



Exploring PR/SM Physical and Logical CPU Utilization Measurements

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Abstract



Exploring PR/SM Physical and Logical CPU Utilization Measurements

Of all the z/OS SMF records available to us, the SMF 70 record is probably one of the most critical records to understand and use. Within the SMF 70 record, the processor dispatch interval measurements are the most important.

During this webinar, **Peter Enrico** will explore the SMF 70 processor dispatch measurements, and the formulas that these measurements are used to calculate both physical and logical processor utilizations. Oh... and what is the conceptual difference and usage between physical and logical utilizations? This difference will also be discussed.

EPS: We do z/OS performance...



- We are z/OS performance!
- Pivotor
 - Performance reporting and analysis of your z/OS measurements
 - Example: SMF, DCOLLECT, other, etc.
 - Not just reporting, but cost-effective analysis-based reporting based on our expertise
- Performance Educational Workshops (while analyzing your own data)
 - Essential z/OS Performance Tuning
 - Parallel Sysplex and z/OS Performance Tuning
 - WLM Performance and Re-evaluating Goals
- Performance War Rooms
 - Concentrated, highly productive group discussions and analysis
- MSU reductions
 - Application and MSU reduction

Like what you see?



- Free z/OS Performance Educational webinars!
 - The titles for our Winter 2022 webinars are as follows:
 - ✓ *SMF Recording Options to Improve Your Performance Analysis*
 - ✓ *SMF 98 and 99: Pinpointing Transient Performance Problems*
 - ✓ *Exploring z/OS Processor Storage Measurements*
 - *Exploring PR/SM Physical and Logical CPU Utilization Measurements*
 - *Exploring Locking and Locking Measurements on z/OS (with Bob Rogers)*
 - *Exploring z/OS SMF 30 Address Space CPU Measurements*
 - *Exploring z/OS XCF Message Traffic Measurements*
 - *Exploring z/OS SMF 14 / 15 Records for Tape and DASD File Activity*
 - *Exploring z/OS WLM CPU Measurements: SUs vs CPU Secs vs APPL% vs Workload%*
 - *Exploring the Coupling Facility Lock Structure Measurements*
 - Dozens of past webinars are available at our website.
- If you want a free cursory review of your environment, let us know!
 - We're always happy to process a day's worth of data and show you the results
 - See also: <http://pivotor.com/cursoryReview.html>

z/OS Performance workshops available



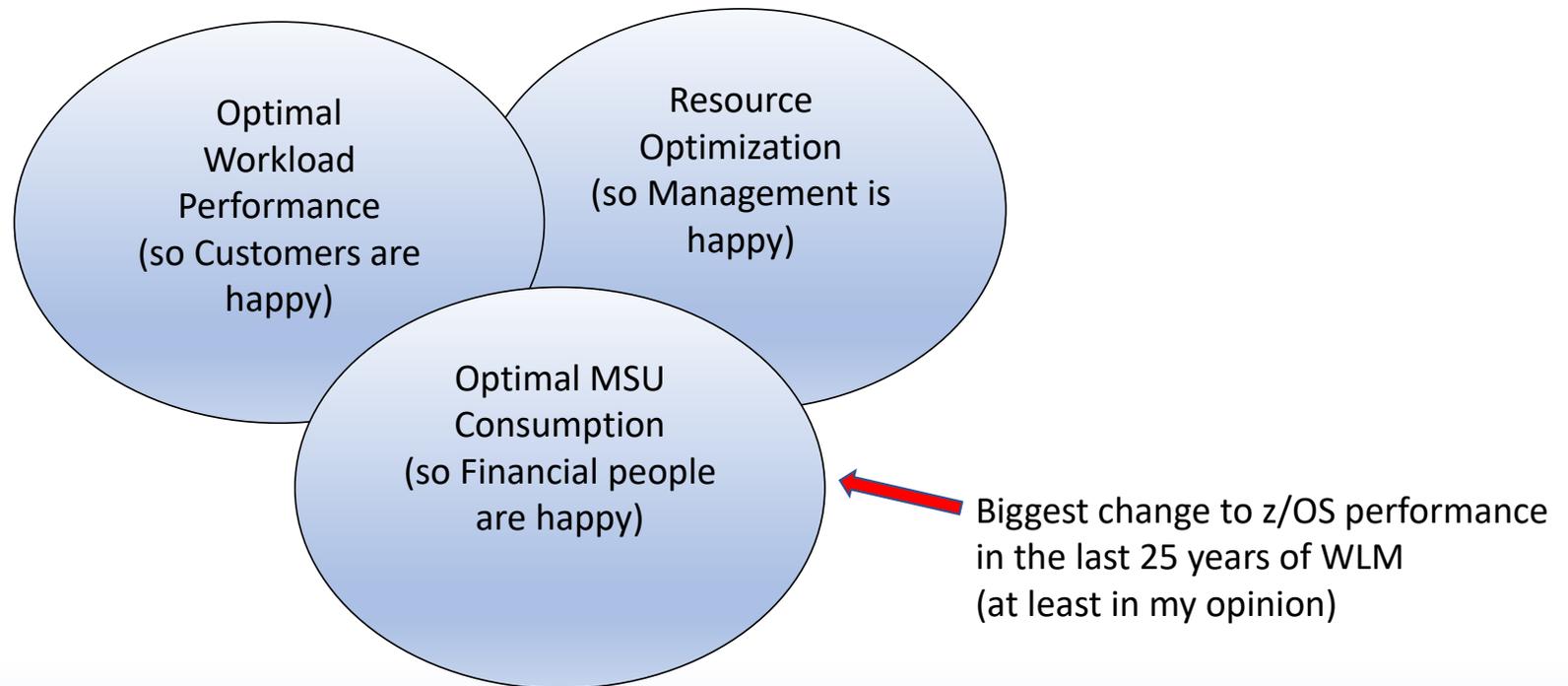
During these workshops you will be analyzing your own data!

- Essential z/OS Performance Tuning
 - October 3-7, 2022
- WLM Performance and Re-evaluating Goals
 - September 12-16, 2022
- Parallel Sysplex and z/OS Performance Tuning
 - August 8-12, 2022
- Also... please make sure you are signed up for our free monthly z/OS educational webinars! (email contact@epstrategies.com)

