

Advanced Technical Support – Washington Systems Center

## An Introduction to the IBM Processor Capacity Reference for zSeries

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# Agenda

- What is the IBM Processor Capacity Reference for zSeries (zPCR)
- Inputs
- Execution considerations
- Sample session
- Where to get more information



# What is zPCR

- A Java based PC tool
- Provides the capacity relationship of zSeries processors
  - LSPR workloads determine the capacity ratio
  - Includes impact of LPAR configurations
  - Expected accuracy of + or -5%
- The IBM tool to properly size zSeries processor upgrades



# Input to zPCR

### • RMF CPU Activity Report for the installed machine

- Machine type and model
- LPAR definitions

### RMF Workload Activity Report(s)

- Determine the workload mix for each partition

### Proposed machine

- Processor type and model
- LPAR definitions



## **Execution Considerations**

- If you are comparing multiple machines, it is critical the analysis be done using the same machine as the reference machine. Otherwise the ratios between the machines will NOT be correct as they are built using a different base machine
- The impact of LPAR on the capacity of a processor impacts all machines. As such, you need to use zPCR to determine the capacity of the current machine as well as the proposed machine



## Inputs for Sample Exercise

#### Current machine characteristics

- 2064-210 (2326 MIPs customer defined)

LPAR name	# LCPs (GP)	Weight	DASD I/O per Consumed MSU	Operating System Version
WSC1	6	500	17	z/OS 1.4
WSC2	3	250	20	z/OS 1.4
WSC3	3	250	18	z/OS 1.6

Proposed machine characteristics

#### - 2084-307 (A08) with 1 zAAP

LPAR name	# LCPs (GP)	Weight	# LCPs (zAAP)	Operating System Version
WSC1	5	500	NA	z/OS 1.4
WSC2	3	250	NA	z/OS 1.4
WSC3	3	250	1	z/OS 1.6



	ZPCR - Function Selection [untitled]
	File Customize CPcalculator Help
	ZPCR
	Capacity Planning for IBM ZSeries Processors
	Customer / Study Identification
	zSeries LSPR Data
	LSPR Capacity Ratios Selected SCP/workload environments
	Traditional IFL
	Typical LPAR configurations (focus SCP/workload)
	LPAR Configurations
	LSPR Info
	LI BAR Canacity Planning
	Cheating Detailed LDAR confirmation
•	Specify LPAR Host and Detailed LPAR conliguration
Select	
Reference CPU	Reference-CPU Workloads
	Select LSPR Table to be Used
	I zSeries LSPR Data (z990, z900, z890, z800 processors)
	Image: Strategy Constraints (Constraints) Constraints (Constraints) Constraints (Constraints) Constraints (Constraints) (Con
	Note: If z/OS 1.6 is not exploited, 1.4 data must be used to properly represent capacity.
	C Legacy LSPR Data (z900, z890, z800, and S/390 processors)
	Combined LSPR Date (imited SCRAuerland actuation)
	Complete LSPR Data (limited SCP/workload selection)     Schwarkload selection)     Schwarkload selection)
	Capacity is relative to a 2064-210 assumed at 1.0000 (entire CEC)

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ZPCR - Function Selection [untitled]	
Image: Production Selection [untitled]         File       Customize         CPCalculator       Help         Image: Product of the production       EPCR         Capacity Planning for IBM zSeries Processors       Customer / Study Identification         Image: Product of the p	Select Workloads
Reference-CPU       Workloads         Select LSPR Table to be Used <ul> <li>✓ zSeries LSPR Data (z990, z900, z890, z800 processors)</li> <li>✓ z/OS 1.4 (capacity for versions prior to 1.6)</li> <li>✓ z/OS 1.6 (24-way support)</li> <li>Note: If z/OS 1.6 is not exploited, 1.4 data must be used to properly represent capacity.</li> </ul>	Workloads
<ul> <li>Legacy LSPR Data (z900, z890, z800, and S/390 processors)</li> <li>OS/390 V2.10</li> <li>Combined LSPR Data (limited SCP/workload selection)</li> <li>Assumes z/OS 1.4</li> </ul>	
Capacity is relative to a 2064-210 assumed at 1.0000 (entire CEC)	© 2005 IBM C <u>orporat</u> i

