



Session G04

IBM System z9 LPAR Advanced Topics

Harv Emery, IBM Americas System z Advanced Technical Support

IBM
SYSTEM z9 AND zSERIES EXPO
October 9 - 13, 2006

Orlando, FL

Trademarks

The following are trademarks of the International Business Machines Corporation in the United States and/or other countries.

APPN*	Geographically Dispersed Parallel Sysplex	Parallel Sysplex*	VM/ESA*
CICS*	HiperSockets	PR/SM	VSE/ESA
DB2*	IBM*	Processor Resource/Systems Manager	VTAM*
DB2 Connect	IBM eServer	RACF*	WebSphere*
DB2 Universal Database	IBM e(logo)server*	Redbook	xSeries*
developerWorks*	IBM logo*	Resource Link	z/Architecture
DirMaint	IMS	RMF	z/OS*
DRDA*	InfoPrint*	S/390*	z/VM*
e-business logo*	Language Environment*	Sysplex Timer*	z/VSE
ESCON*	Multiprise*	System z	zSeries*
FICON*	MVS	System z9	
GDPS*	OS/390*	TotalStorage*	

* Registered trademarks of IBM Corporation

The following are trademarks or registered trademarks of other companies.

Java and all Java-related trademarks and logos are trademarks of Sun Microsystems, Inc., in the United States and other countries

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Microsoft, Windows and Windows NT are registered trademarks of Microsoft Corporation.

Red Hat, the Red Hat "Shadow Man" logo, and all Red Hat-based trademarks and logos are trademarks or registered trademarks of Red Hat, Inc., in the United States and other countries.

SET and Secure Electronic Transaction are trademarks owned by SET Secure Electronic Transaction LLC.

* All other products may be trademarks or registered trademarks of their respective companies.

Notes:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

Agenda

- **IBM System z9™ Update**
 - System z9 EC New Function
 - System z9 BC
 - Dispatching Pool Change
 - LPAR Configuration

- **Activation Profile Changes**

- **Changing Running Partitions**

- **Memory and Addressability**

- **HSA Estimation Tool**



IBM System z9™ Update

z9-109 New Functions and Features (2005)

Five New Hardware Models		Up to 16 2.7 GB STIs per book
Faster Uni Processor		MIDAW facility
Up to 54 CPs		Second Subchannel Set in each LCSS
Up to 512GB Memory		Subchannel set 0 increased to 63.75K Subchannels
Up to 60 LPARs		FICON Express2 supports 64 Open Exchanges
CBU for IFL, ICF and zAAP		Increased Number of FICON® Express2 features
Separate PU Pool Management		N_Port ID Virtualization
Redundant I/O Interconnect		IPv6 Support for HiperSockets™
Enhanced Driver Maintenance		OSA-Express2 1000BASE-T
Enhanced Book Availability		OSA-Express2 OSN (OSA for NCP)
Wild Branch PD Assist		Enhanced CPACF with AES, PRNG and SHA-256
54 additional hardware Instructions		Configurable Crypto Express2

Preview*
Server Time Protocol

**This statement represents IBM's current intentions. IBM development plans are subject to change or withdrawal without further notice.*

z9 EC - New functions/features enhancements Microcode level 63J plus MCLs (May, 2006)

**24 New
subcapacity settings**

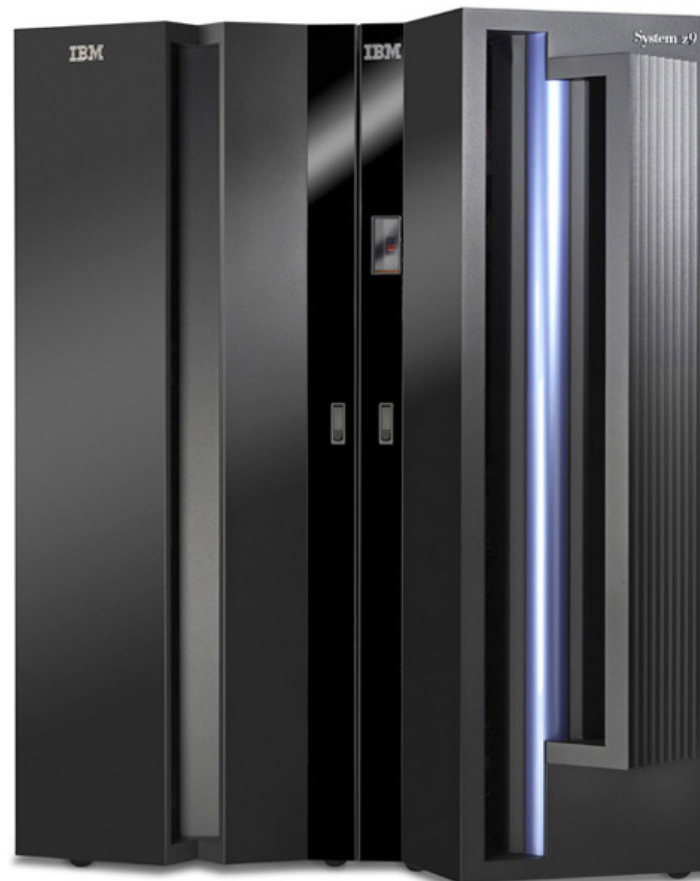
**New Specialty
Engine – IBM zIIP**

CBU for zIIP

**PU Conversions for
zAAPs and zIIPs**

**CBU
Enhancements**

**On/Off CoD
Enhancements**



**New FICON
Express4**

**Improved FICON
Error Recovery**

**OSA Layer 2/3
Enhancements**

**Crypto
Enhancements**

**Availability in EU after
implementation of
RoHS**

Note: Please refer to the latest PSP bucket for latest PTFs for new functions/features

Finding the server that meets your business needs

Approximate Capacity relative to full speed

MCI 701:

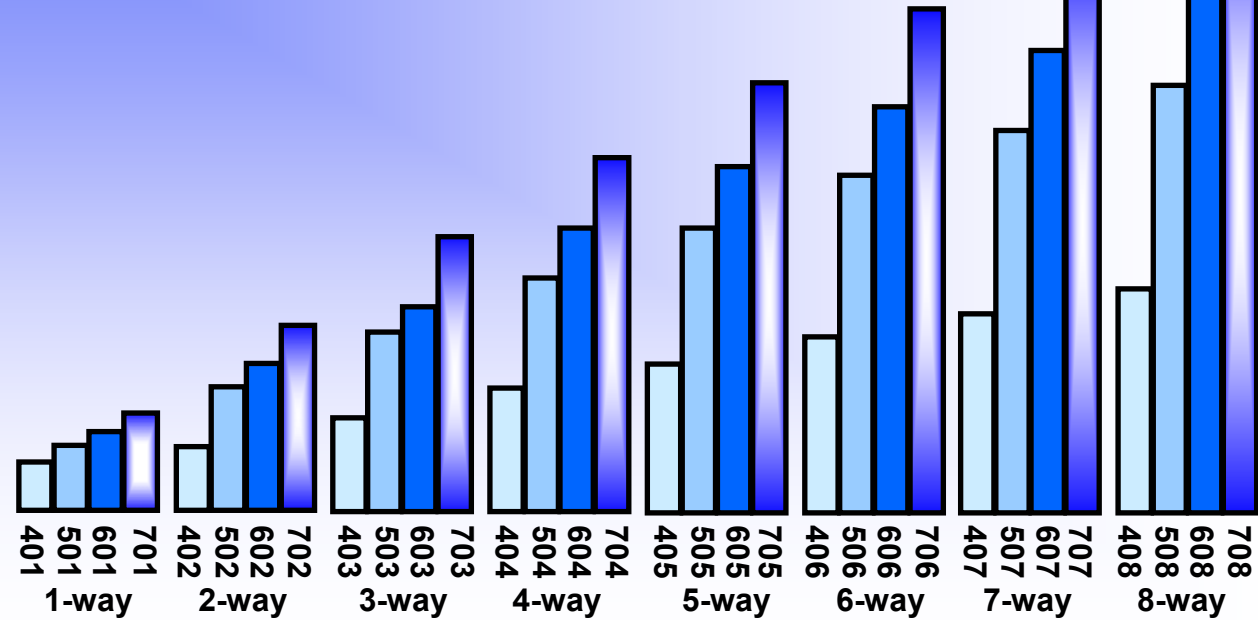
601 = 80%

501 = 66%

401 = 34%



Subcapacity servers



- The z9 EC will now offer 24 additional subcapacity settings with the first eight general purpose (CP) engines
- Entry point is approximately one third the capacity of the 701
- All general purpose processors must be the same capacity within one z9 EC
- The one for one relationship of zAAP or zIIP to CP still exists, but one CP can satisfy requirement for either or both specialty engines