The Performance Balancing Act



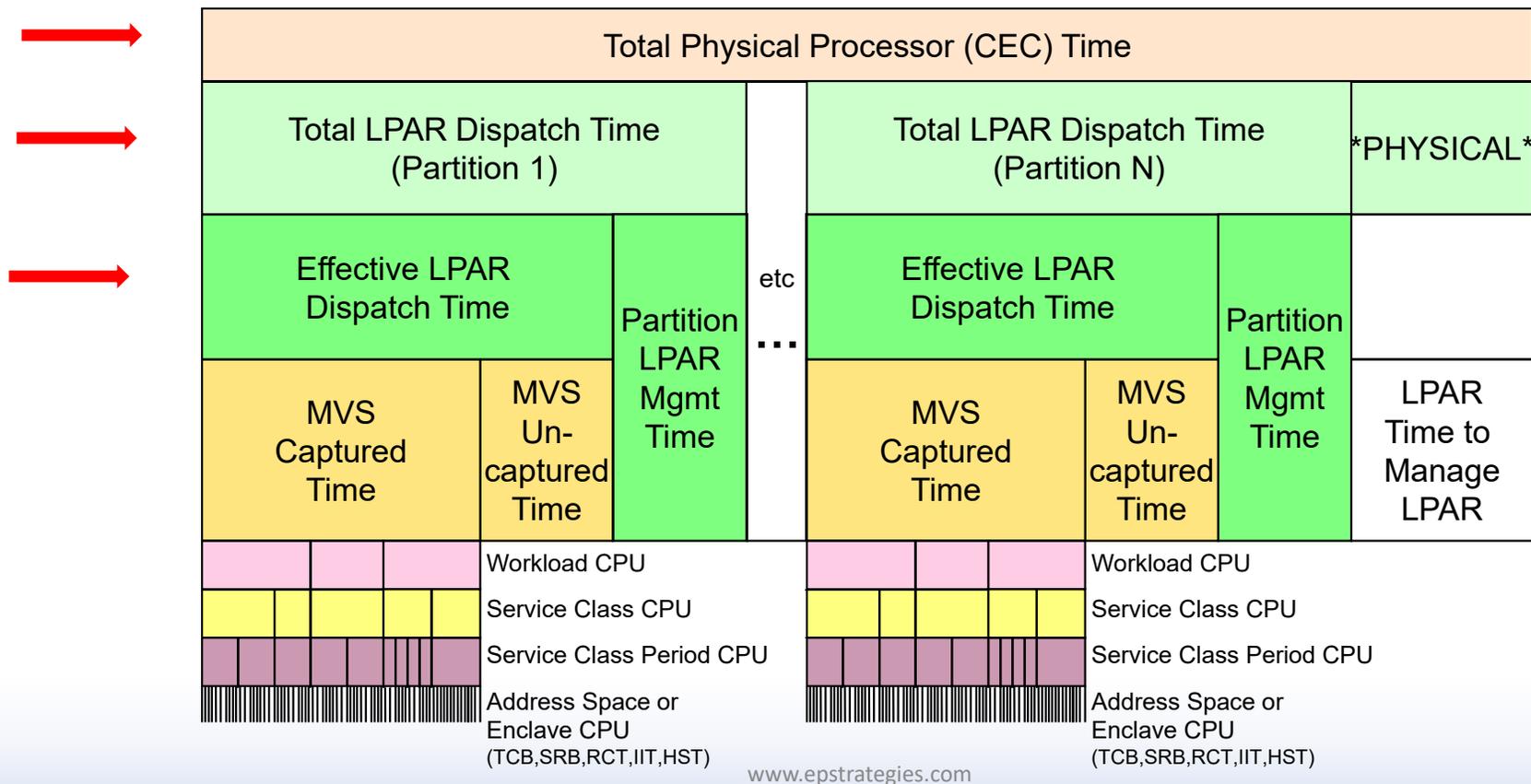
- Performance on z/OS is about finding an optimal balance of the following:



Breakdown of General Purpose Processor



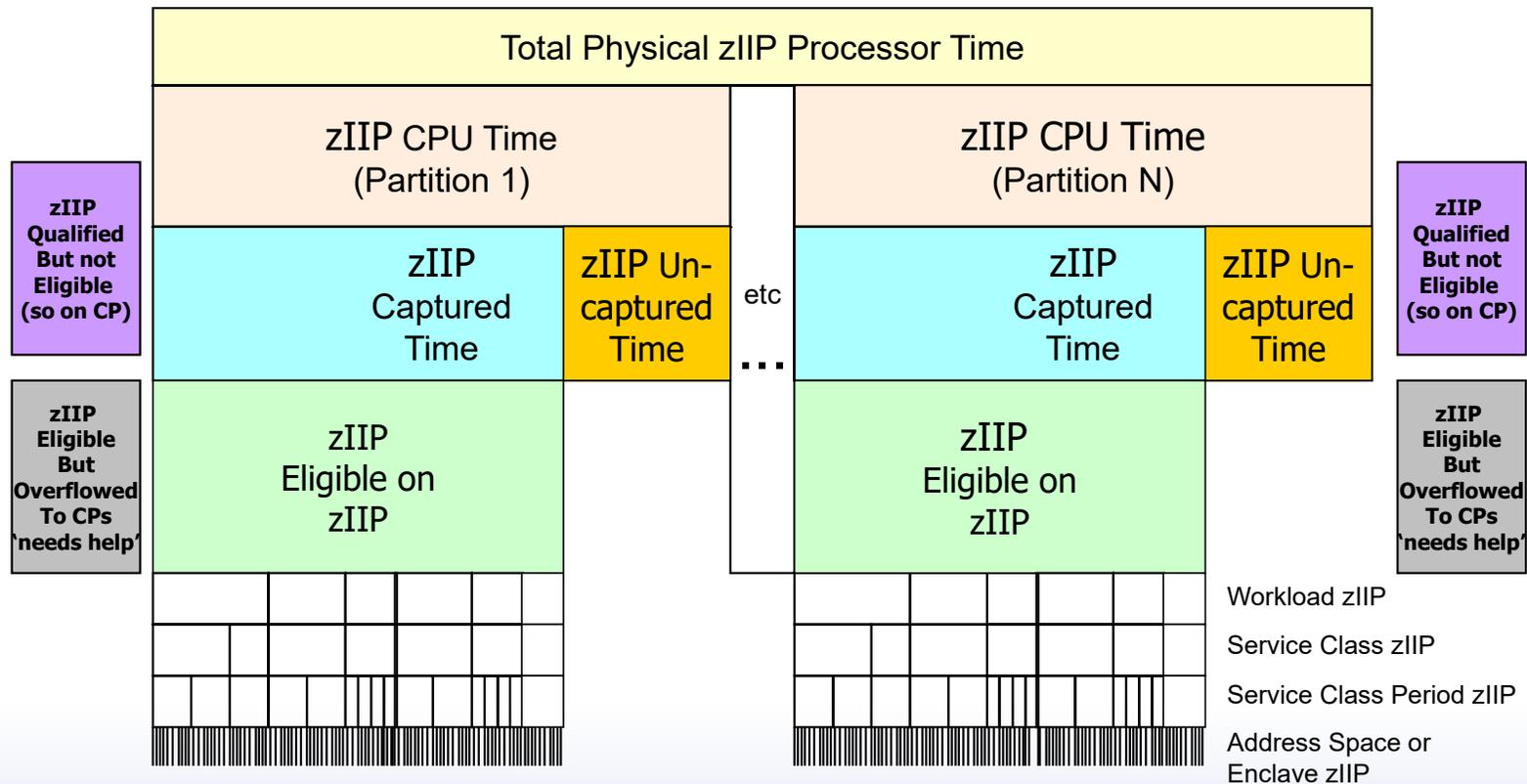
- We always needed to understand the break down of CP CPU consumption



Breakdown of zIIP Engine Time



- We need to understand how PR/SM allocates the zIIP processor resource
 - In all measurements zIIPs