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ZPCR - Workloads [untitled]			×
Image: Second Stress	Series LSPR Data (10/31/2004)         Cload Mixes         Interfered         Ceneric (not for capacity planning)         Z/OS LSPR-Mix LSPR Generic Mix         New (zSeries data only)         Z/OS LSPR-Mix LSPR Generic Mix         New (zSeries data only)         Z/OS TIP-Mix LSPR Generic Mix         New (zSeries data only)         Z/OS TIP-Mix Transaction Intensive         2. Z/OS TIP-Mix Transaction Dominant         2. Z/OS TIP-Mix Transaction Moderate         2. Z/OS TIP-Mix Transaction Moderate         2. Z/OS TIP-Mix Transaction Moderate         2. Z/OS CB-Mix Commercial Batch         2. Z/OS Lolo-Mix Low I/O Content         Display         User Defined         2.       3.       .       .         3.       .       .       .         4.       .       .       .       .         Add z/OS       Change	Plections Initialize Add Add	
Return Cancel Choosing a Workload Mix	Select Choo	sing Workload Mix	
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套 LSPR Workload H	elp System				_ <b>8</b> ×
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LSPR Workload Onlin	e Help	Choosing a We	orkload Mix		
SCP Version     Choosing a     Choosing a     Winen Is     LolO-Mix	s and Workloa Vorkload Mix R-Mix Workloa the Use of a M Worklo <u>ad</u> - a :	As an aid for deciding have been defined, co should be used for a own, are discussed u	g which LSPR workload primitiv mmon to both the <b>zSeries LSPF</b> // <b>OS (or OS/390) capacity plam</b> nder <u>Tailoring a Custom Mix</u> , b	(s) should be used to represent a production I Data and the Legacy LSPR Data. Normal ing exercises. Guidelines for selecting the a elow.	workload, five suggested workload mixes Ily, one of these five suggested mixes appropriate workload mix, or defining your
	a Custom Mix Other Ratio the Online Cor the Other Com nments oads	Note: If a capacity pl LSPR Data (in zPC) five suggested work sets of LSPR data. 7 consistency in capac	anning exercise involves migratio <b>R</b> ) and the <b>Legacy LSPR Data</b> ( <b>Doub mixes be used</b> . This is bea The mix content for each of the fi ty relationships with those produ-	n from a G6 or prior processor, capacity data in <b>zPCR</b> and <b>PCRW</b> ). When bridging is cause the actual LSPR workload primitives th ve suggested mixes in the OS/390 LSPR table test from the z/OS LSPR table.	a must be bridged between the <b>zSeries</b> required, it is essential that one of these at were measured differ between the various es has been specifically set to help assure
FPC1 (OS/39	0) - Engineerir CBW2 (OS/39	The suggested work	oad mixes include:		
CB-S (z/OS);	CB84 (OS/39) )) - Online Wor	1. TI-Mix	Transaction Intensive	60% Online / 40% Other	
WASDB (z/C	)S) - WebSphe	2. <b>TD-Mix</b>	Transaction Dominant	40% Online / 60% Other	Select LolO-MI
CICS (OS/39)     DB2 (OS/39)	D) - On-line Wc	3. <b>TM-Mix</b>	Transaction Moderate	30% Online / 70% Other	
OLTP-W (z/0	)S) - Web-enal	4. CB-Mix	Transaction Moderate	100% Other	
EAS-DB (z/O	s); R/3-DB (O:	5. LoIO-Mix	Low IO Content Special c	ase when IO rate per MSU < 30	
Here Viviller Vorkio	doads	For zSeries LSPR D	ata (available in zPCR):		
	Dads	• The <i>Online</i> cor	nponent is distributed equally betw	ween OLTP-T and OLTP-W	
		• The Other com	ponent is assigned as ¾ CB-L a	nd ¼ CB-S	
		For Legacy LSPR D	ata (available in zPCR and in I	PCRW):	
		• The <i>Online</i> cor	nponent is distributed between $T$	SO, CICS/DB2, and IMS	
		• The Other com	ponent is generally assigned as $rac{3}{4}$	CBW2 and <sup>1</sup> / <sub>4</sub> CB84	