z9 BC Hardware Model Structure

- **One machine type – 2096 – two hardware models, R07 and S07**
- **Model number indicates PUs available for characterization**
 - **Single serial number**
 - **PU characterization is identified by number of features ordered**
- **One System Assist Processors (SAPs) per System**
- **z9 BC machine capacity indicators (MCIs) also called capacity settings**
 - **nxx, where n = subcapacity engine size and xx = number of CPs**
 - **For Model R07 n = A up to J and xx = 1 to 3**
 - **For Model S07 n = K up to Z and xx = 1 to 4**
 - **Total 73 MCIs for the two z9 BC hardware models**
 - **20 for Model R07 and 53 for Model S07**

Models	MCMs	Available PUs	Max Available Subcapacity CPs	Standard SAPs	Standard Spares	CP/IFL/ICF/zAAP/zIIP ****	Max Memory	Max Channels
R07*	1	8	3	1	0	3/6/6/3/3	64 GB	240 ***
S07**	1	8	4	1	0	4/7/7/3/3	64 GB	420 ***

Notes:

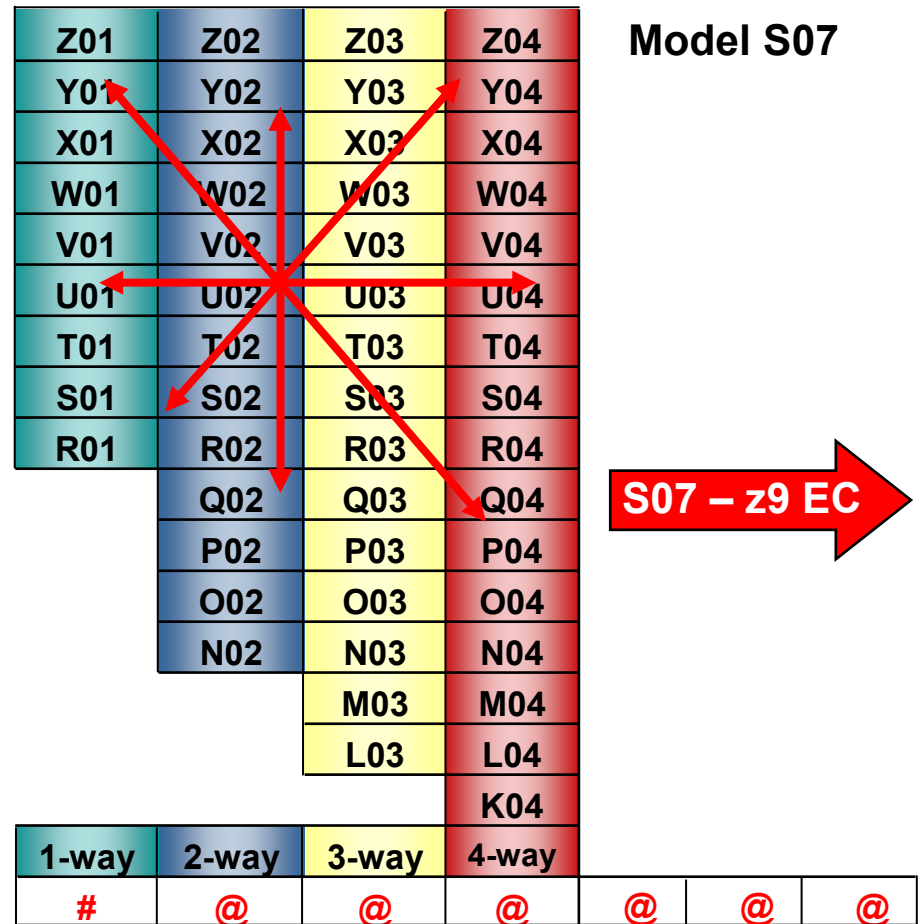
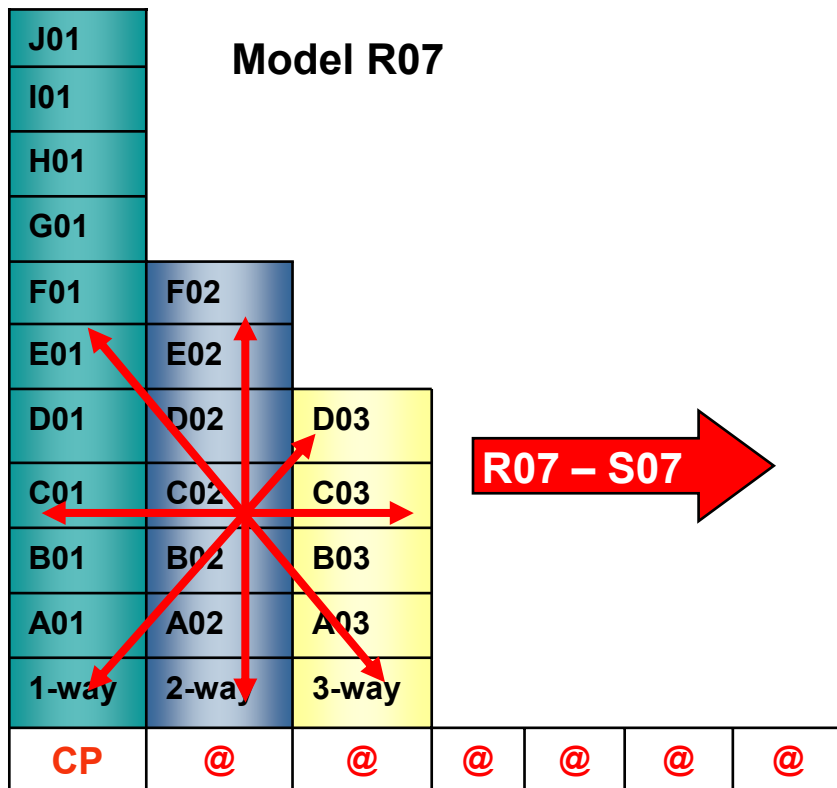
* Must have a minimum of 1 CP

** Must have a minimum of 1 CP, IFL or ICF

*** Max is for ESCON® channels.

**** For each zAAP and/or zIIP installed there must be a corresponding CP. The CP may satisfy the requirement for both the zAAP and/or zIIP. The combined number of zAAPs and/or zIIPs can not be more than 2x the number of general purpose processors (CPs).

z9 BC Improved granularity and scalability



Full on demand upgradeability in the family

- ▶ Model R07 must have minimum 1 CP engine
- ▶ Model S07 may be a full IFL or ICF system
- ▶ Model R07 upgradeable to model S07
- ▶ Model S07 upgradeable to z9 EC Model S08

= CP or IFL or ICF


@ = Any Specialty Engines. zAAPs and zIIPs have T & Cs

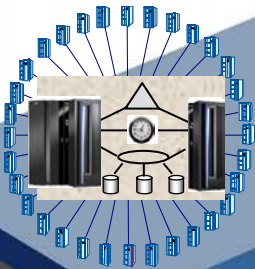
LIC Update to get 109 to EC and to support BC

