



IBM eServer™

LPAR Advanced Topics



zSTSU
October 14, 2004
Harv Emery, zSeries Hardware ATS



LPAR AT_1

© 2004 IBM Corporation

zSeries



Trademarks

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

APPN*	IBM eServer	Redbook	z/Architecture
CICS*	IBM logo*	Resource Link	z/OS*
DB2*	IMS	RMF	z/VM*
e-business logo*	Multiprise*	S/390*	zSeries*
Enterprise Storage Server*	MVS	Sysplex Timer*	zSeries Entry License Charge
ESCON*	On demand business logo	TotalStorage*	
FICON	OS/390*	Virtual Image Facility	
FICON Express	Parallel Sysplex*	VM/ESA*	
GDPS*	Performance Toolkit for z/VM	VSE/ESA	
HiperSockets	PR/SM	VTAM*	
HiperSpace	pSeries*	WebSphere*	
IBM*	RACF*		

* 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 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 in the United States, other countries or both.

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 these 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.

LPAR AT_2

zSTSU, October 14, 2004


© 2004 IBM Corporation



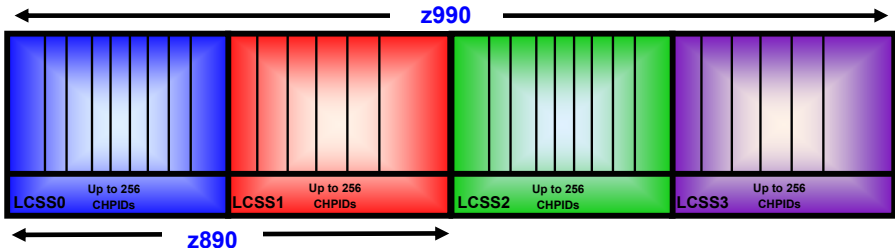
LPAR Advanced Topics

- Introduction to IBM eServer™ zSeries® 890 and 990 (z890 and z990)
 - Logical Channel Subsystems
 - HCD Definition
 - LPAR Enhancements – More than 16 logical processors, zAAPs, etc.
- z990 Activation Profile Changes
- Changing Running Partitions
- Memory Addressability, Configuration and Reconfiguration
 - Concurrent Memory Upgrades
 - Dynamic Storage Reconfiguration
 - HSA Size and Estimation Tool
- References: <https://www.ibm.com/servers/resourceLink>
 - **zSeries 890 and 990 PR/SM Planning**, SB10-7036-03 (October, 2004)
 - **zSeries (z800, z900) PR/SM Planning**, SB10-7033-06a (August, 2004)


Introduction to z890 and z990


zSeries 

z990 and z890 Logical Channel Subsystems (LCSSes)

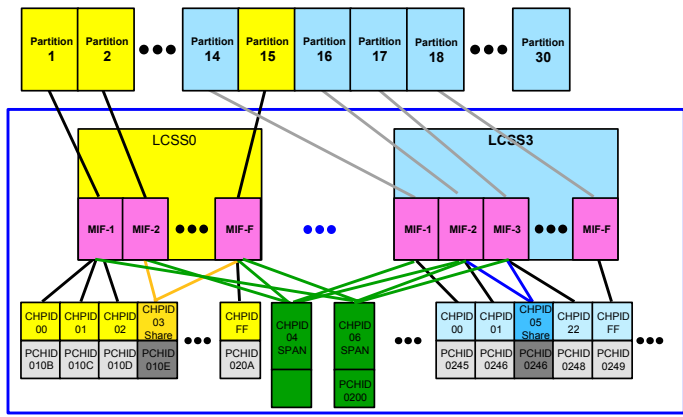


- Up to four Logical Channel SubSystems (LCSSes) z990, two LCSSes on z890
 - ▶ Up to 15 LPARs per LCSS
 - ▶ Up to 256 channels per LCSS
- Multiple LCSSes Enable
 - ▶ Up to 30 Logical Partitions per CEC (Even with three or four LCSSes on z990)
 - ▶ Up to 1024 external channels on z990, Up to 421 external channels on z890
- 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, CBP, CBS, CFP, CFS
 - ▶ But not ESCON, FICON Conversion, Coupling Receiver (CBR, CFR)


LPAR AT_5 zSTSU, October 14, 2004 © 2004 IBM Corporation 

zSeries 

Multiple LCSSes and External Spanned Channels

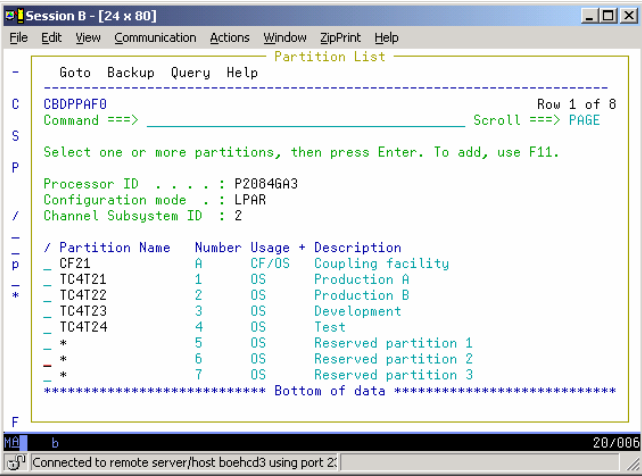


- CHPID 04 Spanned Internal HiperSockets (IQD) or Internal Coupling Link (ICP)
- CHPID 06 Spanned external channel (FICON, OSA, or External Coupling Link) – New Supported: FC, FCP, OSE, OSD, OSC, CBP, CBS, CFP, CFS
Not supported: ESCON, FICON Conversion, Coupling Receiver (CBR, CFR)