		Refer to the <i>Workloa</i> mixes assigned are u	<b>ds</b> window in <b>zPCR</b> and/or in <b>F</b> nique to each set of OS/390 (i.e.,	<b>CRW</b> to see the specific weights assigned to v2r10, v2r4, or v1r1) LSPR data.	o define these mixes. Note that the exact
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	LoIO-Mix Workload - a Spe	ecial Case
LSPR Data and Usage Guideline     SCP Versions and Workloa     Choosing a Workload Mix     The LSPR-Mix Workload Mix     When Is the Use of a M     LolO-Mix Workload - a s     Tailoring a Custom Mix	In cases where the total syste is less than 30, the predefined category. Note: MSU values for the z89 price/performance). Therefor the MSU value shown in <b>zPC</b>	m DASD IO per second per MSU (that is, the total DASD IO rate divided by the consumed MSUs of the system) LoIO-Mix should be chosen. This mix is the preferred representation for production workload that falls in this 20 and 2990 are now shown in zPCR and PCRW as discounted values (providing improved software re, they must be adjusted to determine if the LoIO-Mix workload would apply. In these cases, you should divide R or PCRW by 0.90 to get the MSU value to be used for the LoIO-Mix workload test.
Online to Other Ratio     Tailoring the Online Cor	Example	
- Tailoring the Other Com	2084-301	Processor model
	70	MSU (a discounted value for z990)
	64%	Utilization for this workload
<ul> <li>TSO (OS/390) - Online Wor</li> <li>W(ASDB (7/OS) - WebSphe</li> </ul>	1,395	DASD IO rate per second
- CICS/DB2 (OS/390) - On-lin	Calculations	
<ul> <li>CICS (OS/390) - On-line Wo</li> <li>DB2 (OS/390) - On-line Wo</li> </ul>	$70 \div 0.90 = 77.8$	2084-301 discounted MSU adjusted to full capacity
OLTP-W (z/OS) - Web-enal     OLTP-T (z/OS); IMS (OS/39	0.64 × 77.8 = 49.8	MSUs consumed
EAS-DB (z/OS); R/3-DB (O:	1,395 ÷ 49.8 = 28.0	DASD IO rate per consumed MSU
H LSPR Workloads	This workload qualifies for <b>L</b>	oIO-Mix since it demonstrates less than 30 DASD IOs per MSU consumed.
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version of the second s			×
Workload Graph Help Workload Primatives z/OS 1.4 (capacity for versions prior to 1.6) z/OS 1.6 (24-way support) <u>z/OS</u> 1. CB-L Comm Batch (long jobs) 2. CB-S Comm Batch (short jobs) 3. WASDB WebSphere App Serving 8 4. OLTP-W Web-enabled on-line 5. OLTP-T Traditional on-line 6. EAS-DB DB server for SAP <u>z/VM</u> 1. CMS1 Interactive CMS Users 2. WASDB/L WebSphere App Serving 8 <u>Linux</u> 1. WASDB/L WebSphere App Serving 8 <u>Linux</u> 1. WASDB/L WebSphere App Serving 8 <u>EAS-AS/L</u> Enterprise App Solution un	Series LSPR Data (10/31/2004)         Ser Workload Mixes         Predefined         Series (not for capacity planning) z/OS LSPR-Mix LSPR Generic Mix         Lyos LSPR-Mix LSPR Generic Mix         New (zSeries data only) z/OS Web-Mix Web-centric Activity         2 z/OS TD-Mix Transaction Intensive         2 z/OS TD-Mix Transaction Intensive         2 z/OS TD-Mix Transaction Moderate         3 z/OS CB-Mix Commercial Batch         5 z/OS Lolo-Mix Low I/O Content         Display         Jame         1       none defined         2       Name         1       none defined         2       Add z/OS	elections	
Return Cancel Choosing a Workload Mix	Select Retu	I <b>rn</b>	
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ZPCR - Function Selection [untitled]	
Image: State State State     State </td <td>Select Detailed LPAR Capacity Plan</td>	Select Detailed LPAR Capacity Plan
C z/OS 1.4 (capacity for versions prior to 1.6) C z/OS 1.6 (24-way support) Note: If z/OS 1.6 is not exploited, 1.4 data must be used to properly represent capacity.     C Legacy LSPR Data (z900, z890, z800, and S/390 processors)     OS/390 V2.10     C Combined LSPR Data (limited SCP/workload selection)	
Capacity is relative to a 2064-210 assumed at 2,326 MIPS (single LP)	

