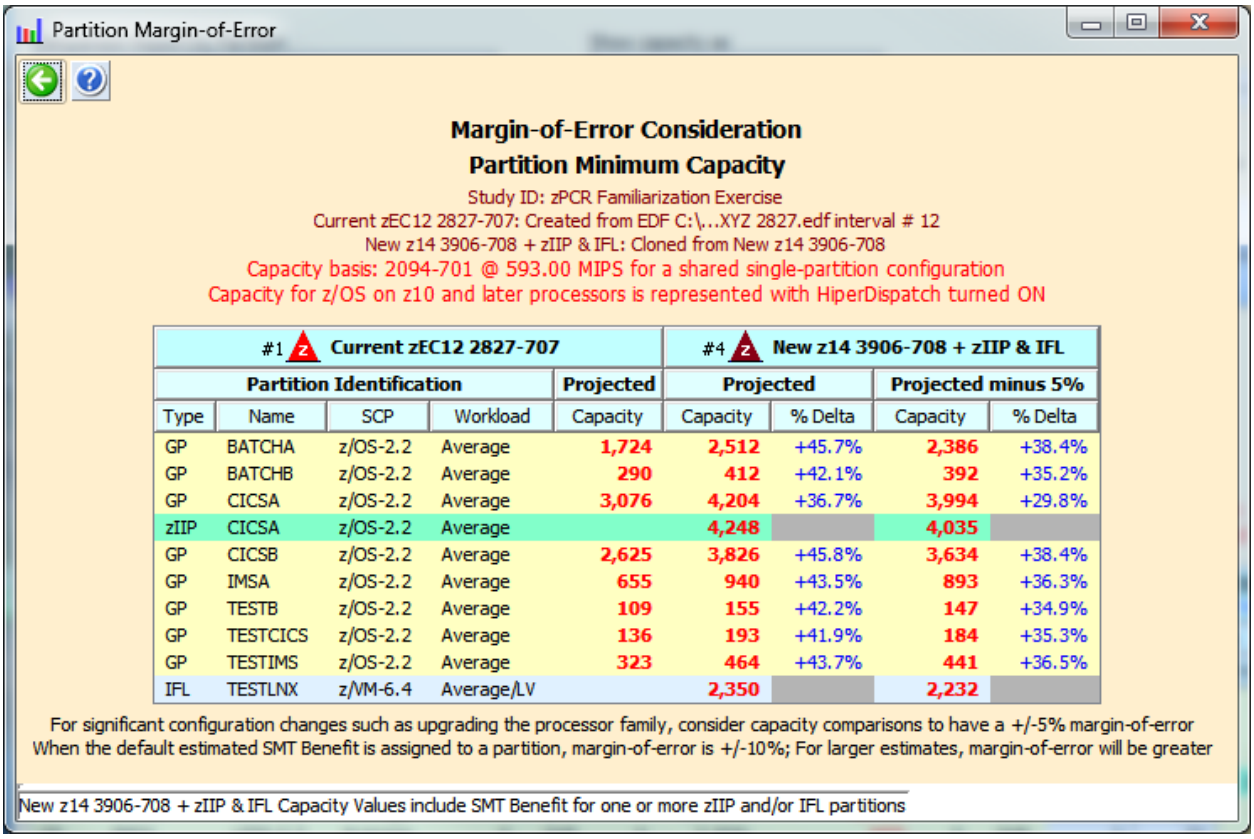
13. On the ***SMT Benefit*** window, click **Commit Changes** and then **Return**. This will apply the estimated ***SMT Benefit*** to the ***Minimum*** and ***Maximum Capacity*** result for the zIIP and IFL partitions.



Note that with the ***SMT Benefit*** applied, the zIIP capacity has increase by 25%, from **3,398 MIPS** to **4,248 MIPS**. The IFL capacity has increased by 25% from **3,880 MIPS** to **2,350 MIPS**, and the total capacity has increased from **17,983 MIPS** to **19,303 MIPS**.

14. Click **Double Return** to close the ***LPAR Configuration*** windows and return to the ***Advanced-Mode Control Panel*** window.