LPAR AT_6 zSTSU, October 14, 2004 © 2004 IBM Corporation 

zSeries IBM

Dynamic LPAR Name (Reserved LPAR) z890 and z990 (z990 at GA3 – May, 2004 level)



```

Session B - [24 x 80]
File Edit View Communication Actions Window ZipPrint Help
Partition List
-----
Goto Backup Query Help
C CBDDPPAF0 Row 1 of 8
Command ==> Scroll ==> PAGE
S
Select one or more partitions, then press Enter. To add, use F11.
P
Processor ID . . . . : P20046A3
Configuration mode . : LPAR
Channel Subsystem ID : 2
-----
/ Partition Name Number Usage + Description
P
- CF21 A CF/OS Coupling facility
- TC4T21 1 OS Production A
* TC4T22 2 OS Production B
- TC4T23 3 OS Development
- TC4T24 4 OS Test
- * 5 OS Reserved partition 1
- * 6 OS Reserved partition 2
- * 7 OS Reserved partition 3
***** Bottom of data *****
F
ME b 20/006
Connected to remote server/host boehcd3 using port 2

```

- A dynamic partition must be reserved in the IOCDs used for POR.
- A reserved partition is defined with partition name placeholder ‘ * ’.
- It has a MIF ID (partition number) and a usage type assigned. It may contain a description.
- Reserved partitions can not be assigned to access or candidate lists of channel paths or devices.
- z/OS 1.6 dynamic I/O can name a reserved LPAR or change a named LPAR to ‘ * ’.

LPAR AT 7
zSTSU, October 14, 2004
© 2004 IBM Corporation
ON DEMAND BUSINESS

zSeries IBM

HCD – Definition Sequence without Migration (Reference: z/OS 1.4 HCD even for lower releases!)

- Define processor (Can't clone old and change type!) →
- ▶ Define channel subsystems →
- Define partitions →
- Define channel paths →
- Define control units →
- Define devices →

- Only LPAR mode allowed
- Number of channel subsystems

- ▶ Define channel subsystems →

- CSS id (0-3), description, MAXDEV

- Define partitions →

- Partition names may not be duplicated across CSSs
- Partition number = MIF image id in range of 1-F, unique within LCSS

- Define channel paths →

- CHPIDs unique only within a LCSS
- Spanned channels - access and candidate lists are by LCSS and partition
- Physical channel id must be specified to map logical CHPID to physical hardware

- Define control units →


- CHPID.link combinations must be specified for each LCSS

- Define devices →

- Channel subsystem data - preferred path and candidate lists must be specified for each LCSS

LPAR AT 8
zSTSU, October 14, 2004
© 2004 IBM Corporation
ON DEMAND BUSINESS


4

zSeries 

HCD – Definition Sequence with Migration

(Reference: z/OS 1.4 HCD even for lower releases!)


- Define z890 processor →
 - Only LPAR mode allowed
 - Number of channel subsystems
- ▶ Define channel subsystems →
 - CSS id (0-1), description, MAXDEV
- Modify existing Definitions (if needed) →
 - Delete or change unsupported channel types
Example: Parallel channels from existing z900
- Migrate into z890 definition →
 - Select target processor
 - Specify target LCSS
 - Resolve duplicate partition names
- Migrate other definitions as needed

LPAR AT_9 zSTSU, October 14, 2004 © 2004 IBM Corporation 

zSeries 

z890 and z990 LPAR Enhancements

- Up to 32 physical processors can be managed
 - z990 PR/SM – Up to 32 logical processors per partition (z990 GA3 – May, 2004)
 - z/OS 1.6 and z/VM 5.1 – Both allow up to 24.
 - Caution – Don't exceed 16 for older releases
- New zSeries Application Assist Processors (z890 and z990 - 3Q 2004)
 - Java processing under z/OS 1.6 only (3Q 2004)
- New Reserved LPAR Definition (z890 and z990 - 3Q 2004)
 - Dynamic Name/Rename z/OS 1.6 only (3Q 2004)
- z990/z890 Implementation = massive **internal** changes to PR/SM
 - Awareness of z990 book structure
 - Efficient resource allocation to logical partitions at activation
 - Efficient dispatching decisions
 - Logical Channel Subsystems and up to 30 partitions
 - Large storage / large concurrent memory upgrade
 - Partition virtualization of storage increment size for memory allocation and reconfiguration
 - Massive increase in available central memory addressability
- Limited but important **external** change
 - "Partition Identifier" now two hex digits
 - Change to Store CPU ID (STIDP) instruction

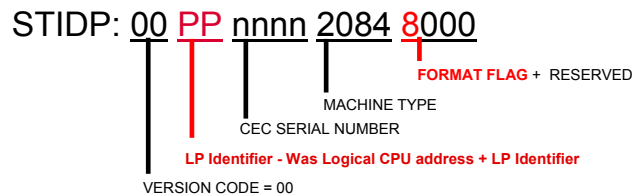
LPAR AT_10 zSTSU, October 14, 2004 © 2004 IBM Corporation 

zSeries 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 z890/z990 assigned at POR by PR/SM
Range (Hex)	z800/z900 - 0-F z890/z990 - 00-3F	1-F	z800/z900 - 1 to F z890/z990 - 1 to 1E
Size	z800/z900 - 4 bits z890/z990 - 8 bits	4 bits	4 bits z800/z900 8 bits z890/z990
Usage	Messages, Store CPUID, PGID z890/z990: 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 z890/z990: Unique in LCSS POR to change.	Unique on the CEC.