Host







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ZPCR - LPAR Detail: Host and Part	ition Configuration [untitled]		
zSerie	s LSPR Data (10/31/2004)		
LPAR Confi	guration Capacity Planning		
	Logical Partition Configu	ration	
LPAR Host Processor	CP Pool No. of Logical	LCP:RCP	
Processor Model 2064-210	Partition Partitions CPs	Ratio	
Configurable CPs 16 TRAD 10 zAAP n/s IFL 0 ICF 0 Unassigned 6 Number of Books n/s Unassigned Books n/s Maximum partitions 15			
Reports Summary Detail Return	Traditional LPs	CE LPS Select Traditional	LPs

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ile Help	LPAR D	)etail: Pa	rtition Definit	ion Luntitl	edj							
<b></b>	)		8									
				zSerie	es LSPR Data	(10/31/2	004)					
			D	efine <sup>-</sup>	Traditiona	al Par	tition	s				
			LPAR I	Host = 20	)64-210 usin	g 10 Cl	Ps: 10 <sup>-</sup>	[RADs				
		Capaci	ty is relativ	e to a 20	)64-210 ass	umed	at 2,32	S MIPS (	single LP	)		Enter
			LP Identifi	cation			L	<sup>o</sup> Configu	ration		ZAAP	
Include	No.	Туре	Name	SCP	Workload	Mode	LCPs	Weight	Weight %	Capping	LCPs	LPAR
	1	TRAD	LP-05	z/0S**	TM-Mi×	SHR	1	100	<mark>&lt;100.0%</mark>		n/a	Definitions
												2064-210
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	ZPCR -	LPAR I	Detail: Pa	artition Definit	ion [untitle	ed]						<u>_                                    </u>
				8								
					zSerie	s LSPR Data	(10/31/2	004)				
				D	)efine 1	<b>Fradition</b>	al Par	tition	s			
				LPAR	Host = 20	64-210 usin	g 10 CF	Ps: 10 1	TRADS			
			Capac	ity is relativ	e to a 20	64-210 ass	umed	at 2,32	6 MIPS (	(single L	P)	
				LP Identifi	ication				P Configu	ration		ZAAP
	Include	No.	Туре	Name	SCP	Workload	Mode	LCPs	Weight	Weight %	Capping	LCPs
		1	TRAD	WSC1	z/0S**	LolO-Mix	SHR	6	500	50.0%		n/a
		2	TRAD	WSC2	z/0S**	LolO-Mix	SHR	3	250	25.0%		n/a
		3	TRAD	WSC3	z/OS 1.6	LolO-Mix	SHR	3	250	25.0%		n/a
			<b>-</b>	CP nool summer	v #1De #		Sumof	\Aleights	7	Mov	e LP	
Select	LP Nar Default p LP	ne refix		CP pool summar DED SHR	<u>y #LPs #</u> 0 3 3d	0 n/a 12 1.2 Ione De	iete	<u>vveignts</u> /a 000				
Return	Return	are whi	te backgri	ound; Single clict	k selection fi	eld for drop-dov	wn list; Do	ouble click	entry field	ls to open.		



	PAR Detail: Host and Parti	ition Configural	tion funtitled	1	
	File Help	cion contiguio	cion Lanciera		
	zSeries	s LSPR Data (1	0/31/2004)		
	LPAR Config	guration Cap	oacity Plan	ning	
		Logic	al Partition	Configura	ation
	LPAR Host Processor	CP Pool	No. of I	Logical	LCP:RCP
	Processor Model 2064-210	Partition	Partitions	CPs	Ratio
	Configurable CPs 16 TRAD 10	TRAD Dedicated	0	0	n/a
	zAAP n/s	Shared	3	12	1.200
	IFL 0 ICF 0	<u>zAAP/IFL/ICF</u> Dedicated	0	0	n/a
	Number of Books n/s	Shared	0	0	0.000
	Unassigned Books <b>n/s</b>	Totals	J	12	
	Maximum partitions 15				
	Specify Host	Traditional L	Ps	LPs IC	FLPs
	Reports-	-Information			
Select Detail –	Summary Detail	About Partitio	onining	zAAP conside	erations
	Return				