Common PR/SM Measurement Questions



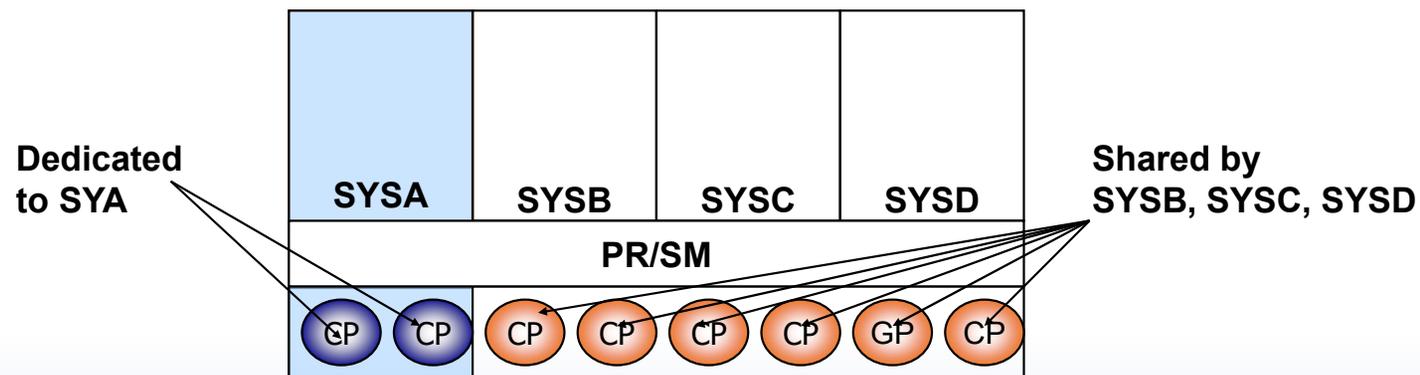
- For each machine, and for each type of processor (CP, zIIP):
 - How many CPs, zIIPs are configured to machine and to each LPAR?
 - What are the LPAR controls for each of these pools of processors (i.e. LPAR weights)
 - How busy 'physically' are CPs and zIIPs
 - (i.e. measurement of machine capacity)
 - How busy 'logically' are logical CPs and zIIPs
 - (i.e. measurement of LPAR capacity)
- Lots more similar type questions to consider, but these are the questions we will focus on today.

LPAR Terminology Review



● Physical Processors

- Physical CEC processors that are used by the different partitions
- Processors can be
 - GCP – General CPU Processor
 - ICF – Integrated Coupling Facilities
 - IFL – Integrated Facilities for Linux
 - zIIP – zArchitecture Integrated Information Processor

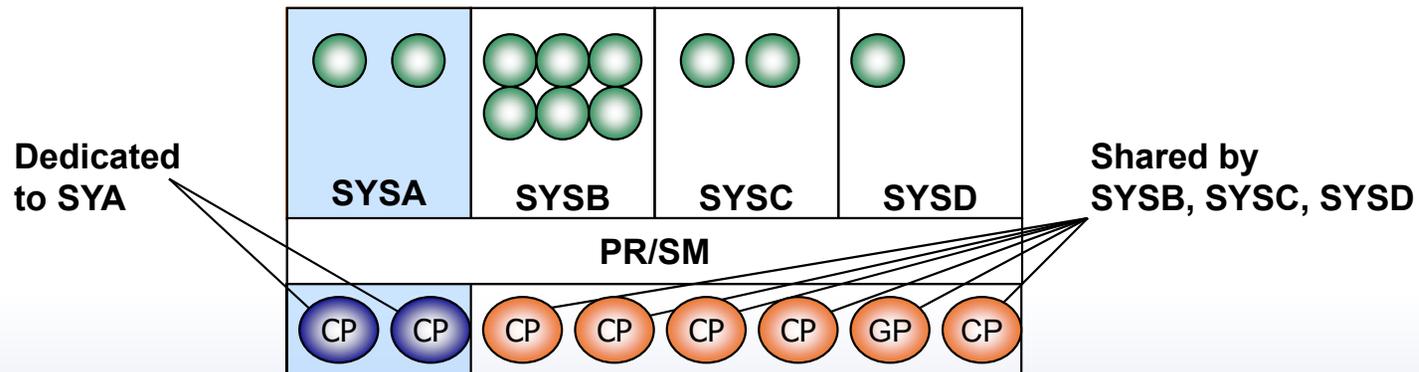


LPAR Terminology Review



- Logical Processor

- Each system image as some number of logical processors assigned
 - System image thinks it has 100% of its number of processors
- Dedicated processors
 - Physical processor dedicated to a partition 100% of the time
 - Accumulates both CPU using and wait/idle time
- Shared logical processors
 - Physical processor that can be share among one or more partitions
 - Physical processors not dedicated to a particular partition



Example of RMF Partition Data Report



PARTITION DATA REPORT

PAGE 3

```

z/OS V2R4                SYSTEM ID PRD1          DATE 04/12/2021          INTERVAL 14.59.994
                          RPT VERSION V2R4 RMF    TIME 09.45.00          CYCLE 1.000 SECONDS
-
MVS PARTITION NAME      PRD1          PHYS PROC NUM    7          GROUP NAME    PLEX01          INITIAL CAP    NO
IMAGE CAPACITY          292          CP              4          LIMIT         292          LPAR HW CAP    NO
NUMBER OF CONFIGURED PARTITIONS 5          ICF             1          AVAILABLE     159          HW GROUP CAP   NO
WAIT COMPLETION         NO          IIP             2          ABS MSU CAP   NO
DISPATCH INTERVAL     DYNAMIC
----- PARTITION DATA ----- -- LOGICAL PARTITION PROCESSOR DATA -- -- AVERAGE PROCESSOR UTILIZATION PERCENTAGES -
NAME          S BT WGT    ---MSU---    --CAPPING--  --PROCESSOR  ---DISPATCH  TIME DATA---  LOGICAL PROCESSORS  --- PHYSICAL PROCESSORS ---
              DEF  ACT  DEF  WLM%  NUM  TYPE  EFFECTIVE  TOTAL  EFFECTIVE  TOTAL  LPAR  MGMT  EFFECTIVE  TOTAL
PRD1          A  N 869    0   92  N N N   0.0  4.0  CP  00.15.41.497 00.15.44.687  26.15  26.24  0.09  26.15  26.24
DEV1          A  N 105    0   33  N N N   0.0  2.0  CP  00.05.38.443 00.05.40.398  18.80  18.91  0.05  9.40   9.46
TEST          A  N 26     0    2  N N N   0.0  2.0  CP  00.00.21.356 00.00.21.830   1.19   1.21  0.01  0.59   0.61
*PHYSICAL*
              -----
TOTAL          1000
              00.21.41.296 00.21.51.411
              0.28  36.15  36.43

CF01          A  DED
*PHYSICAL*
              -----
TOTAL          0
              00.14.59.993 00.14.59.998
              0.00  100.0  100.0

PRD1          A  N 145    N N N   2  IIP  00.00.49.347 00.00.50.651  2.74   2.81  0.07  2.74   2.81
DEV1          A  N 10     N N N   1  IIP  00.00.29.036 00.00.30.031  3.23   3.34  0.06  1.61   1.67
TEST          A  N 6      N N N   1  IIP  00.00.02.197 00.00.02.282  0.24   0.25  0.00  0.12   0.13
*PHYSICAL*
              -----
TOTAL          161
              00.01.20.580 00.01.24.920
              0.24  4.48  4.72
    
```

Example of CMF Partition Data Report



PRODUCED BY CMF ANALYZER (6.2.00 RSL 1910)
 BMC Software, Inc.
 REQD 12 OCT 21 09.00.00 12 OCT 21 10.00.00
 ACTL 12 OCT 21 09.00.00 12 OCT 21 09.20.00

CPU UTILIZATION REPORT
 BMC SOFTWARE, INC.
 HOUSTON, TX.