Note: z990 compatibility support for the OSeS is required to support changes to Partition Identifier "Size" and "Usage" running on z990 or z890 and often on other images in a Sysplex with an OS image on z990. ICKDSF R17 is required on any image sharing disk with an OS on z990 for the same reasons, especially the path group ID (PGID) change.

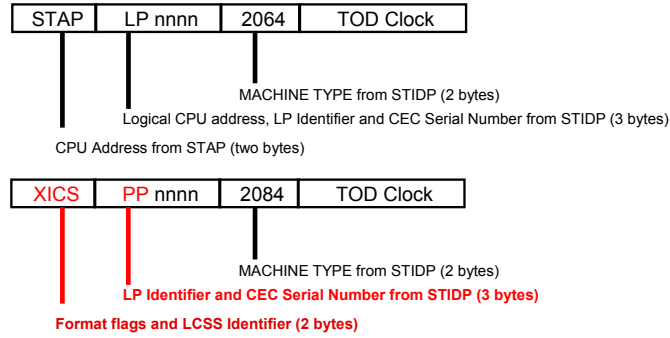
New z990 STIDP Result Format



Programs that use this must change

- PGID (OS/390®, VM/ESA®, VSE/ESA™, Linux/390, ICKDSF)
- XES and CFRM (CF identification)
- RMF™
- ISV software (should use STSI instruction, not STIDP)

Path Group Identifier (PGID) Before z990 and New Format



z990 Activation Profile Changes

zSeries IBM

z990 - Reset Profile - General (CEC OSYS)

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
D8 DIAGNOSE	Partition	No	008LP01 008LP02

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

LPAR AT_15 zSTSU, October 14, 2004 © 2004 IBM Corporation **ON DEMAND BUSINESS**

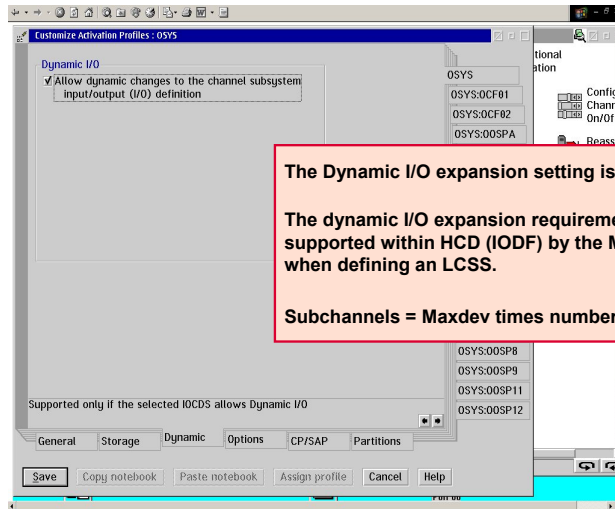
zSeries IBM

z990 - Reset Profile - Storage

Ignore everything on this page except the first line! Use "Storage Information" after Activation.

LPAR AT_16 zSTSU, October 14, 2004 © 2004 IBM Corporation **ON DEMAND BUSINESS**

z990 Reset Profile - Dynamic

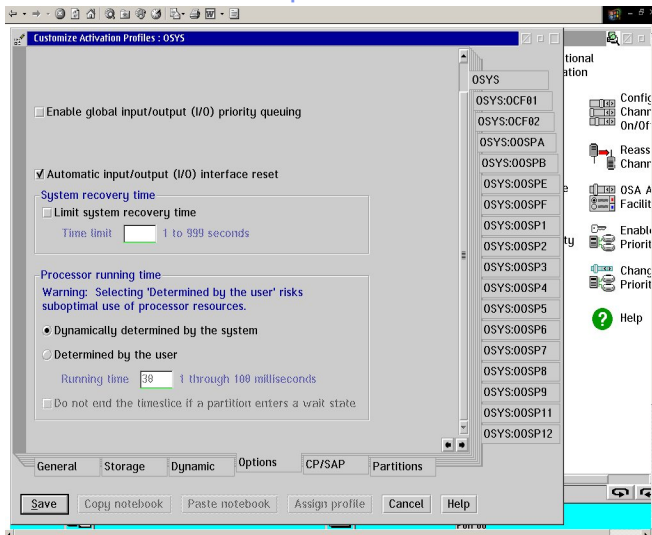


The Dynamic I/O expansion setting is removed.

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

Subchannels = Maxdev times number of LPARs in LCSS

z990 Reset Profile - Options



No change

zSeries IBM

z990 Reset Profile - CP/SAP

Customize Activation Profiles : OSYS

Select a CP/SAP assignment.

CPs	SAPs
15	4
14	5
13	6
12	7
11	8
10	9

OSYS

- OSYS:OCF01
- OSYS:OCF02
- OSYS:OOSPA
- OSYS:OOSPB
- OSYS:OOSPE
- OSYS:OOSPF
- OSYS:OOSP1
- OSYS:OOSP2
- OSYS:OOSP3
- OSYS:OOSP4
- OSYS:OOSP5
- OSYS:OOSP6
- OSYS:OOSP7

Integrated facility for Applications (IFAs): 1

Allows the customer to use purchased CPs as SAPs. Uncommon to use. Test?
Change: Number of zAAPs (IFAs) shown.