15. On the ***Advanced-Mode Control Panel*** window, select both **#1 Current zEC12 2827-707** and **#4 z14 3906-708 + 2 zIIP & 1 IFL**. Click on one, press the **Ctrl** key 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 zEC12 2827-707: Created from EDF C:\...XYZ 2827.edf interval # 12
New z14 3906-708 + zIIP & IFL: Cloned from New z14 3906-708
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

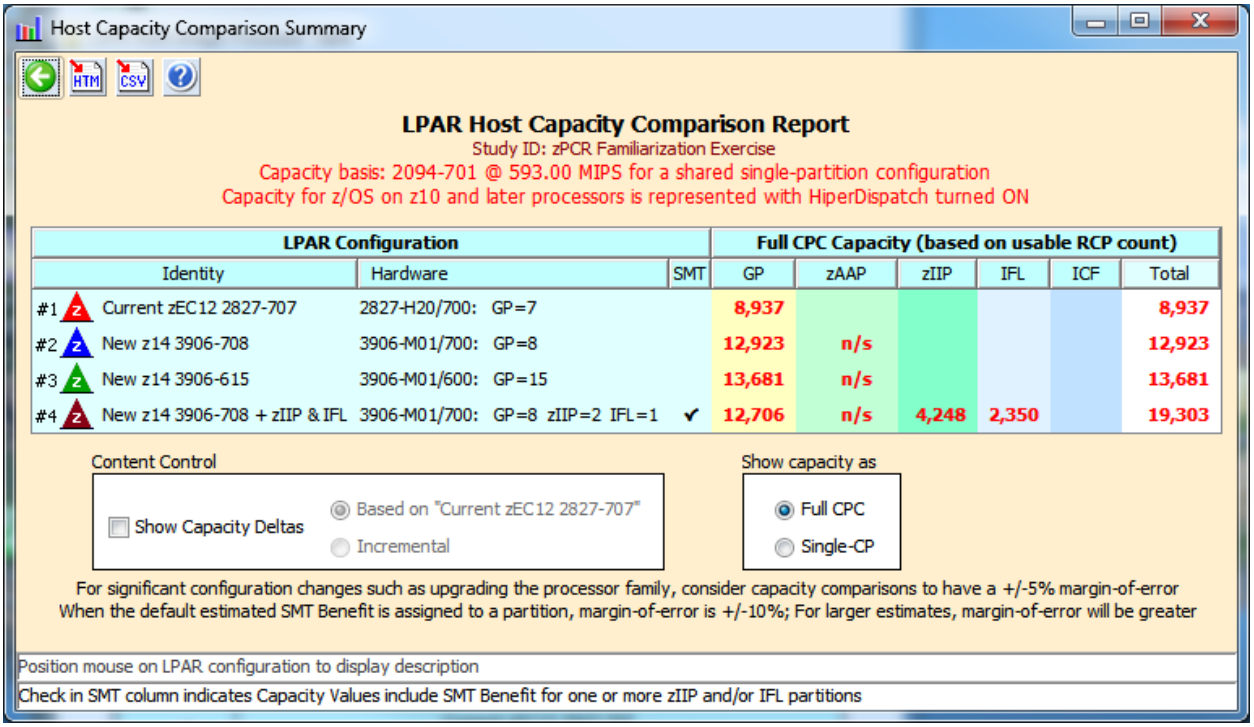
#1 Current zEC12 2827-707					#4 New z14 3906-708 + zIIP & IFL			
Partition Identification				Projected	Projected		Projected minus 5%	
Type	Name	SCP	Workload	Capacity	Capacity	% Delta	Capacity	% Delta
GP	BATCHA	z/OS-2.2	Average	1,724	2,512	+45.7%	2,386	+38.4%
GP	BATCHB	z/OS-2.2	Average	290	412	+42.1%	392	+35.2%
GP	CICSA	z/OS-2.2	Average	3,076	4,204	+36.7%	3,994	+29.8%
zIIP	CICSA	z/OS-2.2	Average		4,248		4,035	
GP	CICSB	z/OS-2.2	Average	2,625	3,826	+45.8%	3,634	+38.4%
GP	IMSA	z/OS-2.2	Average	655	940	+43.5%	893	+36.3%
GP	TESTB	z/OS-2.2	Average	109	155	+42.2%	147	+34.9%
GP	TESTCICS	z/OS-2.2	Average	136	193	+41.9%	184	+35.3%
GP	TESTIMS	z/OS-2.2	Average	323	464	+43.7%	441	+36.5%
IFL	TESTLNX	z/VM-6.4	Average/LV		2,350		2,232	

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

New z14 3906-708 + zIIP & IFL Capacity Values include SMT Benefit for one or more zIIP and/or IFL partitions