RPTSEQ 7 PAGE 22
 REPORT DATE: 15 OCT 28 16.04
 SYSTEM ID: SYS1 Z 2.04.0
 REPORT CYCLE: CYCLE099

BASED ON REC TYPE/# RECS/# SAMPLES/REC HOURS: 70-1/2/2,394/0.33

----- PARTITION DATA SECTION -----

IMAGE CAPACITY = 1,245
 CAPACITY GROUP NAME = -----
 PHYSICAL PROCESSORS = 38
 CP = 9
 CBP = 0
 IFL = 13
 ICF = 5
 ZIIP = 11

DISPATCH INTERVAL = DYNAMIC
 CAPACITY GROUP LIMIT = ---
 CAPACITY AVAILABLE = N/A

MVS PARTITION NAME = SYS1
 INITIAL NO
 LPAR HW NO
 GROUP HW NO
 ABS MSU NO

PARTITION	STATUS	WEIGHT	BT	CNT	TYPE	DEF	MSU USED	%DEF	-CAPPING-- %WLM	DEF	TOTAL EFFTV	DISP LOG	TOTAL EFFTV	DISP PHY	OVH	CPU DISPATCH PERCENT
SYS1	ACTIVE	500	-	5	CP	---	645	---	0.0	---	62.24	62.04	34.58	34.47	0.11	.PPPPPPP
SYS2	ACTIVE	DED	-	3	CP	---	---	---	0.0	---	100.00	99.98	33.33	33.33	0.00	.PPPPPPP
SYS3	ACTIVE	410	-	5	CP	---	412	---	0.0	---	39.77	39.58	22.09	21.99	0.11	.PPPPP
SYS6	ACTIVE	30	-	2	CP	---	20	---	0.0	---	4.72	4.65	1.05	1.03	0.02	.
DEV1	ACTIVE	40	-	2	CP	---	10	---	0.0	---	2.45	2.36	0.54	0.53	0.02	.
DVT1	ACTIVE	10	-	2	CP	---	7	---	0.0	---	1.73	1.67	0.38	0.37	0.01	.
DVX1	ACTIVE	10	-	2	CP	---	6	---	0.0	---	1.41	1.35	0.31	0.30	0.01	.
PHYSICAL													0.40	0.40		.
TOTAL		1,000											92.7	92.0	0.68	.PPPPPPPPPPPPPPPPPP
SYS1	ACTIVE	500	-	6	ZIIP	---	---	---	---	---	11.53	11.49	6.29	6.27	0.02	.P
SYS2	ACTIVE	DED	-	3	ZIIP	---	---	---	---	---	100.00	100.00	27.27	27.27	0.00	.PPPPP
SYS3	ACTIVE	400	-	5	ZIIP	---	---	---	---	---	13.43	13.37	6.10	6.08	0.03	.P
SYS6	ACTIVE	40	-	2	ZIIP	---	---	---	---	---	0.49	0.48	0.09	0.09	0.00	.
DEV1	ACTIVE	40	-	2	ZIIP	---	---	---	---	---	0.25	0.24	0.05	0.04	0.00	.
DVT1	ACTIVE	10	-	2	ZIIP	---	---	---	---	---	0.24	0.23	0.04	0.04	0.00	.
DVX1	ACTIVE	10	-	2	ZIIP	---	---	---	---	---	0.24	0.23	0.04	0.04	0.00	.
PHYSICAL													0.08	0.08		.
TOTAL		1,000											40.0	39.8	0.13	.PPPPPPPP

Partition Data Report Overview



- Header data
 - Information about the partition where the measurement were collected
 - Static PR/SM configuration information
- Partition data
 - What partitions are configured on the physical machine
 - What may be running in those configured partitions
 - Configuration information that influence how PR/SM will manage each partition (weighting of shared resources, capping indicator)
- Logical partition processor data
 - Number of logical processors assigned to each partition
 - MSU and Capping measurements
 - Partition's effective dispatch time
 - Partition's total dispatch time
- Average processor utilization percentages
 - Logical constraint percentages
 - Physical constraint percentages
 - PR/SM management time percentages

RMF Partition Data Report - Heading



- Top part of report is used to understand
 - MVS partition name
 - Image capacity -- information related to software pricing
 - Number of configured partitions
 - Number of physical processors in total and per type
 - Wait completion indicator
 - Dispatch interval Number of physical processors (CP, IIP, ICF, IFL)

P A R T I T I O N D A T A R E P O R T							
z/OS V2R4	SYSTEM ID PRD1	DATE 04/12/2021	INTERVAL 14.59.994	PAGE	3		
-	RPT VERSION V2R4 RMF	TIME 09.45.00	CYCLE 1.000 SECONDS				
MVS PARTITION NAME	PRD1	PHYS PROC NUM	7	GROUP NAME	PLEX01	INITIAL CAP	NO
IMAGE CAPACITY	292	CP	4	LIMIT	292	LPAR HW CAP	NO
NUMBER OF CONFIGURED PARTITIONS	5	ICF	1	AVAILABLE	159	HW GROUP CAP	NO
WAIT COMPLETION	NO	IIP	2			ABS MSU CAP	NO
DISPATCH INTERVAL	DYNAMIC						

RMF Partition Data Report



- Image Capacity

- CPU capacity available to the z/OS image
- Measured in MSUs (millions of service units) per hour

- The field is calculated as minimum of the following capacities:

- The capacity based on the partition's logical CP configuration
- The defined capacity limit of the partition, if available (image softcap)
- The capacity limit of the related WLM capacity group, if the partition belongs to a capacity group.

P A R T I T I O N D A T A R E P O R T								PAGE	3
z/OS V2R4	SYSTEM ID PRD1	DATE	04/12/2021	INTERVAL	14.59.994				
	RPT VERSION V2R4 RMF	TIME	09.45.00	CYCLE	1.000 SECONDS				
-									
MVS PARTITION NAME	PRD1	PHYS PROC	NUM 7	GROUP NAME	PLEX01	INITIAL CAP	NO		
IMAGE CAPACITY	292	CP	4	LIMIT	292	LPAR HW CAP	NO		
NUMBER OF CONFIGURED PARTITIONS	5	ICF	1	AVAILABLE	159	HW GROUP CAP	NO		
WAIT COMPLETION	NO	IIP	2			ABS MSU CAP	NO		
DISPATCH INTERVAL	DYNAMIC								

(PR/SM) Dispatching



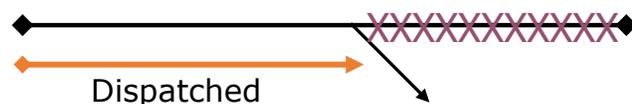
- Dispatch Time

- Time logical processor is associated with a physical processor

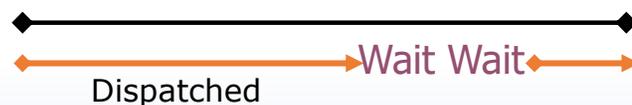


- Wait Completion

- When z/OS voluntarily gives up the CPU, it is going into a 'wait' state



Voluntary Wait and Wait Completion = NO
- z/OS voluntarily gives up the processor
- MVS time equals dispatch time



Voluntary Wait and Wait Completion = YES
- z/OS voluntarily gives up the processor
- PR/SM keeps logical processor associated with physical

RMF Partition Data Report - Heading



- Wait completion
 - Recommend 'No'
 - When z/OS voluntarily gives up the CPU, it is going into a 'wait' state
 - No – PR/SM will un-dispatch the logical processor from the physical
 - Yes – PR/SM allows z/OS to keep physical processor until the end of the dispatch interval

- Dispatch Interval
 - Recommend 'Dynamic'
 - Dynamic – PR/SM dynamically determines the dispatch interval length
 - Number – time (in milliseconds) of the static dispatch interval