When using this option, the z990 model capacity indicator (3nn) does not change. The purchased characterization of the PU (a CP) remains the same.

General Storage Dynamic Options CP/SAP Partitions

Save Copy notebook Paste notebook Assign profile Cancel Help

LPAR AT_19 zSTSU, October 14, 2004 © 2004 IBM Corporation **ON DEMAND BUSINESS**

zSeries IBM

z990 Reset Profile - Partitions

Customize Activation Profiles : OSYS

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	Partition	Order
OCF01	1		
OCF02	2		
OOSPA	3		
OOSPB	4		
OOSPE	5		
OOSPF	6		
OOSP1	7		
OOSP2	8		
OOSP3	9		
OOSP4	10		
OOSP5	11		
OOSP6	12		
OOSP7	13		
OOSP8	14		
OOSP9	15		
OOSP11	16		
OOSP12	17		

OSYS

- OSYS:OCF01
- OSYS:OCF02
- OSYS:OOSPA
- OSYS:OOSPB
- OSYS:OOSPE
- OSYS:OOSPF
- OSYS:OOSP1
- OSYS:OOSP2
- OSYS:OOSP3
- OSYS:OOSP4
- OSYS:OOSP5
- OSYS:OOSP6
- OSYS:OOSP11
- OSYS:OOSP12


Conflict Chanr On/Off
Reass Chanr
OSA A
Facilit
Enable Priorit
Chanr Priorit
Help

No change except 30 partitions supported.

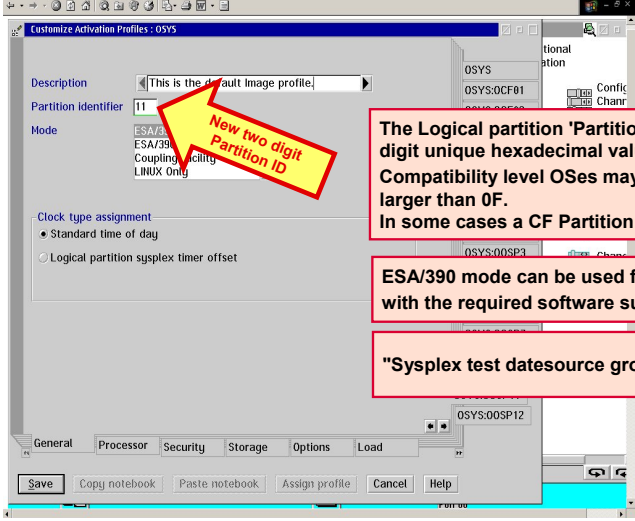
General Storage Dynamic Options CP/SAP Partitions

Save Copy notebook Paste notebook Assign profile Cancel Help

LPAR AT_20 zSTSU, October 14, 2004 © 2004 IBM Corporation **ON DEMAND BUSINESS**

zSeries 

z990 Image Profile - General (Partition OOSP11)




**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.**

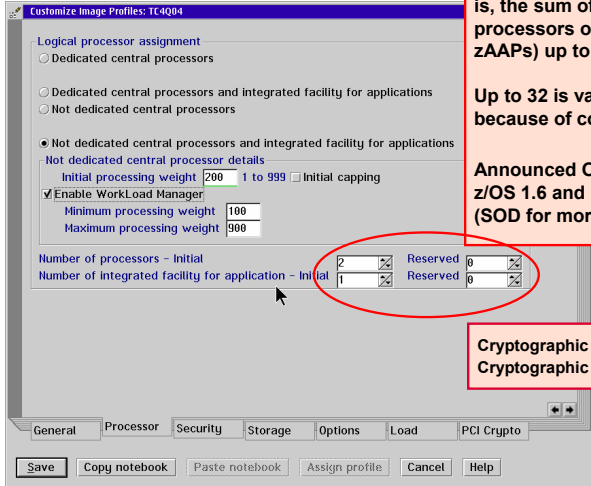
ESA/390 mode can be used for OS/390® z/OS® - z/VM® with the required software support for the z990

"Sysplex test datesource group" time removed.

LPAR AT_21 zSTSU, October 14, 2004 © 2004 IBM Corporation **ON DEMAND BUSINESS**

zSeries 

z990 LPAR – More than 16 Processors in an LPAR ESA/390 Mode – CPs and zAAPs




z990 allows up to 32 processors total. That is, the sum of Initial and Reserved processors of all types (e.g. CPs plus zAAPs) up to 32.

Up to 32 is valid even on an A08 or B16 because of concurrent book add support.

Announced OS support for more than 16: z/OS 1.6 and z/VM 5.1 – Both up to 24. (SOD for more. Watch this space!)