- **LIC for the Support Element**
 - Driver 63j (Same as z9-109)
 - Plus MCL Bundle 22A of June 1, 2006 (Concurrent)
- **LIC for the HMC**
 - Driver 64x
 - Plus MCL Bundle 3 of June 28, 2006
- **Options to get the LIC**
 1. Shipped with any new build System z9 or MES to z9-109
 2. Service can order SE and HMC AROMs for z9-109
 3. Dr 64x update for **HMC 0075 and later on non-z9 CECs** :
Service can order **ECA 241** for the CEC that “owns” the HMC
This ECA ships memory if needed on the older HMC
Prerequisite: Bring SE up to current MCL level

Note: Driver 63 Exception Letter includes 63j and 64x

Technology evolution with specialty engines

 Building on a strong track record of technology innovation with specialty engines, IBM introduces the System z9 Integrated Information Processor



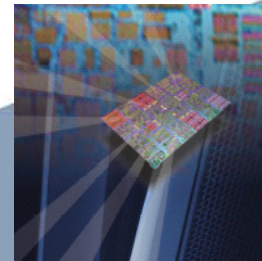
Internal Coupling Facility (ICF) 1997

Centralized data sharing across mainframes



Integrated Facility for Linux (IFL) 2001

Support for new workloads and open standards



System z9 Application Assist Processor (zAAP) 2004

Designed to help improve resource optimization for z/OS Java technology-based workloads

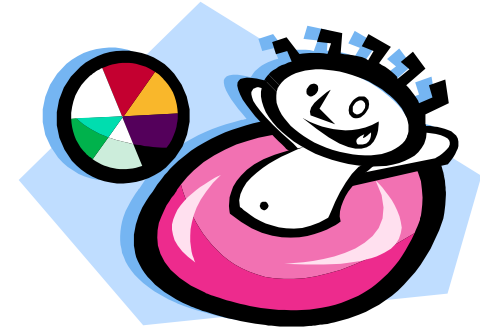


IBM System z9 Integrated Information Processor (zIIP) 2006

Designed to help improve resource optimization for eligible data workloads within the enterprise

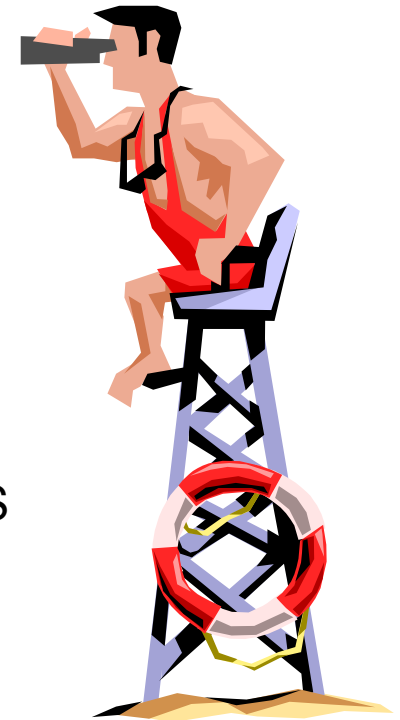
PR/SM™ Hypervisor™ PU Dispatching “Pools”

- **PU Pool – Physical PUs to dispatch to online logical PUs**
- **z9 EC with 10 CPs, 1 ICF, 2 IFLs, 1 zIIP and 3 zAAPs**
 - CP pool contains 10 CP engines
 - **ICF pool** contains 1 ICF
 - **IFL pool** contains 2 IFLs
 - **zAAP pool** contains 3 zAAPs
 - **zIIP pool** contains 1 zIIP
 - **z/OS LPAR can have different CP, zAAP and zIIP weights**
- **z990 with 11 CPs, 1 ICF, 2 IFLs, and 3 zAAPs**
 - CP pool contains 11 CP engines
 - **Specialty pool** contains 6 engines – ICFs, IFLs, zAAPs
 - z/OS LPAR zAAP weight is set equal to the initial CP weight



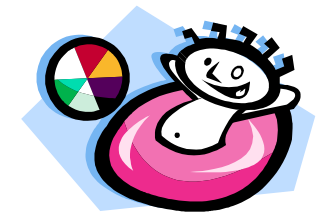
PR/SM Hypervisor PU Pool Rules

- **Logical PUs dispatched from supporting pool only**
 - Logical CPs from CP pool only, for example
- **Pool “width”**
 - Width equals the number of physical PUs in the pool
 - Limits an LPAR’s maximum number of shared logical PUs brought online
- **PUs placed in pools by**
 - Activate (POR)
 - Concurrent Upgrade – On/Off CoD, CBU, CIU, CUoD MES
 - Dedicated LPAR **deactivation**
 - Dedicated LPAR configure logical PU **OFF**
- **PUs removed from pools by**
 - Concurrent Downgrade - On/Off CoD, CBU, PU Conversion MES
 - Dedicated LPAR activation (“width” permitting)
 - Dedicated LPAR configure logical PU ON (“width” permitting)



z9 EC with 9 CPs, 1 ICF, 2 IFLs, 3 zAAPs and 1 zIIP

- **LPAR Share = Pool PUs x (LPAR Pool Weight)/(Total Pool Weight)**
 - Can't exceed number of Online Logical Processors dispatched from the pool
 - z/OS LPAR – Separate "Initial" weights for CPs, zAAPs, and zIIPs
- **Pool PUs (Physical) – CP =9, zIIP=1, zAAP = 3, IFL = 2, ICF =1**
- **Total Pool Weights – CP = 900, zIIP = 1000, zAAP = 200, IFL= 400, ICF= 1000**

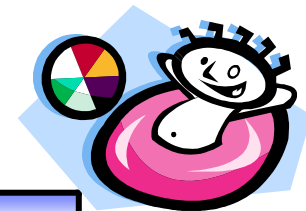


LPAR Name	Online Logical PUs, LPAR Weights					Intended PU Share: PUs				
	CP	zIIP	zAAP	IFL	ICF	CP	zIIP	zAAP	IFL	ICF
zOS1	5, 200	1, 100	2, 100	NA	NA	2	.1	1.5	0	0
zOS2	9, 700	1, 900	3, 100	NA	NA	7	.9	1.5	0	0
CF1	0, 0	NA	NA	NA	1, 500	0	0	0	0	.5
CF2	0, 0	NA	NA	NA	1, 500	0	0	0	0	.5
zVM1	0, 0	NA	NA	2, 100	NA	0	0	0	.5	0
Linux1	0, 0	NA	NA	2, 300	NA	0	0	0	1.5	0
	900	1000	200	400	1000	← Sums of pool weights				
Sums of PU shares by type →						9	1	3	2	1

- **Specialty engine weights are independent. All desired shares achieved.**

z990 – 10 CPs, 1 ICF, 2 IFLs, and 3 zAAPs

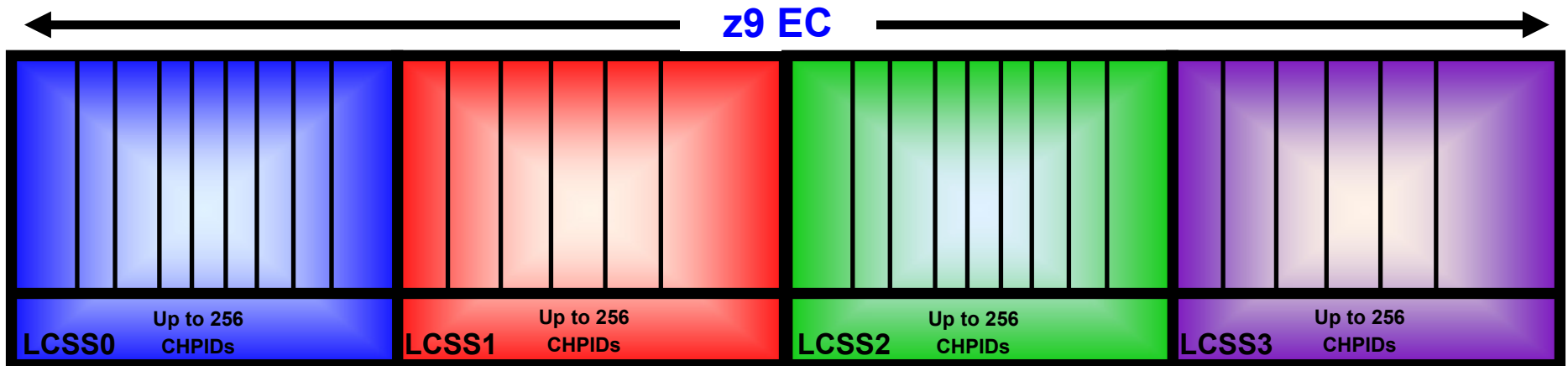
- **LPAR Share = Pool PUs x (LPAR Pool Weight)/(Total Pool Weight)**
 - Can't exceed number of Online Logical Processors dispatched from the pool
 - zIIP processors are not available
 - z/OS LPAR – **“Initial” CP weight applies to CPs and to zAAPs**
- **Pool PUs (Physical) – CP =10, Specialty = 6 (ICF, IFL, zAAP)**
- **Total Pool Weights – CP = 1000, Specialty = 2000**