P A R T I T I O N D A T A R E P O R T								PAGE	3
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	RPT VERSION V2R4 RMF	TIME 09.45.00	CYCLE 1.000 SECONDS						
MVS PARTITION NAME	PRD1	PHYS PROC NUM	7	GROUP NAME	PLEX01	INITIAL CAP	NO		
IMAGE CAPACITY	292	CP	4	LIMIT	292	LPAR HW CAP	NO		
NUMBER OF CONFIGURED PARTITIONS	5	ICF	1	AVAILABLE	159	HW GROUP CAP	NO		
WAIT COMPLETION	NO	IIP	2			ABS MSU CAP	NO		
DISPATCH INTERVAL	DYNAMIC								

RMF Partition Data Report



- Provides information on number of configured physical processors
 - Total number of processors
 - Then broken down by processor type
 - Number of CPs
 - Number of IFLs
 - Number of ICFs
 - Number of IIPs (zIIPs)

P A R T I T I O N D A T A R E P O R T								PAGE	3
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IMAGE CAPACITY	292	CP	4	LIMIT	292	LPAR HW CAP	NO		
NUMBER OF CONFIGURED PARTITIONS	5	ICF	1	AVAILABLE	159	HW GROUP CAP	NO		
WAIT COMPLETION	NO	IIP	2			ABS MSU CAP	NO		
DISPATCH INTERVAL	DYNAMIC								

RMF Partition Data Report – Partition Data



MSU Columns

- Shows capacity information for a partition in terms of MSUs per hour.
 - DEF - Defined capacity limit of the partition
 - ACT - Actual consumption by the partition based on the Effective Dispatch time

Capping columns

- Shows capping information for a partition
 - DEF - YES or NO : The capping option of the partition (as set on HMC)
 - WLM% - Percentage of time when WLM capped the partition

Capping DEF

- The first character (Y or N) indicates whether "Initial Capping ON" has been set.
- The second character (Y or N) indicates whether an absolute physical hardware capping limit (maximal number of CPUs) has been defined.
- The third character (Y or N) indicates whether an absolute hardware group capping limit (maximal number of CPUs) has been defined.

PARTITION DATA				LOGICAL PARTITION PROCESSOR DATA				AV				ENTAGES					
NAME	S	BT	WGT	----MSU----		--CAPPING--		PROCESSOR NUM	TYPE	----DISPATCH TIME DATA----		LOGICAL PROCESSORS		--- PHYSICAL PROCESSORS ---			
				DEF	ACT	DEF	WLM%			EFFECTIVE	TOTAL	EFFECTIVE	TOTAL	LPAR	MGMT	EFFECTIVE	TOTAL
PRD1	A	N	869	0	92	N	N	N	4.0	CP	00.15.41.497	00.15.44.687	26.15	26.24	0.09	26.15	26.24
DEV1	A	N	105	0	33	N	N	N	2.0	CP	00.05.38.443	00.05.40.398	18.80	18.91	0.05	9.40	9.40
TEST	A	N	26	0	2	N	N	N	2.0	CP	00.00.21.356	00.00.21.830	1.19	1.21	0.01	0.59	0.59
PHYSICAL											00.00.04.494				0.12		0.12
TOTAL			1000								00.21.41.296	00.21.51.411			0.28	36.15	36.40

RMF Partition Data Report – Dispatch Time Data



- Center of report is used to understand
 - Effective Dispatch Time
 - Total Dispatch Time
 - Both reported in HH:MM:SS.ttt time value

PARTITION DATA				LOGICAL PARTITION PROCESSOR DATA						AVERAGE PROCESSOR UTILIZATION PERCENTAGES								
NAME	S	BT	WGT	MSU		CAPPING		PROCESSOR		DISPATCH TIME DATA		LOGICAL PROCESSORS		PHYSICAL PROCESSORS				
				DEF	ACT	DEF	WLM%	NUM	TYPE	EFFECTIVE	TOTAL	EFFECTIVE	TOTAL	LPAR	MGMT	EFFECTIVE	TOTAL	
PRD1	A	N	869	0	92	N	N	N	0.0	4.0	CP	00.15.41.497	00.15.44.687	26.15	26.24	0.09	26.15	26.24
DEV1	A	N	105	0	33	N	N	N	0.0	2.0	CP	00.05.38.443	00.05.40.398	18.80	18.91	0.05	9.40	9.46
TEST	A	N	26	0	2	N	N	N	0.0	2.0	CP	00.00.21.356	00.00.21.830	1.19	1.21	0.01	0.59	0.61
PHYSICAL													0.12		0.12			
TOTAL			1000									00.21.41.296	00.21.51.411			0.28	36.15	36.43

Dispatch Time



- Partition Effective Dispatch Time
 - Time a physical CPU was dispatched to a logical CPU during measurement interval
 - Think of this as time that z/OS system and the workloads got to use the physical CPU
 - For *PHYSICAL* this value is blank
- Partition Total Dispatch Time
 - Includes Effective Dispatch Time plus LPAR Management time
 - For *PHYSICAL* this value includes the processor time that cannot be attributed to any one partition
 - Time that LPAR spent managing itself
- LPAR Management Time = Delta between Total Time and Effective Time
 - Time PR/SM spent managing a particular partition





Remember

When Wait Completion is NO

If z/OS goes into a Wait State, PR/SM takes the physical processor away from the logical processor

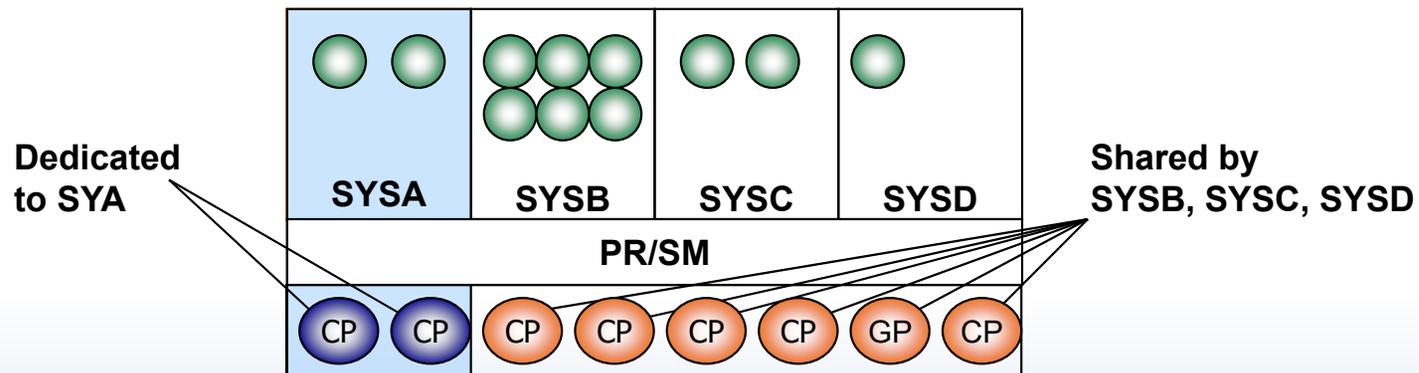
So, a partition is only busy when dispatched, so dispatch time is how much CPU the partition used.

Do we still even care about logical utilization times?

LPAR Terminology Review



- Say SYSC is using 100% of its logical capacity
- Would adding another physical CPU to the CEC help?