Cryptographic Coprocessor Selection removed. Cryptographic controls now in "PCI Crypto" page


LPAR AT_22 zSTSU, October 14, 2004 © 2004 IBM Corporation **ON DEMAND BUSINESS**


zSeries 

z990/890 - zAAP Characteristics

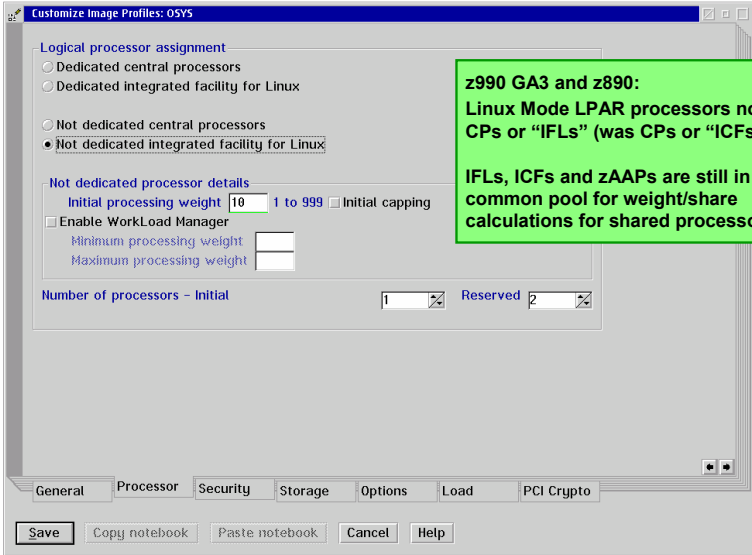
- z990 zAAP feature code 0520 characterizes one PU as a zAAP
- z890 zAAP feature code 6520 characterizes one PU as a zAAP
 - ▶ One zAAP feature may be ordered for each CP and Unassigned CP feature ordered
 - ▶ zAAPs do not affect the overall MSU rating of a CEC or an LPAR
- Supporting level of z/OS and JVM (planned)
 - ▶ z/OS 1.6 and later
 - ▶ JVM 1.4.1 - SDK 1.4.1 and later (SOD: to be 64-bit with the release of z/OS 1.6)
- IBM, Vendor and Customer Java can exploit zAAPs if running on a supporting level of z/OS AND JVM.
 - ▶ This includes:
 - WebSphere Application Server 5.1
 - CICS®/TS 2.3
 - DB2 V8
 - IMS™ V8
 - WebSphere WBI for z/OS
 - ▶ Execution of Java on traditional CPs only, zAAPs only, or both is controlled by a z/OS system parameter when zAAPs are present in the LPAR



LPAR AT_23 zSTSU, October 14, 2004 © 2004 IBM Corporation 


zSeries 

“LINUX ONLY” Mode – CPs or IFLs



z990 GA3 and z890:
Linux Mode LPAR processors now CPs or “IFLs” (was CPs or “ICFs”)

IFLs, ICFs and zAAPs are still in a common pool for weight/share calculations for shared processors.

LPAR AT_24 zSTSU, October 14, 2004 © 2004 IBM Corporation 

zSeries IBM

z990 Image Profile - Security

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

General Processor Security Storage Options Load

Save Copy notebook Paste notebook Assign profile Cancel Help

LPAR AT_25 z/STSU, October 14, 2004 © 2004 IBM Corporation ON DEMAND BUSINESS

zSeries IBM

z990 Image Profile - Storage

Central storage

Amount (in megabytes)

Initial 2560

Reserved 1280

Storage origin

- Determined by the system
- Determined by the user

Origin

Expanded storage

Amount (in megabytes)

Initial 1280

Reserved 640

Storage origin

- Determined by the system
- Determined by the user

Origin

Central storage : Hardware supports up to 128 GB
Central Storage (Initial + Reserved)
Check OS level for supported amounts.

Only MVS (OS/390 or z/OS) supports Reserved.
Reserved: for DSR or storage added by CUoD

Expanded Storage: Some OSs do not support. One example is z/OS (64-bit) running on a z990.
z/VM and Linux 64- or 31-bit do support.

Only MVS (OS/390 or z/OS) supports Reserved.
Reserved: for DSR or storage added by CUoD

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

General Processor Security Storage Options Load

Save Copy notebook Paste notebook Assign profile Cancel Help

LPAR AT_26 z/STSU, October 14, 2004 © 2004 IBM Corporation ON DEMAND BUSINESS

zSeries IBM

z990 Image Profile - Options

Customize Activation Profiles - OSYS

Image options

Minimum input/output (I/O) priority: 4

Maximum input/output (I/O) priority: 10

Defined capacity: 150

CP management cluster name:

No change

General Processor Security Storage Options Load

Save Copy notebook Paste notebook Assign profile Cancel Help

OSYS OSYS:OCF01 OSYS:OCF02 OSYS:OOSP A OSYS:OOSPB OSYS:OOSPE OSYS:OOSPF OSYS:OOSP1 OSYS:OOSP2 OSYS:OOSP3 OSYS:OOSP4 OSYS:OOSP5 OSYS:OOSP6 OSYS:OOSP7 OSYS:OOSP8 OSYS:OOSP9 OSYS:OOSP11 OSYS:OOSP12

Optional
Config Chanr On/Of
Reass Chanr
OSA A Facilit
Enable Priorit
Chan Priorit
Help

LPAR AT_ 27 zSTSU, October 14, 2004 © 2004 IBM Corporation **ON DEMAND BUSINESS**

zSeries IBM

z990 Image Profile - Load

Customize Activation Profiles - OSYS

Load during activation

Load address: 0000 Use dynamically changed

Load parameter: 300 Use dynamically changed

Time-out value: 60 to 600 seconds

No change

General Processor Security Storage Options Load

Save Copy notebook Paste notebook Assign profile Cancel Help

OSYS OSYS:OCF01 OSYS:OCF02 OSYS:OOSP A OSYS:OOSPB OSYS:OOSPE OSYS:OOSPF OSYS:OOSP1 OSYS:OOSP2 OSYS:OOSP3 OSYS:OOSP4 OSYS:OOSP5 OSYS:OOSP6 OSYS:OOSP7 OSYS:OOSP8 OSYS:OOSP9 OSYS:OOSP11 OSYS:OOSP12