LPAR Name	Online Logical PUs, LPAR Weight				PU Share: PUs	
	CP	zAAP	IFL	ICF	CP	Specialty
zOS1	5, 250	2, 250	NA	NA	2.5	.75
zOS2	10, 750	3, 750	NA	NA	7.5	2.25
CF1	0,0	NA	NA	1, 167	0	.5
CF2	0,0	NA	NA	1, 167	0	.5
zVM1	0, 0	NA	2, 166	NA	0	.5
LINUX1	0, 0	NA	2, 500	NA	0	1.5
	1000	2000 (Specialty pool)		←Sums of weights		
Sums of PU shares by type →					10	6

- **Specialty engine weights must be aggregated. Desired zAAP share not achieved.**

z9 EC Logical Channel Subsystems (LCSSes)



- Up to four Logical Channel Subsystems (LCSSes) on z9 EC
 - ▶ Up to 15 LPARs per LCSS
 - ▶ Up to 256 channels per LCSS
- Multiple LCSSes Enable
 - ▶ **Up to 60 Logical Partitions per CEC (Requires four LCSSes on z9 EC)**
 - ▶ Up to 1024 external channels on z9 EC
- An LPAR can access channels ONLY in its assigned LCSS
- Some channels may be assigned to multiple LCSSes - **“Spanned Channels”**
 - ▶ ICP, IQD, FC, FCP, OSE, OSD, OSC, **OSN**, CBP, CFP
 - ▶ But not ESCON or FICON Conversion

Partition ID, MIF ID, and Partition Number

	Partition Identifier	MIF ID	Partition (Zone) Number
Defined	By systems programmer in the LPAR image profile on HMC	By systems programmer: HCD "Partition Number" IOCP RESOURCE statement	z800/z900 = MIF ID else assigned at POR by PR/SM z9/z990/z890/assigned at POR by PR/SM
Range (Hex)	z800/z900 - 0-F z9/z890/z990 - 00-3F	1-F	z800/z900 - 1 to F z9/z990/z890 - 1 to 3C/1E
Size	z800/z900 - 4 bits z9/z890/z990 - 8 bits	4 bits	4 bits z800/z900 8 bits z9/z990/z890
Usage	Messages, Store CPUID, PGID z9/z990/z890 : CFRM Policy to identify a CF LPAR	MIF Channel Sharing z800/z900: CFRM policy to identify a CF LPAR	Internal usage, not externalized.
Aliases	LP ID, User logical Partition ID (UPID)	Image ID (IID), EMIF ID	None
Notes	Unique on the CEC. LPAR deactivate/activate to change.	z800/z900: Unique on CEC z9/z990/z890 : Unique in LCSS. POR to change.	Unique on the CEC. POR to change.

Note: z990 compatibility support for the OSES is required to support changes to Partition Identifier "Size" and "Usage" running on z9/z990/z890 and often on other images in a Sysplex with an OS image on one of these. ICKDSF R17 is required on any image sharing disk with an OS on z9/z990/z890 for the same reasons.

System z9 Activation Profile Changes

z990 HMC Reset Profile – General Page

Customize Activation Profiles : OSYS

Profile name: Assigned for activation

Description:

Input/Output Configuration Data Set	Type	Allow Dynamic I/O	Partitions
A0 07.24.03	Partition	Yes	OCF01 OCF02
A1 07.14.03	Partition	Yes	OCF01 OCF02
A2 07.18.03	Partition	Yes	OCF01 OCF02
A3 07.23.03	Partition	Yes	OCF01 OCF02
D0 DIAGNOSE	Partition	No	0D0LP01 0D0LP02

Use Active IOCDs: Currently A0

Mode:

Load delay for power sequencing: minutes seconds

General | Storage | Dynamic | Options | CP/SAP | Pa

Save Copy notebook Paste notebook Assign profile

Logical partition is the only mode supported, basic mode is not available (HCD also provides only the LPAR mode option)

Logical Partition 'Suffix' Naming Convention

LPnameXX

where LPname is the first 6 characters of the customer required name

where xx = LPname suffix

1st character = LCSSid (0 = LCSS.0, 1 = LCSS.1)

2nd character = same as MIFid of 1 to F

System z9 - Reset Profile - General (CEC SSYS)

Customize Activation Profiles: SSYS : WSCSSYS : General

- SSYS
 - WSCSSYS
 - General
 - Storage
 - Dynamic
 - Options
 - CP/SAP
 - Partitions
 - SOSPA
 - SOSPB
 - SOSPC
 - SOSPD
 - SOSPE
 - SOSPF
 - SOSP1
 - SOSP2
 - SOSP3
 - SOSP4
 - SOSP5
 - SOSP6
 - SOSP7
 - SOSP8
 - SOSP9
 - SOSP1A
 - SOSP1B
 - SOSP1C
 - SOSP1D
 - SOSP1E

Profile name: Assigned for activation

Description:

Select	Input/Output Configuration Data Set	Type	Allow Dynamic I/O	Partitions
<input type="radio"/>	A0 DISKETTE	Partition	Yes	SOSPA SOSPB SOSPC SOSPD SOSPE SOSPF SOSP1 SOSP2 SOSPF
<input checked="" type="radio"/>	A1 08.11.05	Partition	Yes	SOSPA SOSPB SOSPC SOSPD SOSPE SOSPF SOSP1 SOSP2 SOSPF
<input type="radio"/>	A2 STARTER	Partition	No	LP1
<input type="radio"/>	A3 STARTER	Partition		
<input type="radio"/>	D0 DIAGNOSE	Partition		
<input type="radio"/>	Use Active IOCDS	Currently A1		

Mode:

Load Delay for Power Sequencing

* minutes * sec

Logical partition is the only mode supported, basic mode is not available (HCD also provides only the LPAR mode option)

Logical Partition 'Suffix' Naming Convention

LPnameXX

where LPname is the first 6 characters of the customer required name

where xx = LPname suffix

1st character = LCSSid (0 = LCSS.0, 1 = LCSS.1)