RMF Partition Data Report – Utilization Values



- Right hand side of report is used to understand
 - System utilizations (effective and total)
 - Percent of time that PR/SM used to manage the partition, and percent of time that PR/SM used to manage PR/SM (*PHYSICAL*)

-- PARTITION DATA --			-- LOGICAL PARTITION PROCESSOR DATA --				-- AVERAGE PROCESSOR UTILIZATION PERCENTAGES --				
NAME	S	BT WGT	NUM	TYPE	DISPATCH EFFECTIVE	TIME DATA TOTAL	LOGICAL PROCESSORS		PHYSICAL PROCESSORS		
							EFFECTIVE	TOTAL	LPAR MGMT	EFFECTIVE	TOTAL
PRD1	A	N 869	4.0	CP	00.15.41.497	00.15.44.687	26.15	26.24	0.09	26.15	26.24
DEV1	A	N 105	2.0	CP	00.05.38.443	00.05.40.398	18.80	18.91	0.05	9.40	9.46
TEST	A	N 26	2.0	CP	00.00.21.356	00.00.21.830	1.19	1.21	0.01	0.59	0.61
PHYSICAL									0.12		0.12
TOTAL		1000			00.21.41.296	00.21.51.411			0.28	36.15	36.43
CF01	A	DED	1	ICF	00.14.59.993	00.14.59.993	100.0	100.0	0.00	100.0	100.0
PHYSICAL									0.00		0.00
TOTAL		0			00.14.59.993	00.14.59.998			0.00	100.0	100.0
PRD1	A	N 145	2	IIP	00.00.49.347	00.00.50.651	2.74	2.81	0.07	2.74	2.81
DEV1	A	N 10	1	IIP	00.00.29.036	00.00.30.031	3.23	3.34	0.06	1.61	1.67
TEST	A	N 6	1	IIP	00.00.02.197	00.00.02.282	0.24	0.25	0.00	0.12	0.13
PHYSICAL									0.11		0.11
TOTAL		161			00.01.20.580	00.01.24.920			0.24	4.48	4.72

Logical Processor Utilizations



- Logical utilizations

- Helps to understand the utilization of the constraint due to the number of logical processors assigned to the partition

- Logical Processor Utilization Effective

- Percentage of the measurement interval that the partition was utilizing a logical processor on behalf of itself

$$\frac{\sum \text{Partition Effective Dispatch Times}}{\text{No of Logical Processors} * \text{Online Time}} * 100$$

- Logical Processor Utilization Total

- Percentage of the measurement interval that the partition was utilizing a logical processor on behalf of itself and for LPAR management time attributed to the partition

$$\frac{\sum \text{Partition Total Dispatch Times}}{\text{No of Logical Processors} * \text{Online Time}} * 100$$

Physical Processor Utilizations



- Physical utilizations

- Helps to understand the utilization of the constraint due to the number of physical processors active on the machine

- Physical Processor Utilization Effective

- Percentage of the measurement interval that the partition was utilizing a physical processor on behalf of itself
- Online time is related to the interval time. A single CPU cannot be online longer than measurement interval

$$\frac{\sum \text{Partition Effective Dispatch Times}}{\text{No of Physical Processors} * \text{Online Time}} * 100$$

- Physical Processor Utilization Total

- Percentage of the measurement interval that the partition was utilizing a physical processor on behalf of itself and for LPAR management time attributed to the partition
- Online time is related to the interval time. A single CPU cannot be online longer than measurement interval

$$\frac{\sum \text{Partition Total Dispatch Times}}{\text{No of Physical Processors} * \text{Online Time}} * 100$$

LPAR Management Times and Utilizations



- LPAR Management Time
 - Time PR/SM spent managing a partition
 - For the partition ‘*PHYSICAL*’, this is the amount of time PR/SM spent managing itself. It is time that could not be attributed to any single partition.
- Physical Processor Utilization LPAR Management
 - Percentage of the measurement interval that PR/SM spent managing the partition. It is reported as a percentage of total physical time possible

$$\frac{\sum \text{Partition Total Dispatch Times} - \sum \text{Partition Effective Dispatch Times}}{\text{No of Physical Processors} * \leftrightarrow \text{Interval Time}} * 100$$

- *PHYSICAL* Partition

$$\frac{\sum \text{Partition Total Dispatch Time for partition PHYSICAL}}{\text{No of Physical Processors} * \leftrightarrow \text{Interval Time}} * 100$$

RMF Partition Data Report – Machine Utilization Values

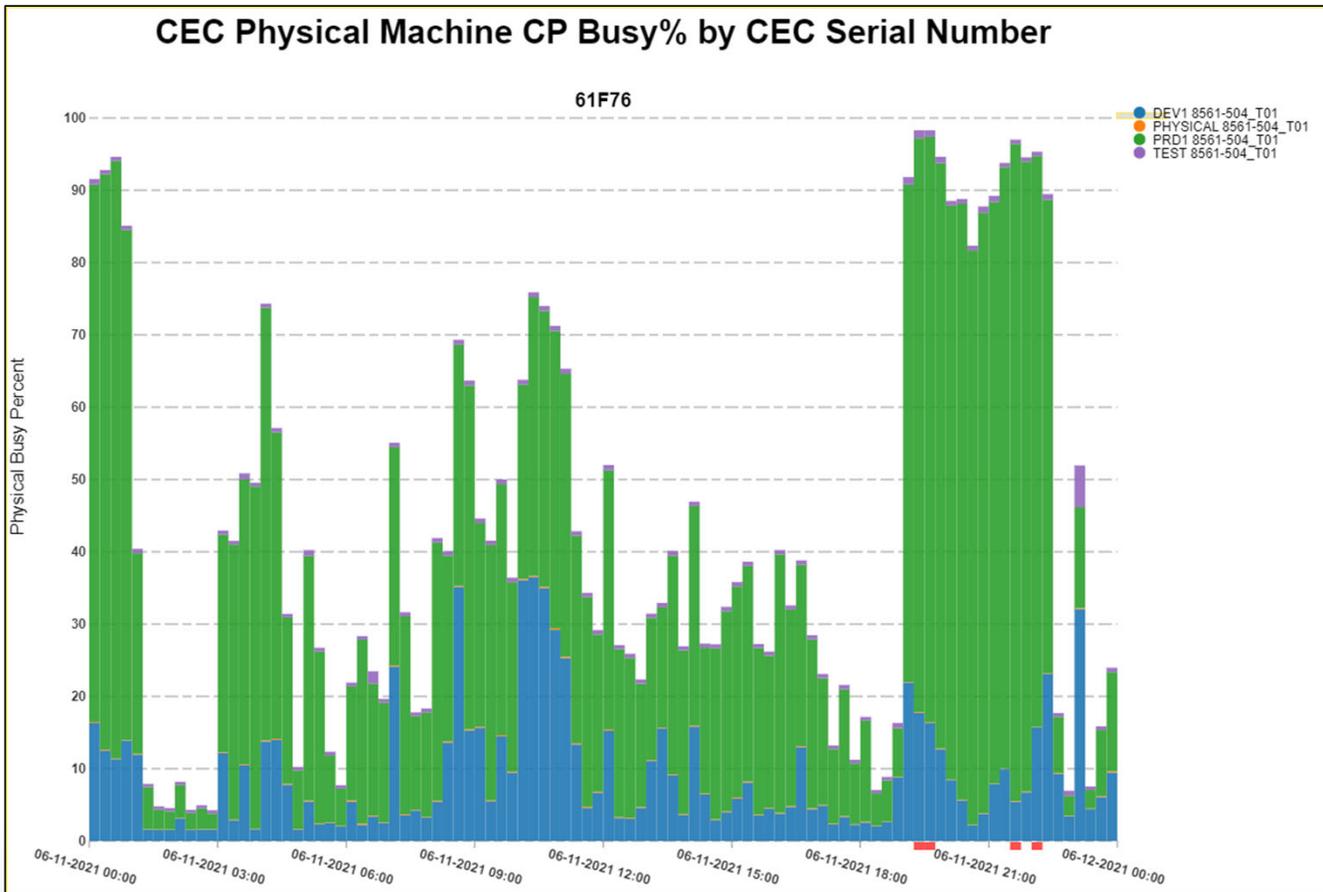


- Total lines

- Reports the total utilization of the physical processors on the machine
- Provides a view of total utilization by all LPARs of physical processor resource