Optional
Config Chanr On/Of
Reass Chanr
OSA A Facilit
Enable Priorit
Chan Priorit
Help

LPAR AT_ 28 zSTSU, October 14, 2004 © 2004 IBM Corporation **ON DEMAND BUSINESS**

zSeries IBM

z990 Image Profile - PCI Crypto for PCICA and PCIXCC

Customize Activation Profiles : OSYS

Control domain index	00	▲	▼	Usage domain index	00	▲	▼
	01				01		
	02				02		
	03				03		
	04				04		
	05				05		

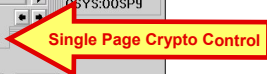
PCI Cryptographic Candidate List	00	▲	▼	PCI Cryptographic Online List	00	▲	▼
	01				01		
	02				02		
	03				03		
	04				04		
	05				05		

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

OSYS
 OSYS:00SPC
 OSYS:00SPD
 OSYS:00SPA
 OSYS:00SPB
 OSYS:00SPE
 OSYS:00SPF
 OSYS:00SP1
 OSYS:00SP2
 OSYS:00SP3
 OSYS:00SP4
 OSYS:00SP5
 OSYS:00SP6
 OSYS:00SP7
 OSYS:00SP8
 OSYS:00SP9

Processor Security Storage Options Load PCI Crypto

Save Copy notebook Paste notebook Assign profile Cancel Help



LPAR AT_ 29 zSTSU, October 14, 2004 © 2004 IBM Corporation **ON DEMAND BUSINESS**

zSeries IBM

Changing Running Partitions

LPAR AT_ 30 zSTSU, October 14, 2004 © 2004 IBM Corporation **ON DEMAND BUSINESS**

zSeries IBM

HMC/SE Change LPAR Controls (Left)

Change Logical Partition Controls

Most recent reset profile attempted: ZSYSRESET0308
 Output configuration data set (IOCDS): A0 03.27.01

Logical Partition	Active	Defined Capacity	Current Weight	WLM Managed	Initial Processing Weight	Minimum Processing Weight	Maximum Processing Weight	Initial Capping	Current Capping	Number of Processors
OSP1	Yes	0	333	<input type="checkbox"/>	333	1	666	<input type="checkbox"/>	No	0
OSP2	Yes	0	333	<input type="checkbox"/>	333	1	666	<input type="checkbox"/>	No	0
OSP3	No	0	0	<input checked="" type="checkbox"/>	333	10	400	<input type="checkbox"/>	No	0
OSP4	Yes	0	333	<input type="checkbox"/>	333	10	400	<input type="checkbox"/>	No	0
CF01	Yes	0	0	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	No	1
CF02	Yes	0	0	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	No	1
OSPX	Yes	0	333	<input checked="" type="checkbox"/>	333	10	500	<input type="checkbox"/>	No	0

Processor running time

Warning: 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: 30 milliseconds (range 1 to 100 milliseconds)

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

Buttons: Save to profiles, Change running system, Save and change, Reset, Cancel, Help

LPAR AT_31 zSTSU, October 14, 2004 © 2004 IBM Corporation ON DEMAND BUSINESS

zSeries IBM

HMC/SE LPAR Change Controls (Right)

Change Logical Partition Controls

ZSYSRESET0308
 (S): A0 03.27.01

Change - zAAPs

Logical Partition	WLM Managed	Initial Processing Weight	Minimum Processing Weight	Maximum Processing Weight	Initial Capping	Current Capping	Number of Non-dedicated Central Processors	Number of Non-dedicated Integrated Coupling Facility Processors	Logical Partition
<input type="checkbox"/>	<input type="checkbox"/>	333	1	666	<input type="checkbox"/>	No	2	0	OOSPA
<input type="checkbox"/>	<input type="checkbox"/>	333	1	666	<input type="checkbox"/>	No	2	0	OOSPB
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	333	10	400	<input type="checkbox"/>	No	2	0	OOSPC
<input type="checkbox"/>	<input type="checkbox"/>	333	10	400	<input type="checkbox"/>	No	2	0	OOSPD
<input type="checkbox"/>	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	No	2	0	OOSPE
<input type="checkbox"/>	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	No	2	0	OOSPF
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	333	10	500	<input type="checkbox"/>	No	4	0	OOSP1

Select 'Dynamically determined by the system' to avoid suboptimal use of processor resources.