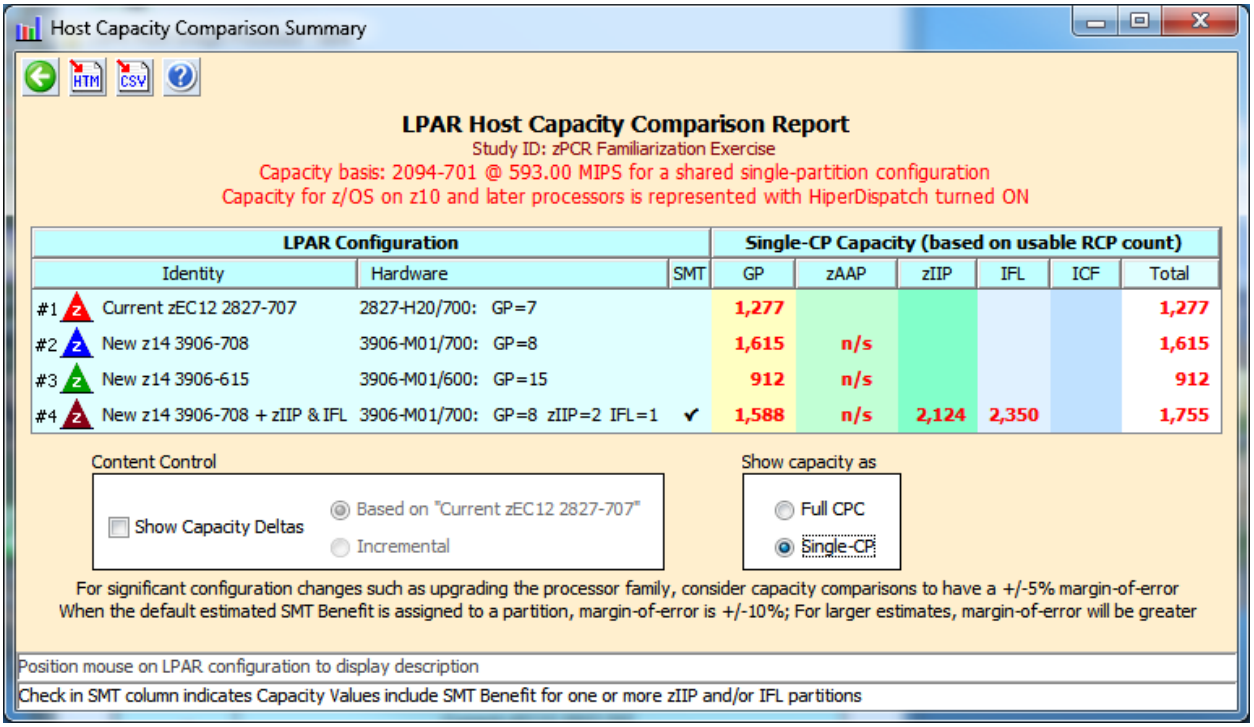
Verify that our partitions will still meet our objective of 35% (rounded up) improvement when the additional zIIP and IFL partitions are included. The exception is the **CICSA** partition, which is only reaching 29.8% capacity improvement. However, since we expect this partition to start routing zIIP eligible work to the zIIP LCPs, 29.8% is likely acceptable (will depend on the percent of the workload that is zIIP eligible).

16. Close all the comparison windows. On the ***Advanced-Mode 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.



17. Change the view to the Single-CP. ***Single-CP*** capacity represents the average capacity of each CP (determined by dividing the full capacity by the number of CPs involved). ***Single-CP*** capacity can be useful for revealing relative engine speed when comparing LPAR configurations where the host processor family is changed.

    One use of the ***Single-CP*** option is to compare the **z14 3906-615** alternative. In this case it has "more & slower" engines (15 engines with **912 MIPS** relative capacity per General Purpose CP) than the **z14 3906-708** option (**1,615 MIPS**) and the original **zEC12** (**1,277 MIPS**), but more total GCP capacity. This would be one consideration for a sub-capacity model, along with the type of work, number of partitions, dispatch points, CPU per Tran, etc.



18. From the menu bar on the ***Advanced-Mode Control Panel*** window click **File→Save as**, and save the complete study which will include both LPAR configurations (e.g., **Lab Task-9.zpcr**).

*** End of Additional Analysis Task-9 ***

*** End of zPCR Lab ***