2nd character = same as MIFid of 1 to F

System z9 - Reset Profile - Storage

Customize Activation Profiles: SSYS : WSCSSYS : Storage

SSYS

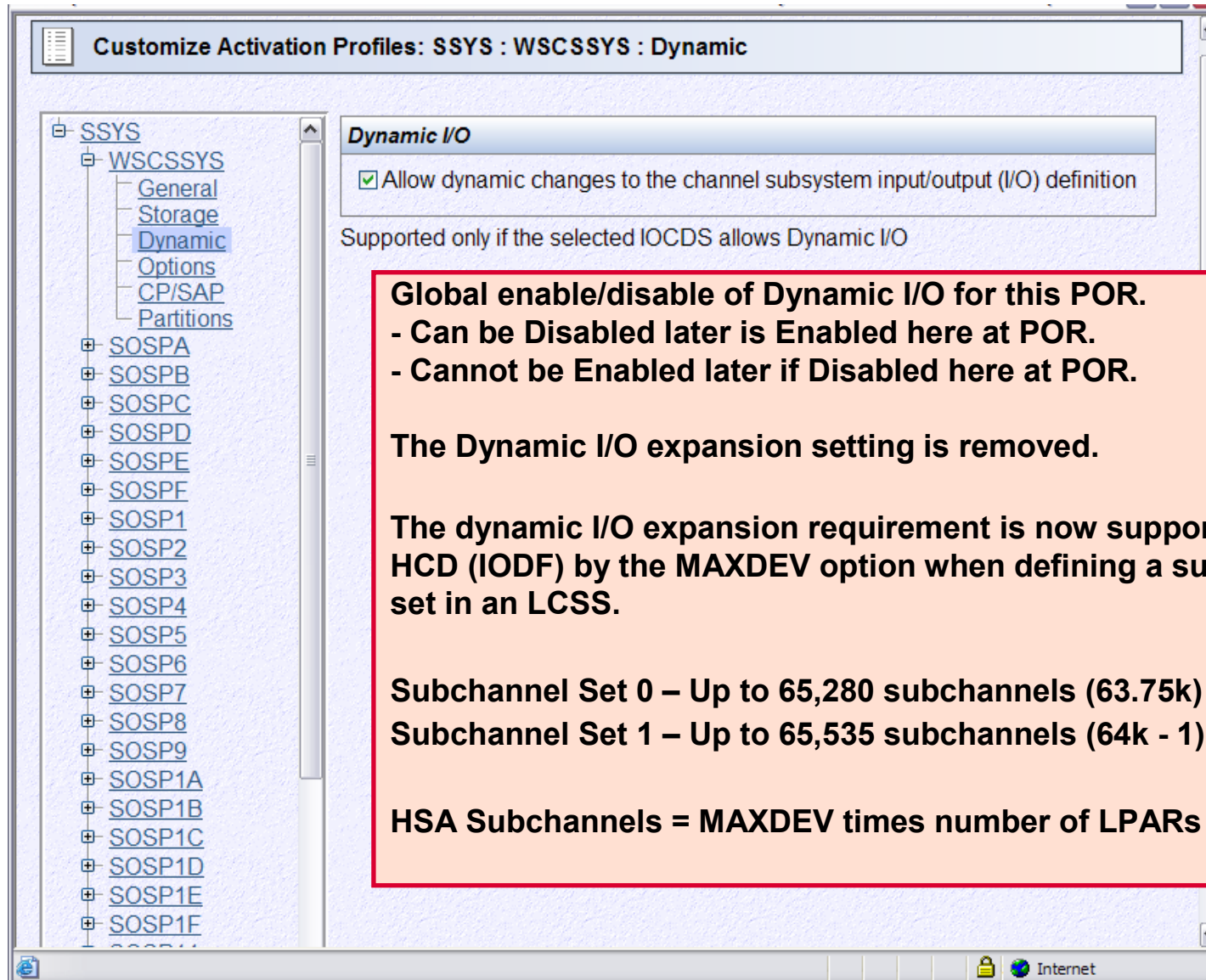
- WSCSSYS
 - General
 - Storage**
 - Dynamic
 - Options
 - CP/SAP
 - Partitions
- SOSPA
- SOSPB
- SOSPC
- SOSPD
- SOSPE
- SOSPE
- SOSP1
- SOSP2
- SOSP3
- SOSP4
- SOSP5
- SOSP6
- SOSP7
- SOSP8
- SOSP9
- SOSP1A
- SOSP1B
- SOSP1C
- SOSP1D

Installed Storage Details

- Installed storage (in Megabytes): 458752 MB
- Customer storage: 458752 MB

**Shows installed storage only.
Bad estimate of HSA has been removed.**

System z9 Reset Profile - Dynamic



Dynamic I/O

Allow dynamic changes to the channel subsystem input/output (I/O) definition

Supported only if the selected IOCDS allows Dynamic I/O

Global enable/disable of Dynamic I/O for this POR.

- Can be Disabled later is Enabled here at POR.
- Cannot be Enabled later if Disabled here at POR.

The Dynamic I/O expansion setting is removed.

The dynamic I/O expansion requirement is now supported within HCD (IODF) by the MAXDEV option when defining a subchannel set in an LCSS.

Subchannel Set 0 – Up to 65,280 subchannels (63.75k)
Subchannel Set 1 – Up to 65,535 subchannels (64k - 1)

HSA Subchannels = MAXDEV times number of LPARs in LCSS

System z9 Reset Profile - Options

Customize Activation Profiles: SSYS : WSCSSYS : Options

- SSYS
 - WSCSSYS
 - General
 - Storage
 - Dynamic
 - Options
 - CP/SAP
 - Partitions
 - SOSPA
 - General
 - Processor
 - Security
 - Storage
 - Options
 - Load
 - Crypto
 - SOSPB
 - SOSPC
 - SOSPD
 - SOSPE
 - SOSPE
 - General
 - Processor
 - Security
 - Storage
 - Options
 - Load

Enable global input/output (I/O) priority queuing
 Enable SCSI IPL
 Automatic input/output (I/O) interface reset

Processor Running Time

Attention: Selecting 'Determined by the user' risks suboptimal use of processor resources.

Dynamically determined by the system
 Determined by the user

Running time *1 1 through 100 milliseconds

Do not end the timeslice if a partition enters a wait state

No functional change

System z9 Reset Profile - CP/SAP

Customize Activation Profiles: SSYS : WSCSSYS : CP/SAP

- SSYS
 - WSCSSYS
 - General
 - Storage
 - Dynamic
 - Options
 - CP/SAP
 - Partitions
 - SOSPA
 - SOSPB
 - SOSPC
 - SOSPD
 - SOSPE
 - SOSPF
 - SOSP1
 - SOSP2
 - SOSP3
 - SOSP4
 - SOSP5
 - SOSP6
 - SOSP7
 - SOSP8
 - SOSP9
 - SOSP1A
 - SOSP1B
 - SOSP1C
 - SOSP1D
 - SOSP1E
 - SOSP1F
 - SOSP11

Select a CP/SAP assignment.

Select	CPs	SAPs
<input checked="" type="radio"/>	54	8
<input type="radio"/>	53	9
<input type="radio"/>	52	10
<input type="radio"/>	51	11
<input type="radio"/>	50	12
<input type="radio"/>	49	13
<input type="radio"/>	48	14
<input type="radio"/>	47	15
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>		
<input type="radio"/>	35	27

Display fenced book page

Allows use of purchased CPs as SAPs for this POR. Uncommon to use. Test? New: Option to view “Fenced Book” page for “Enhanced Book Availability”

When using this option, the System z9 model capacity indicator does not change. The purchased characterization of the PU (as a CP) remains the same.

System z9 Reset Profile – Fenced Book Page

Customize Activation Profiles: SSYS : WSCSSYS : Fenced

SSYS

- WSCSSYS
 - General
 - Storage
 - Dynamic
 - Options
 - CP/SAP
 - Fenced**
 - Partitions
- SOSPA
- SOSPB
- SOSPC
- SOSPD
- SOSP1
- SOSP2
- SOSP3
- SOSP4
- SOSP5
- SOSP6
- SOSP7
- SOSP8
- SOSP9
- SOSP1A
- SOSP1B
- SOSP1C
- SOSP1D
- SOSP1E
- SOSP1F

Number of available processors for Licenced Internal Code: 62
 Number of available processors when a book is fenced: 46

Processor Assignment

Determined by the system
 Determined by the user

Processor Type	LICCC Definition	Value Used when Book is Fenced
Central	50	40
System assist	8	6
Integrated facility for applications	2	0
System z9 integrated information processors	2	0
Total:	62	46

**Shows PU Resource in LIC CC and available PUs if one book is removed.
 Note: Spare PUs are not required in that case.
 Supports “Enhanced Book Availability”**

Save Copy Notebook Paste Profile Assign Profile Cancel Help

System z9 Reset Profile - Partitions

Customize Activation Profiles: SSYS : WSCSSYS : Partitions

Specify the order in which the logical partitions will be activated. If no order is specified for a partition, it will not be activated.