Running time: 30 milliseconds (range 1 to 100 milliseconds)

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

Buttons: Save to profiles, Change running system, Save and change, Reset, Cancel, Help

Soft cap - On/Off

LPAR AT_32 zSTSU, October 14, 2004 © 2004 IBM Corporation ON DEMAND BUSINESS

zSeries

zSeries Change Logical Partition, CSS I/O Priority Queuing

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

Input/output configuration data set (IOCDSD): A1

Global input/output (I/O) priority queuing: Enabled

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
R0SP1	Yes	07	13
R0SP2	Yes	07	13
R0SP3	Yes	00	00
R0SP4	Yes	00	00
R0SP5	Yes	00	00
R0SP6	No	07	13
R0SP7	No	00	00
R0SP8	No	00	00
R0SP9	Yes	15	15
R0SPA	Yes	00	00
R0SPB	Yes	00	00
RCF01	Yes	00	00
RCF02	Yes	00	00
RCF03	Yes	00	00

Priority Range

Static Priority

LPAR AT_ 33 zSTSU, October 14, 2004 © 2004 IBM Corporation ON DEMAND BUSINESS

zSeries

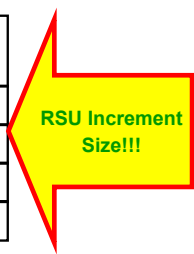
zSeries Memory and Addressability

LPAR AT_ 34 zSTSU, October 14, 2004 © 2004 IBM Corporation ON DEMAND BUSINESS

z900 and z800 Memory Granularity

- Memory Granularity = Increment Size
 - Storage assignments/reconfiguration and HSA must be an even multiple
 - Varies depending on installed memory size
 - LPAR Mode ONLY, 1 MB in BASIC mode for HSA)
 - Was 1 MB prior to G3 Dr 88 for LPAR, too
- Single Storage Pool - All central storage
 - ES configured as needed from CS - No POR needed
 - zSeries and G5/6 (Dr 22e and later)
- Machines without Single Storage Pool support
 - **POR required to change CS/ES split**

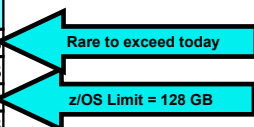
Total Storage G5/6 or zSeries	Granularity CS & ES
5 - 8 GB	16 MB
10 - 16 GB	32 MB
18 - 32 GB	64 MB
40 - 64 GB	128 MB




z990 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





zSeries 


MVS RSU Parameter

- 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

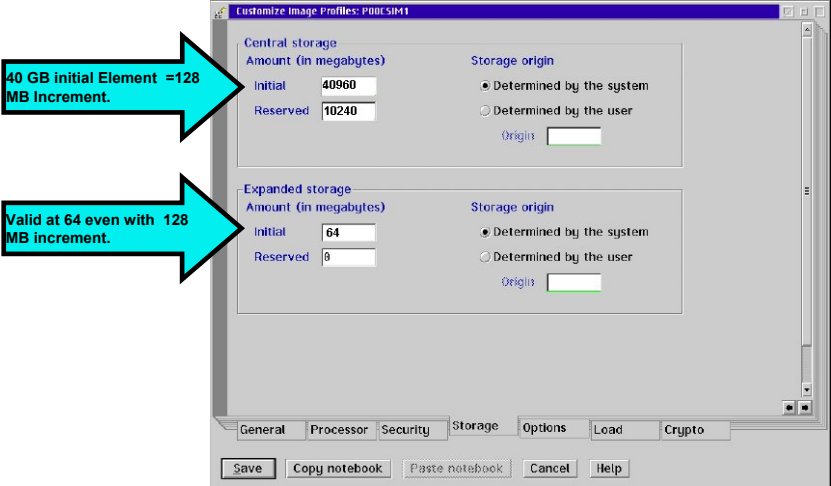
$$\text{RSU} = \frac{\text{CS amount to be reconfigured}}{\text{storage increment size}}$$

- Or: Storage to be kept free = RSU * **increment**
If memory is upgraded, **check the RSU parameter!**
-  OS/390 V2.10 and z/OS - Better RSU Options
All OFFLINE storage (Reserved Storage)
An amount (% , MB or GB) - System calculates increments

LPAR AT_ 37 zSTSU, October 14, 2004 © 2004 IBM Corporation 


zSeries 


z990 Image "Storage" Page Increment Example



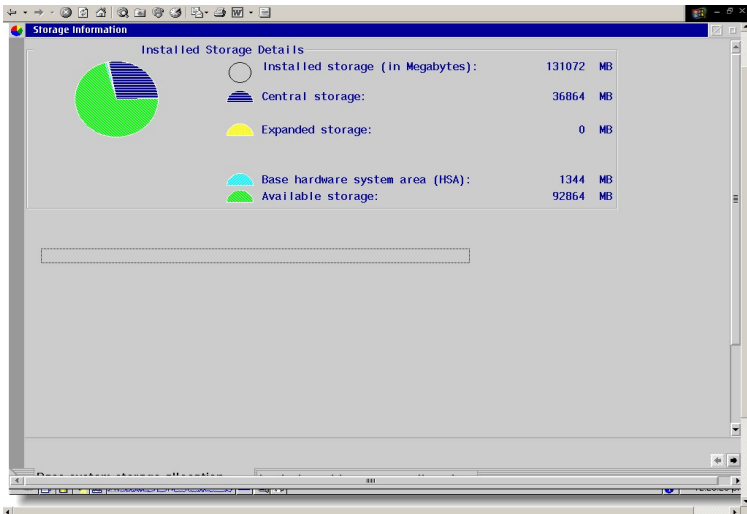
40 GB initial Element =128 MB Increment.

Valid at 64 even with 128 MB increment.