#### Contents of Clipboard

								Ca	n be pa	asted ir	nto a do	ocumer	۱t
zPCF	(2.	4) – LPAR	Capacity	Report			/						
	zSer	ies LSPR	Data (10/	31/2004)									
LPAF	R Hos	t and Par	tition Ca	pacity		×							
	LPAR	Host =	2064-210	using 10 C	Ps: 10 TRADs								
	Acti	ve partit	ions = 3;	3 TRAD, 0	zaap, 0 ifl,	, 0 IC	F						
	Capa	city is r	elative t	o a 2064-2	10 assumed at	= 2,32	6 MIPS	(entir	e CEC)				
	LP	Identific	ation			LP De	finitic	n			LP Cap	acity	
Inc	No	Туре	Name	SCP	Workload	Mode	#LCPs W	leight	Weight%	Capping	Minimum	Maximum	
	+	-+	-+	+	-+	+	++		-+	-+	+	-+	-
Y	1	TRAD	WSC1	z/0S**	LoIO-Mix	SHR	6	500	50.0%		1,125.1	1,350.1	
Y	2	TRAD	WSC2	z/0S**	LoIO-Mix	SHR	3	250	25.0%		568.3	681.9	
Y	3	TRAD	WSC3	z/OS 1.6	LoIO-Mix	SHR	3	250	25.0%		567.0	680.3	
			То	tals for a	ll partitions	s incl	uded in	n confi	guration	LP	capacity		
			+-							+			
				3 Parti	tions in TRAI	D RCP	pool				2,260.3		
				0 Parti	tions in zAAB	P/IFL/	ICF RCF	, bool			0.0		
				3 Parti	tions - combi	ined t	otal				2,260.3		



	ZPCR - LPAR Detail: Host and	d Part	ition Configural	tion [untitled]		<u>-</u> □×
	2	zSerie	s LSPR Data (1	0/31/2004)		
	LPAR C	Confi	guration Cap	acity Planr	ning	
			Logic	al Partition	Configura	ation
	LPAR Host Processo	Ľ	CP Pool	No. of L	.ogical	LCP:RCP
	Processor Model 2064-	-210	Partition	Partitions	CPs	Ratio
	Configurable CPs	16 10	TRAD Dedicated		0	nla
	ZAAP	n/s	Shared	3	12	1 200
	IFL	0	ZAAP/IFL/ICF	Ŭ		
	ICF	0	Dedicated	0	0	n/a
	Unassigned	6	Shared	0	0	0.000
	Unassigned Books		Totals	3	12	
	Maximum partitions	15				
Select Specify	Specify Host		Traditional Lf	Ps FLL	.Ps IC	FLPs
HUSI	-Reports-		Information			
	Summary		About Partitio	onining	zAAP conside	erations
	Return					

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zSerie	s LSPR Data (1	0/31/2004)		
LPAR Confi	guration Cap	oacity Plann	ing	
	Logic	al Partition	Configura	ation
LPAR Host Processor	CP Pool	No. of L	ogical	LCP:RCP
Processor Model 2084-A08	Partition	Partitions	CPs	Ratio
Configurable CPs 8 TRAD 7	TRAD Dedicated	0	0	n/a
ZAAP 1	Shared	3	12	1.714
ICF 0 Unassigned 0	ZAAP/IFL/ICF Dedicated	0	0	n/a
Number of Books 1	Totals	3	12	0.000
Unassigned Books none Maximum partitions 30				
Specify Host	, Traditional LI	Ps FLL	Ps IC	FLPs
eports	-Information			
Summary Detail	About Partitio	onining	ZAAP conside	erations
Return				



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	File Help				
	zSerie	es LSPR Data (1	0/31/2004)		
	LPAR Conf	iguration Ca	pacity Plan	ning	
		Logic	al Partition	n Configura	ation
	LPAR Host Processor	CP Pool	No. of	Logical	LCP:RCP
	Processor Model 2084-A08	Partition	Partitions	CPs	Ratio
	Configurable CPs 8	TRAD Dedicated		0	nía
	zAAP 1	Shared	3	11	1.571
	IFL 0	ZAAP/IFL/ICF			
	ICF 0	Dedicated	0	0	n/a
	Number of Books 1	Shared	1	1	1.000
	Unassigned Books none	lotais	4	12	
	Maximum partitions 30				
	Specify Host	, Traditional L	Ps IFL	LPs IC	FLPs
Calast Datail	Reports-	_Information			
Select Detail	Summary Detail	About Partitio	onining	zAAP conside	erations
	Return				







# zPCR Results

- Reference CPU is a 2064-210 provides 2326 MIPS (customer defined)
- 2064-210 with current LPAR configuration provides approximately 2260 MIPS
- 2084-307 (A08) and 1 zAAP with the proposed LPAR configuration would deliver approximately 2,477 GP CP MIPS and 366 zAAP CP MIPS for a total capacity of approximately 2843 MIPS

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## Where to Get More Information

- The IBM Processor Capacity Reference for zSeries User Manual
  - Provides information about all the features contained in the tool
- The zPCR Newsgroup
  - Provides Q&A support
- The zPCR Email address
  - Provides defect support