-- PARTITION DATA -- -- LOGICAL PARTITION PROCESSOR DATA -- -- AVERAGE PROCESSOR UTILIZATION PERCENTAGES --												
NAME	S	BT	WGT	--PROCESSOR ----DISPATCH TIME DATA----				LOGICAL PROCESSORS		--- PHYSICAL PROCESSORS ---		
				NUM	TYPE	EFFECTIVE	TOTAL	EFFECTIVE	TOTAL	LPAR	MGMT	EFFECTIVE
PRD1	A	N	869	4.0	CP	00.15.41.497	00.15.44.687	26.15	26.24	0.09	26.15	26.24
DEV1	A	N	105	2.0	CP	00.05.38.443	00.05.40.398	18.80	18.91	0.05	9.40	9.46
TEST	A	N	26	2.0	CP	00.00.21.356	00.00.21.830	1.19	1.21	0.01	0.59	0.61
PHYSICAL							00.00.04.494			0.12		0.12
TOTAL			1000			00.21.41.296	00.21.51.411			0.28	36.15	36.43
CF01	A		DED	1	ICF	00.14.59.993	00.14.59.993	100.0	100.0	0.00	100.0	100.0
PHYSICAL							00.00.00.005			0.00		0.00
TOTAL			0			00.14.59.993	00.14.59.998			0.00	100.0	100.0
PRD1	A	N	145	2	IIP	00.00.49.347	00.00.50.651	2.74	2.81	0.07	2.74	2.81
DEV1	A	N	10	1	IIP	00.00.29.036	00.00.30.031	3.23	3.34	0.06	1.61	1.67
TEST	A	N	6	1	IIP	00.00.02.197	00.00.02.282	0.24	0.25	0.00	0.12	0.13
PHYSICAL							00.00.01.954			0.11		0.11
TOTAL			161			00.01.20.580	00.01.24.920			0.24	4.48	4.72

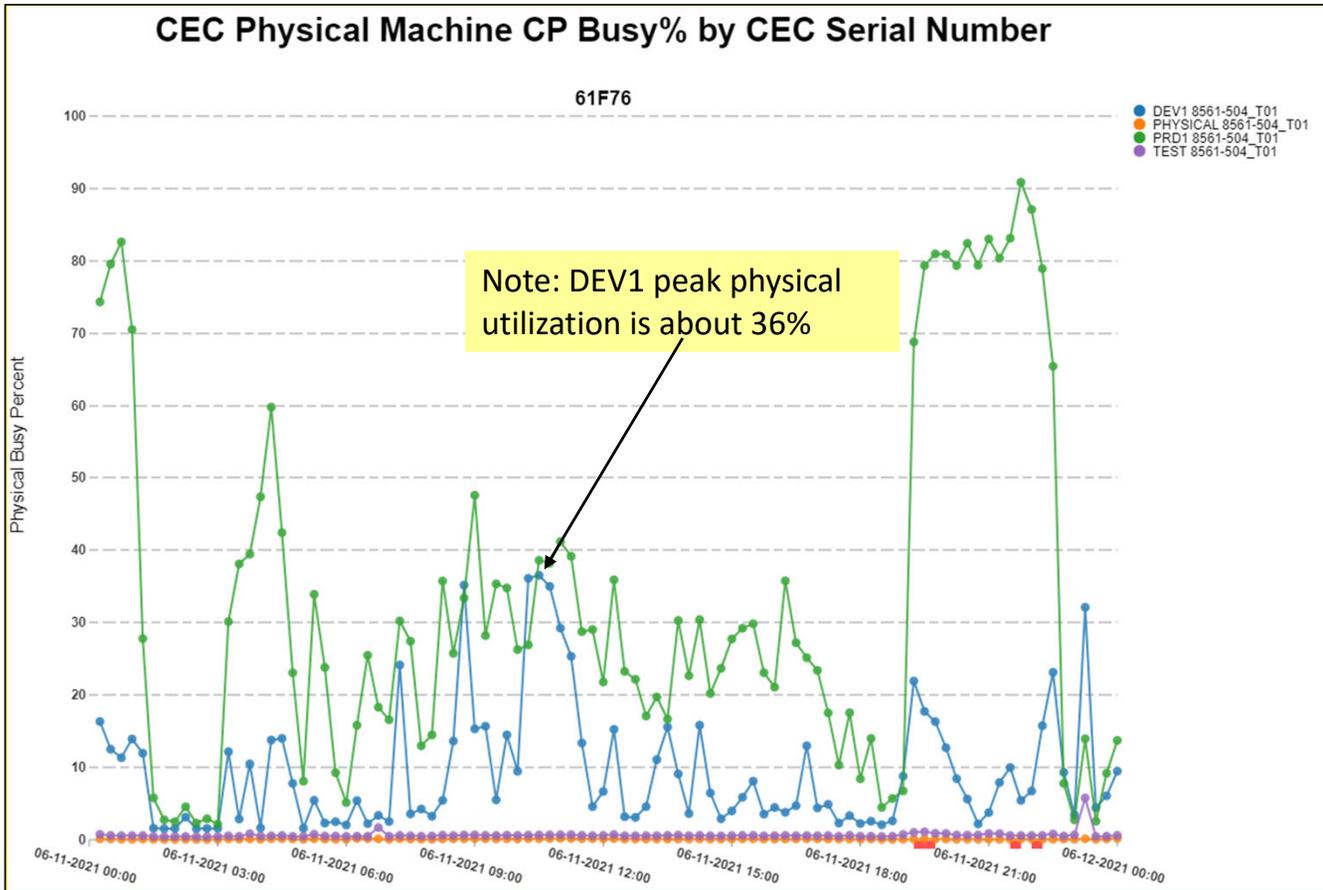
Example of Physical Processor Busy



For each logical partition, the physical utilization of the machine is a function of the number of physical processors.

The partitions of all partitions is based on the number of physical processors of the machine, and not the number of logical processors assigned to the partition.