LPAR AT_ 38 zSTSU, October 14, 2004 © 2004 IBM Corporation 


zSeries 


z990 SE - System Storage Allocation after POR



The screenshot shows a 'Storage Information' window with the following details:

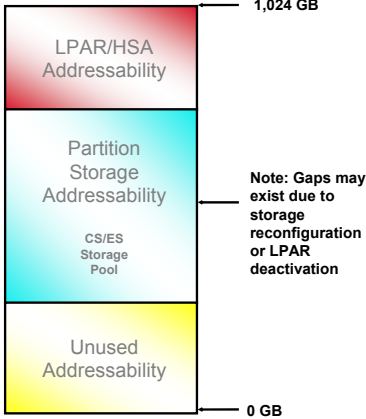
Category	Value
Installed storage (in Megabytes)	131072 MB
Central storage	36864 MB
Expanded storage	0 MB
Base hardware system area (HSA)	1344 MB
Available storage	92864 MB

LPAR AT_39 zSTSU, October 14, 2004 © 2004 IBM Corporation 

zSeries 


z990 and z990 Absolute Address Assignment


- Storage Addressability for LPAR/HSA is allocated top down from highest supported address
 - z800, z900 - Highest address based on installed memory
 - z990/890 - Highest address = 1,024 GB (1 TB), HUGE!
- Partition Storage Addressability for OS, applications, and I/O is assigned below HSA at LPAR activation
 - OS, Application, I/O operations**
 - Origin address is assigned top/down by default but a specific origin can be requested
 - All Initial and Reserved CS and ES takes addressability at LPAR activation
 - Addressability is contiguous
- In Book/Memory Physical Storage
 - LPAR/HSA starts at book/memory physical address 0 (in book 0)
 - LPAR/HSA size can exceed 2 GB
 - Physical storage assigned to LPARs is above this
 - No requirement to be contiguous



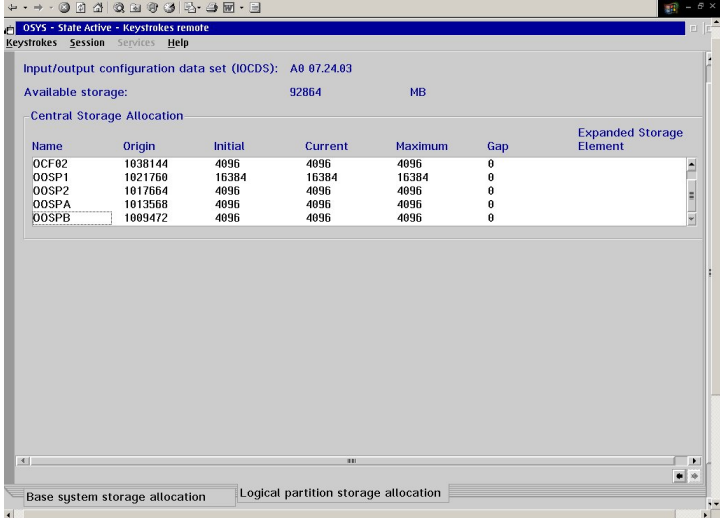
The diagram illustrates the address assignment structure:

- LPAR/HSA Addressability:** Located at the top, starting from 1,024 GB.
- Partition Storage Addressability:** Located below LPAR/HSA, containing CS/ES Storage Pool. A note indicates: "Note: Gaps may exist due to storage reconfiguration or LPAR deactivation".
- Unused Addressability:** Located at the bottom, starting from 0 GB.

LPAR AT_40 zSTSU, October 14, 2004 © 2004 IBM Corporation 

zSeries 

z990 Base Logical Partition Storage Allocation



OSYS - State Active - Keystrokes remote
Keystrokes Session Services Help


Input/output configuration data set (IOCDs): A0 07.24.03


Available storage: 92864 MB

Central Storage Allocation

Name	Origin	Initial	Current	Maximum	Gap	Expanded Storage Element
OCF02	1038144	4096	4096	4096	0	
OOSP1	1021760	16384	16384	16384	0	
OOSP2	1017664	4096	4096	4096	0	
OOSPA	1013568	4096	4096	4096	0	
OOSPB	1009472	4096	4096	4096	0	

Base system storage allocation Logical partition storage allocation

LPAR AT_ 41 zSTSU, October 14, 2004 © 2004 IBM Corporation 

zSeries 

z990 Hardware System Area (HSA)

LPAR AT_ 42 zSTSU, October 14, 2004 © 2004 IBM Corporation 

zSeries IBM

z990 HSA Estimation Tool

HSA estimation tool
File Help

Configuration

dynamic enabled

50 Physical Control Units (PCUs)

64512 Number of devices CSS 0

15 Number of logical partitions CSS 0

0 Number of devices CSS 1

0 Number of logical partitions CSS 1

Result Window

Estimated HSR size	1351037 kB
HSR granularity	64 MB
Effective HSR size	1344 MB

Calculate Help Close

HSA estimation tool
File Help

Configuration

dynamic enabled

Physical Control Units (PCUs)

64512 Number of devices CSS 0

15 Number of logical partitions CSS 0

0 Number of devices CSS 1

0 Number of logical partitions CSS 1

0 Number of devices CSS 2

0 Number of logical partitions CSS 2

0 Number of devices CSS 3

0 Number of logical partitions CSS 3

Result Window

Estimated HSR size	1723159 kB
HSR granularity	64 MB
Effective HSR size	1728 MB

Calculate Help Close

1,344 MB – Big at GA!

1,728 MB – Bigger at GA3!

LPAR AT_ 43 zSTSU, October 14, 2004 © 2004 IBM Corporation **ON DEMAND BUSINESS**

zSeries IBM

End of Presentation

LPAR AT_ 44 zSTSU, October 14, 2004 © 2004 IBM Corporation **ON DEMAND BUSINESS**