Partition	Order
SOSPA	1
SOSPB	2
SOSPC	3
SOSPD	4
SOSPE	5
SOSPF	6
SOSP1	7
SOSP2	8
SOSP3	9
SOSP4	10
SOSP5	11
SOSP6	12
SOSP7	13
SOSP8	14
SOSP9	15
SOSP10	16
SOSP11	17
SOSP12	18
SOSP13	19
SOSP14	20
SOSP15	21
SOSP16	22
SOSP17	23
SOSP18	24
SOSP19	25
SOSP20	26
SOSP21	27
SOSP22	28
SOSP23	29
SOSP24	30
SOSP25	31
SOSP26	32
SOSP27	33
SOSP28	34
SOSP29	35
SOSP30	36
SOSP31	37
SOSP32	38
SOSP33	39
SOSP34	40
SOSP35	41
SOSP36	42
SOSP37	43
SOSP38	44
SOSP39	45
SOSP40	46
SOSP41	47
SOSP42	48
SOSP43	49
SOSP44	50
SOSP45	51
SOSP46	52
SOSP47	53
SOSP48	54
SOSP49	55
SOSP50	56
SOSP51	57
SOSP52	58
SOSP53	59
SOSP54	60

No change except 60 partitions supported. Remember – Activate CF LPARs first

System z9 Image Profile - General Page (Partition SOSP1)

Customize Activation Profiles: SSYS : WSCSSYS : SOSP1 : General

Profile name: SOSP1

Description: This is the default Image profile.

Partition identifier: 1

Mode:

- ESA/390
- ESA/390 TPF
- Coupling facility
- LINUX only

Clock Type Assignment

Standard time of day
 Logical partition time offset

SSYS

- WSCSSYS
 - General
 - Storage
 - Dynamic
 - Options
 - CP/SAP
 - Partitions
- SOSPA
- SOSPB
- SOSPC
- SOSPD
- SOSPE
- SOSPF
- SOSP1
 - General
 - Processor
 - Security
 - Storage
 - Options
 - Load
 - Crypto
- SOSP2
- SOSP3
- SOSP4
- SOSP5
- SOSP6
- SOSP7

**The Logical partition 'Partition Identifier' is a 1 or 2 digit unique hexadecimal value from 0 to 3F
Compatibility level OSeS may not support a Partition ID larger than 0F.
In some cases a CF Partition ID cannot exceed 0F.**

ESA/390 mode can be used for OS/390® z/OS® - z/VM® with the required software support for the z990

"Sysplex test datesource group" time removed.

System z9 Image Profile - General Page

Customize Activation Profiles: SSYS : WSCSSYS : SOSP1 : General

Profile name: SOSP1

Description: This is the default Image profile.

Partition identifier: 1

Mode:

- ESA/390
- ESA/390 TPF
- Coupling facility
- LINUX only

Clock Type Assignment

Standard time of day
 Logical partition time offset

Time Offset

System z9 Image Profile – Time Offset

Customize Activation Profiles: SSYS : WSCSSYS : SOSP1 : Time Offset

days hours minutes
 Decrease system time value by the amount shown
 Increase system time value by the amount shown

- Processor
- Security
- Storage
- Options
- Load
- Crypto
- Time Offset**
- SOSP2
- SOSP3
- SOSP4
- SOSP5
- SOSP6
- SOSP7
- SOSP8
- SOSP9
- SOSP1A
- SOSP1B
- SOSP1C
- SOSP1D
- SOSP1E
- SOSP1F
- SOSP11
- SOSP12
- SOSP13
- SOSP14
- SOSP15
- SOSP16
- SOSP17
- SOSP18
- SOSP19

System z9 Image Profile - Processor Page

Customize Activation Profiles: SSYS : WSCSSYS : SOSP1 : Processor

- SSYS
 - WSCSSYS
 - General
 - Storage
 - Dynamic
 - Options
 - CP/SAP
 - Fenced
 - Partitions
 - SOSPA
 - SOSPB
 - SOSPC
 - SOSPD
 - SOSPE
 - SOSPF
 - SOSP1
 - General
 - Processor**
 - Security
 - Storage
 - Options
 - Load
 - Crypto
 - SOSP2
 - SOSP3
 - SOSP4
 - SOSP5
 - SOSP6
 - SOSP7
 - SOSP8
 - SOSP9

Logical Processor Assignments

Dedicated processors

Select	Processor Type	Initial	Reserved
<input checked="" type="checkbox"/>	Central processors (CPs)	8	4
<input checked="" type="checkbox"/>	Integrated facility for applications (IFAs)	2	1
<input checked="" type="checkbox"/>	System z9 integrated information processor (zIIPs)	1	1

Not Dedicated Processor Details For :

CPs IFAs zIIPs

CPs

CP Details

Initial processing weight: 300 (1 to 999) Initial capping

Enable workload manager

Minimum processing weight: 100

Maximum processing weight: 400

Save Copy Notebook Paste Profile Assign Profile Cancel Help

z9 EC allows up to 54 PUs total. The sum of Initial and Reserved of all types can be up to 54. In this example, z/OS would “see” 17 PUs. BUT: z/OS supports only up to 32, z/VM only up to 24. Configure only PU types supported by the intended OS release. Do not configure more PUs than the intended OS release supports.

System z9 Image Profile - Security

Customize Activation Profiles: SSYS : WSCSSYS : SOSP1 : Security

- SSYS
 - WSCSSYS
 - General
 - Storage
 - Dynamic
 - Options
 - CP/SAP
 - Partitions
 - SOSPA
 - SOSPB
 - SOSPC
 - SOSPD
 - SOSPE
 - SOSPF
 - SOSP1
 - General
 - Processor
 - Security**
 - Storage
 - Options
 - Load
 - Crypto
 - SOSP2
 - SOSP3
 - SOSP4
 - SOSP5
 - SOSP6
 - SOSP7

Partition Security Options

- Global performance data control
- Input/output (I/O) configuration control
- Cross partition authority
- Logical partition isolation

Enable Dynamic I/O

No change in function

System z9 Image Profile - Storage

Customize Activation Profiles: SSYS : WSCSSYS : SOSP1 : Storage

- [-] SSYS
 - [-] WSCSSYS
 - General
 - Storage
 - Dynamic Options
 - CP/SAP
 - Partitions
 - [+] SOSPA
 - [+] SOSPB
 - [+] SOSPC
 - [+] SOSPD
 - [+] SOSPE
 - [+] SOSPF
 - [-] SOSP1
 - General
 - Processor
 - Security
 - Storage
 - Options
 - Load
 - Crypto
 - [+] SOSP2
 - [+] SOSP3
 - [+] SOSP4
 - [+] SOSP5
 - [+] SOSP6
 - [+] SOSP7

Central Storage

Amount (in megabytes) Storage origin

Initial Determined by the system

Reserved Determined by the user

Origin

Expanded Storage

Amount (in megabytes) Storage origin

Initial Determined by the system

Reserved Determined by the user

Origin

Central storage : Hardware supports up to 512 GB Central Storage (Initial + Reserved) Check OS level for supported amounts.

Expanded Storage: Some OSs do not support. One example is z/OS (64-bit) running on a System z9.

Initial Storage: Brought ON at LPAR activation.
Reserved Storage: Specify like reserved processors to add storage to a running partition.
z/OS supports configuring storage ON and, if RSU specified, OFF.