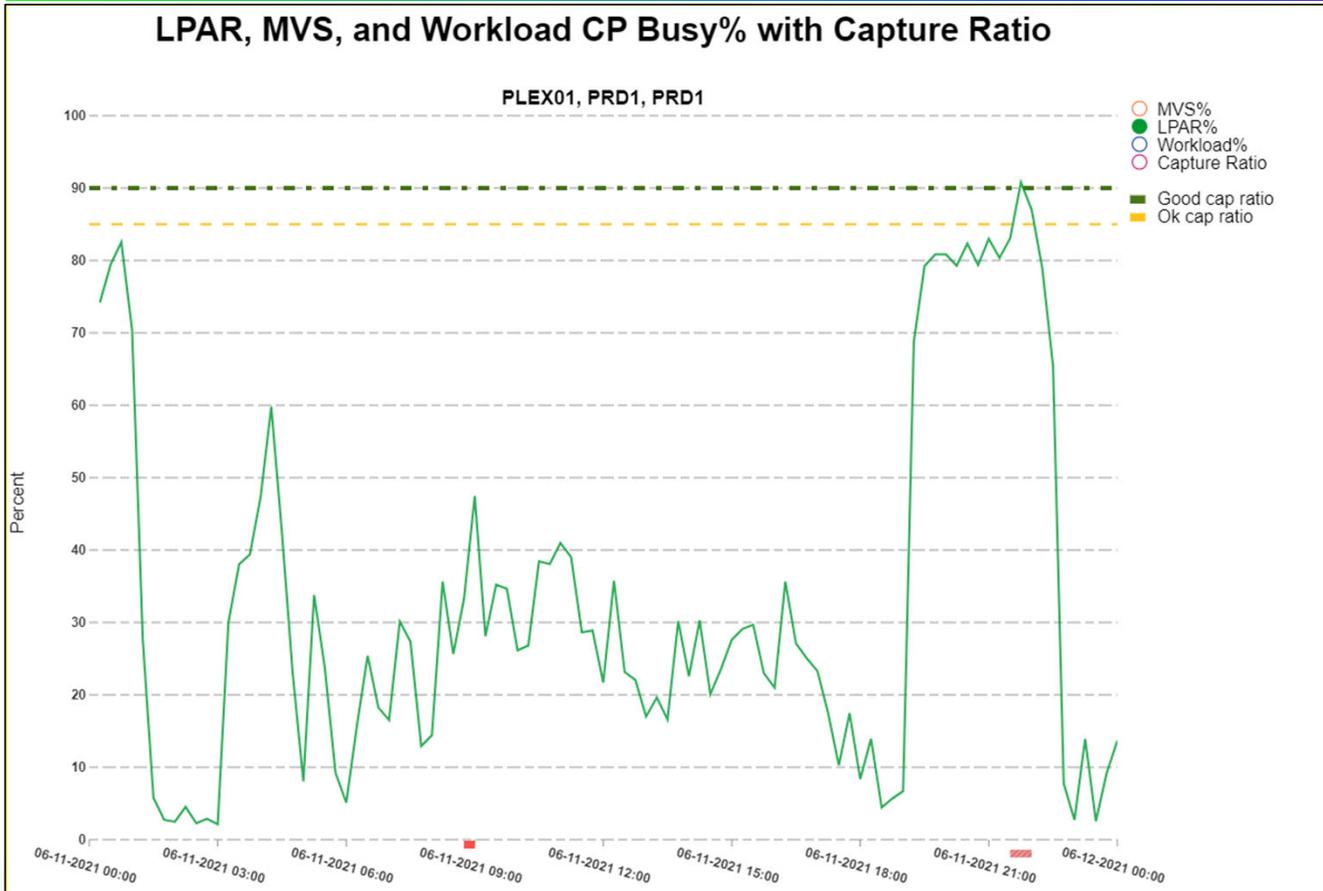
Physical Machine Utilization as Line Chart



For each logical partition, the physical utilization of the machine is a function of the number of physical processors.

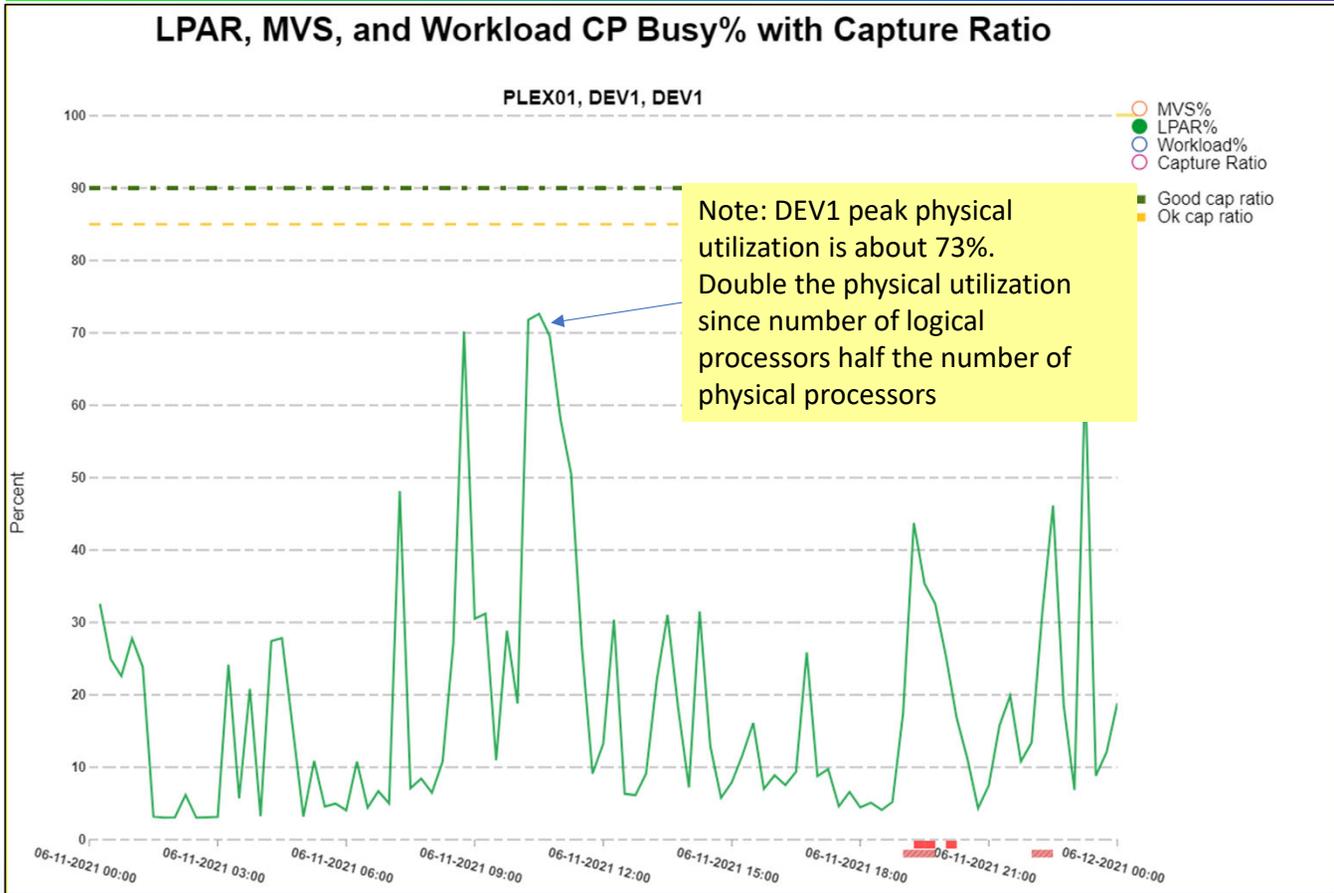
The partitions of all partitions is based on the number of physical processors of the machine, and not the number of logical processors assigned to the partition.

Example of Logical Processor Busy

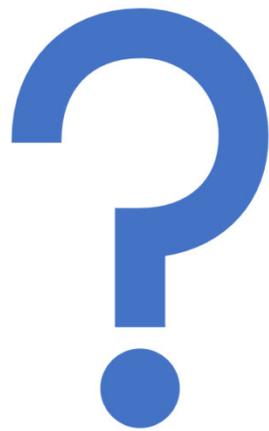


When the number of logical processors assigned to a partition is equal to the number of physical processors on the CEC, the LPAR utilization for that LPAR will equal the physical utilization for that LPAR.

LPAR, MVS, and Workload CP Busy% with Capture Ratio



When the number of logical processors assigned to a partition is NOT equal to the number of physical processors on the CEC, the LPAR utilization for that LPAR will be higher since we are looking at the constraint of the number of logical processors.



Questions?