Storage origin (Central and Expanded storage)
 It is recommended that you use the 'Determined by the system' option

System z9 Image Profile - Options

Customize Activation Profiles: SSYS : WSCSSYS : SOSP1 : Options

- SSYS
 - WSCSSYS
 - General
 - Storage
 - Dynamic
 - Options
 - CP/SAP
 - Partitions
 - SOSP1
 - General
 - Processor
 - Security
 - Storage
 - Options
 - Load
 - Crypto

Image Options

Minimum input/output (I/O) priority *	5
Maximum input/output (I/O) priority *	10
Defined capacity *	200
CP management cluster name	

No change in function

I/O Priority Range

MSUs - WLC

Cluster Name

System z9 Image Profile – Load “Classic”

Customize Activation Profiles: SSYS : WSCSSYS : SOSPA1A : Load

- SSYS
 - WSCSSYS
 - General
 - Storage
 - Dynamic
 - Options
 - CP/SAP
 - Partitions
 - SOSPA
 - SOSPB
 - SOSPC
 - SOSPD
 - SOSPE
 - SOSPF
 - SOSP1
 - General
 - Processor
 - Security
 - Storage
 - Options
 - Load
 - Crypto
 - SOSP2
 - SOSP3
 - SOSP4
 - SOSP5
 - SOSP6
 - SOSP7

Load during activation

Load type: Clear SCSI SCSI dump

Load address: Use dynamically changed address

Load parameter: Use dynamically changed parameter

Time-out value: 60 to 600 seconds

Worldwide port name:

Logical unit number:

Boot program selector:

Boot record logical block address:

Operating system specific load parameters:

Optional IPL at Activate

System z9 Image Profile – SCSI Load

Customize Activation Profiles: SSYS : WSCSSYS : SOSP1 : Load

- SSYS
 - WSCSSYS
 - General
 - Storage
 - Dynamic
 - Options
 - CP/SAP
 - Partitions
 - SOSPA
 - SOSPB
 - SOSPC
 - SOSPD
 - SOSPE
 - SOSPF
 - SOSP1
 - General
 - Processor
 - Security
 - Storage
 - Options
 - Load
 - Crypto
 - SOSP2
 - SOSP3
 - SOSP4
 - SOSP5
 - SOSP6
 - SOSP7

Load during activation

Load type: Clear SCSI SCSI dump

Load address: Use dynamically changed address

Load parameter: Use dynamically changed parameter

Time-out value: 60 to 600 seconds

Worldwide port name:

Logical unit number:

Boot program selector:

Boot record logical block address:

Operating system specific load parameters:

Optional IPL at Activate

System z9 Image Profile - Crypto for Crypto Express2

Customize Activation Profiles: SSYS : WSCSSYS : SOSP1 : Crypto

- [-] SSYS
 - [-] WSCSSYS
 - General
 - Storage
 - Dynamic
 - Options
 - CP/SAP
 - Fenced
 - Partitions
 - [+] SOSPA
 - [+] SOSPB
 - [+] SOSPC
 - [+] SOSPD
 - [+] SOSPE
 - [+] SOSPF
 - [-] SOSP1
 - General
 - Processor
 - Security
 - Storage
 - Options
 - Load
 - Crypto
 - [+] SOSP2
 - [+] SOSP3
 - [+] SOSP4
 - [+] SOSP5
 - [+] SOSP6
 - [+] SOSP7
 - [+] SOSP8
 - [+] SOSP9

Control Domain Index		Usage Domain Index	
Select		Select	
<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	0
<input checked="" type="checkbox"/>	1	<input type="checkbox"/>	1
<input checked="" type="checkbox"/>	2	<input checked="" type="checkbox"/>	2
<input type="checkbox"/>	3	<input type="checkbox"/>	3
<input type="checkbox"/>	4	<input type="checkbox"/>	4

Cryptographic Candidate List		Cryptographic Online List	
Select		Select	
<input checked="" type="checkbox"/>	0	<input checked="" type="checkbox"/>	0
<input checked="" type="checkbox"/>	1	<input checked="" type="checkbox"/>	1
<input checked="" type="checkbox"/>	2	<input type="checkbox"/>	2
<input checked="" type="checkbox"/>	3	<input type="checkbox"/>	3
<input type="checkbox"/>	4	<input type="checkbox"/>	4

Attention: You must install the 'IBM CP Assist for Cryptographic Functions' (CPACF) feature if a cryptographic candidate is selected from the list box; otherwise, some functions of Integrated Cryptographic Service Facility (ICSF) may fail.

Note candidate list for concurrent addition of Crypto Coprocessors.

Save Copy Notebook Paste Profile Assign Profile Cancel Help

Changing Running Partitions

System z9 EC Change LPAR Controls – CP Tab (2006)

Change Logical Partition Controls

Last reset profile attempted:
Input/output configuration data set (IOCDs):A2 07.10.06

CPs
IFAs
IBM zIIPs

Logical Partitions with Central Processors

Logical Partition	Active	Defined Capacity	WLM	Current Weight	Initial Weight	Minimum Weight	Maximum Weight	Current Capping	Initial Capping	Number of Dedicated Processors	Number of Not dedicated Processors
SOSP1	No	<input type="text" value="0"/>	<input checked="" type="checkbox"/>	0	<input type="text" value="300"/>	<input type="text" value="100"/>	<input type="text" value="400"/>	No	<input type="checkbox"/>	0	1
SOSP11	No	<input type="text" value="100"/>	<input type="checkbox"/>	0	<input type="text" value="100"/>			No	<input checked="" type="checkbox"/>	0	2
SOSP12	No	<input type="text" value="0"/>	<input type="checkbox"/>	0	0			No	<input type="checkbox"/>	8	0
SOSP13	No	<input type="text" value="0"/>	<input type="checkbox"/>	0	0			No	<input type="checkbox"/>	5	0
SOSP14	No	<input type="text" value="0"/>	<input type="checkbox"/>	0	0			No	<input type="checkbox"/>	1	0

Processor running time

Attention: It is recommended that you select "Dynamically determined by the system". Selecting "Determined by the user" risks suboptimal use of processor resources.

Dynamically determined by the system
 Determined by the user

Running time: 1 to 100 milliseconds

Do not end the timeslice if a partition enters a wait state

System z9 EC Change LPAR Controls – zIIP Tab (2006)

Change Logical Partition Controls

Last reset profile attempted:
Input/output configuration data set (IOCDS):A2 07.10.06

Logical Partitions with IBM System z9 Integrated Information Processors

Logical Partition	Active	Defined Capacity	WLM	Current Weight	Initial Weight	Minimum Weight	Maximum Weight	Current Capping	Initial Capping	Number of Dedicated Processors	Number of Not dedicated Processors
SOSP4	Yes	0	<input type="checkbox"/>	500	<input type="text" value="500"/>			No	<input type="checkbox"/>	0	2
SOSPD	No	0	<input type="checkbox"/>	0	0			No	<input type="checkbox"/>	0	0

Processor running time

Attention: It is recommended that you select *"Dynamically determined by the system"*. Selecting *"Determined by the user"* risks suboptimal use of processor resources.

Dynamically determined by the system
 Determined by the user

Running time: 1 to 100 milliseconds

Do not end the timeslice if a partition enters a wait state

System z9 Change Logical Partition I/O Priority Queuing

Change Logical Partition Input/Output (I/O) Priority Queuing

Input/output configuration data set (IOCDS): a1
 Global input/output (I/O) priority queuing: Disabled
 Maximum global input/output (I/O) priority queuing value: 15

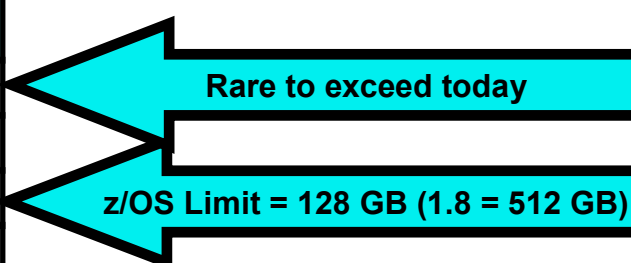
Logical Partition	Active	Minimum Input/Output (I/O) Priority	Maximum Input/Output (I/O) Priority
SOSPA	Yes	0	0
SOSPB	Yes	0	0
SOSPC	Yes	0	0
SOSPD	Yes	0	0
SOSPE	Yes	0	0
SOSPF	Yes	0	0
SOSP1	Yes	0	0
SOSP2	Yes	0	0
SOSP3	Yes	0	0
SOSP4	Yes	0	0
SOSP5	Yes	0	0
SOSP6	Yes	0	0
SOSP7	Yes	0	0
SOSP8	Yes	0	0
SOSP9	Yes	0	0
SOSP1A	Yes	0	0
SOSP1B	Yes	0	0
SOSP1C	Yes	0	0

System z9 Memory and Addressability

System z9, z990, and z890 Memory Granularity

- Memory Granularity = Increment Size
 - Storage assignments/reconfiguration and HSA must be an even multiple
 - Physical increment size fixed at 64 MB
 - Expanded memory granularity always 64 MB
 - Central memory granularity is virtualized for each LP
 - LP central memory increment is determined according to the size of the larger of the two central memory elements defined in the activation profile: Initial central memory or Reserved central memory
- Single Storage Pool - All central storage
 - ES configured as needed from CS - No POR needed
- **Review MVS™ RSU parameter.** Large z990 increment size may result in too much memory being reserved for reconfiguration after migration unless the new RSU options introduced in OS/390 2.10 are used.

Large Element Size	Granularity
64 MB to 32 GB	64 MB
>32 GB to 64 GB	128 MB
>64 GB to 128 GB	256 MB
>128 GB to 256 GB	512 MB



MVS RSU Parameter for System z9, z990 or z890

- In IEASYSxx. Specifies the number of central storage **increments** to be made available for central storage reconfiguration
 - **MVS attempts to keep this area free of long term fixed pages – calculated as follows for RSU = a number**

$$\text{RSU} = \frac{\text{CS amount to be reconfigured}}{\text{storage increment size}}$$

- Or: Storage to be kept free = RSU * **increment**
 - **If element size is upgraded, check the RSU parameter!**
- ✓ ■ z/OS - Recommended RSU coding instead of RSU = a number to allow z/OS to calculate the number of increments
 - **RSU = % of storage, MBs or GBs**
 - **RSU = OFFLINE – Amount is Reserved Storage amount.** No storage is kept free of long term fixed pages except Reserved Storage that has been configured ON.

System z9 SE – Base System Storage Allocation

i **Storage Information**

Base System Storage Allocation **Logical Partition Storage Allocation**

Installed Storage Details

Total Installed Storage (in Megabytes): 524288 MB

Storage Type	Amount	Percent
Central Storage:	117504 MB	22 %
Expanded Storage:	14336 MB	3 %
Base Hardware System Area (HSA):	4288 MB	1 %
Available Storage:	386112 MB	74 %

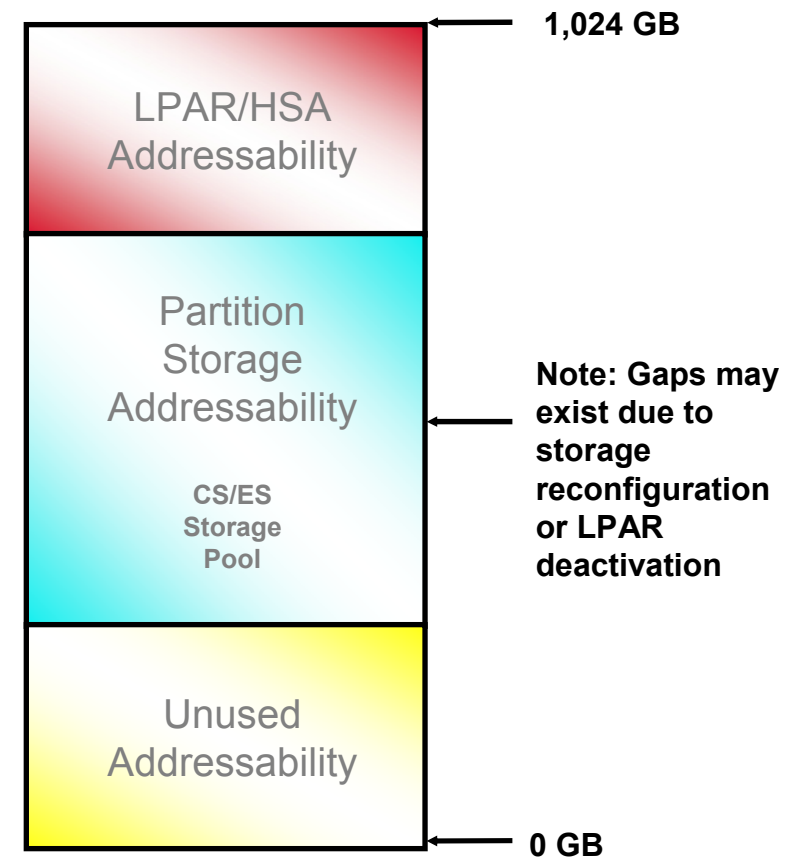
OK Help

System z9, z990 and z890 Storage Addressability

- **Storage Addressability for LPAR/HSA is allocated top down from highest supported address**
 - z800, z900 - Highest address based on installed memory
 - System z9/990/890 – Highest address = 1,024 GB (1 TB), HUGE!

- **Partition Storage Addressability for OS, applications, and I/O is assigned below HSA at LPAR activation**
 - Origin address is assigned top/down by default but a specific origin can be requested. Default allocation is recommended.
 - All Initial and Reserved CS and ES takes addressability at LPAR activation
 - Addressability for an LPAR must be contiguous

- **In Book/Memory Physical Storage**
 - LPAR/HSA starts at book/memory physical address 0 (in book 0)
 - EBA can move partition memory and HSA
 - LPAR/HSA size is large
 - Physical storage assigned to LPARs is above this
 - **No requirement for LPAR physical storage to be contiguous**



System z9 SE - Logical Partition Storage Allocation

i Storage Information

Base System Storage Allocation | **Logical Partition Storage Allocation**

Input/Output configuration data set (IOCDs): A3 02.22.06
 Available storage: 386112 MB

Central Storage Allocation

Name	Origin	Initial	Current	Maximum	Gap	Expanded Storage Element
SOSPE	1027840	256	256	256	4096	
SOSP9	1017600	10240	10240	10240	0	
SOSP1B	1009408	8192	8192	8192	0	
SOSP1B	1007360		2048		0	0
SOSP1C	970496	36864	36864	36864	0	

Expanded Storage Allocation

Name	Origin	Initial	Current	Maximum	Gap
SOSP1B	1042432	2048	2048	2048	0
SOSP1C	1030144	12288	12288	12288	0
SOSPA	1	0	0	0	0
SOSPB	1	0	0	0	0
SOSPC	1	0	0	0	0
SOSPD	1	0	0	0	0
SOSPE	1	0	0	0	0
SOSPF	1	0	0	0	0
SOSP4	1	0	0	0	0
SOSP5	1	0	0	0	0

System z9 Hardware System Area (HSA)

System z9 HSA Estimator tool 2.9.1 on Resource Link

<https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/hsamain?opendocument>

z9 EC Model S18 Example

z9 BC Model S07 Example

Configuration

S18 Model

dynamic enabled

HiperSocket Channels

65280 Number of devices CSS 0, SS-0

65535 Number of devices CSS 0, SS-1

10 Number of logical partitions CSS 0

65280 Number of devices CSS 1, SS-0

65535 Number of devices CSS 1, SS-1

4 Number of logical partitions CSS 1

0 Number of devices CSS 2, SS-0

0 Number of devices CSS 2, SS-1

0 Number of logical partitions CSS 2

0 Number of devices CSS 3, SS-0

0 Number of devices CSS 3, SS-1

0 Number of logical partitions CSS 3

Result Window

Estimated HSA:	2,482,558 KB
granularity:	64 MB
Effective HSA:	2,432 MB

Calculate Clear Small Config Large Config

Configuration

S07 Model

dynamic enabled

HiperSocket Channels

65280 Number of devices CSS 0, SS-0

0 Number of devices CSS 0, SS-1

10 Number of logical partitions CSS 0

65280 Number of devices CSS 1, SS-0

0 Number of devices CSS 1, SS-1

4 Number of logical partitions CSS 1

Result Window

Estimated HSA:	1,872,391 KB
granularity:	64 MB
Effective HSA:	1,856 MB

Calculate Clear Small Config Large Config

zEnd



System z9

The logo for IBM System z9 features the word "System" in a classic serif font, followed by "z9" in a bold, stylized sans-serif font. The entire text is rendered in a light gray color with a dark gray drop shadow, giving it a three-dimensional appearance. The "z" is particularly large and has a decorative flourish at its base.