IBM eServer zSeries 890 Overview

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HiperSpace	PR/SM	z/VM
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Terminology

- APAR - Authorized Program Analysis Report
- ATM - Asynchronous Transfer Mode
- CBP - Coupling Facility Peer Channel (copper)
- CBR - Coupling Facility Receiver Channel (ICB definition)
- CBS - Coupling Facility Sender Channel (ICB definition)
- CBU - Capacity Backup
- CBY - ESCON Converter Channel (byte mode)
- CEC - Central Electronics Complex
- CF - Coupling Facility
- CFCC - Coupling Facility Control Code
- CFM - Cubic Feet per Minute
- CFP - Coupling Facility Peer Channel (fiber)
- CFR - Coupling Facility Receiver Channel (ISC-3 definition)
- CFS - Coupling Facility Sender Channel (ISC-3 definition)
- CHPID - Channel Path Identifier

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Terminology

- CIU - Customer Initiated Upgrade
- CLK - Clock
- CMOS - Complementary metal oxide semiconductor
- CNC - ESCON Channel
- CP - Central Processor
- CPACF - CP Assist for Cryptographic Function
- CTC - Channel to channel
- CU - Control Unit
- DB2 - Database 2
- BTU - British Thermal Unit
- DCA - Distributed Converter Assembly
- ECKD - Extended Count Key Data
- ESA - Enterprise System Architecture
- ESCON - Enterprise Systems CONNection
- ETR - External Time Reference (Sysplex Timer)

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Terminology

- FCP - Fibre Channel Protocol
- FCTC - Ficon Channel to Channel
- FDDI - Fiber Distributed Data Interface
- FENET - Fast Ethernet (100 bps)
- FICON - Fibre CONnection
- FIPS - Federal Information Processing Standard (USA)
- FQC - Fiber Quick Connect (ESCON Trunk connection)
- G4 - IBM 9672 Generation 4 eServer
- G5 - IBM 9672 Generation 5 eServer (etc)
- GbE - Gigabit Ethernet
- GUI - Graphical User Interface
- HCD - Hardware Configuration Definition
- HCM - Hardware Configuration Manager
- HZ - Hertz (ISO 1000)
- IC - Internal Coupling

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Terminology

- ICC - Integrated Console Controller
- ICB - Integrated Cluster Bus
- ICF - Internal Coupling Facility
- ICP - Internal Coupling Peer Channel
- ICSF - Integrated Cryptographic Service Facility
- IBF - Internal Battery Feature
- ICKDSF - Device Support Facility (software)
- IFL - Integrated Facility for Linux
- IGS - IBM Global Services
- IMPP - Installation Manual – Physical Planning
- IOCP - Input Output Control Program
- IPL - Initial Program Load
- IQD - HiperSocket channel type definition
- ISC - InterSystem Coupling
- JVM - Java Virtual Machine

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Terminology

- KBTU - 1000 BTU
- KVA - Kilovolt - Amperes
- LAN - Local Area Network
- LCSS - Logical Channel SubSystem
- LIC - Licensed Internal Code
- LICCC - Licensed Internal Code Configuration Code
- LPAR - Logically Partitioned mode
- LSPR - Large Systems Performance Reference
- LX - Long Wave Fiber (single mode fiber)
- MBA - Memory Bus Adapter
- MCM - Multiple Chip Module
- MCP - Mode Conditioning Patch
- MES - Miscellaneous Equipment Specification
- MIF ID - Multiple Image Facility Identifier
- MIP - Millions of Instructions per Second

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Terminology

- MPCIPA - Multipath Channel with IP Assist
- MSU - Million Service Units
- MTU - Maximum Transmission Unit
- N/C - No Charge
- OAT - OSA Address Table
- OOCoD - On/ Off Capacity on Demend
- OSA - Open Systems Adapter
- OSA-ICC - Open Systems Adapter – Integrated Console Controller
- OSA/SF - OSA/Support Facility
- OSC - Oscillator
- PCHID - Physical Channel Identifier
- PCI - Peripheral Component Interconnect
- PCICA - PCI Cryptographic Accelerator
- PCIXCC - PCI X Cryptographic Coprocessor
- PKDS - Private/Public Key Data Set
- PR/SM - Processor Resource / Systems Manager

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Terminology

- PTF - Temporary Program Fix
- PU - Physical Unit
- QDIO - Queued Direct Input and Output
- QoS - Quality of Service
- RPQ - Request for Price Quotation
- SAP - System Assist Processor
- SC - Storage Control
- SD - System Data
- SHA - Secure Hash Algorithm
- SCSI - Small Computer System Interface
- SDK - Software Development Kit
- SSL - Secure Sockets Layer
- STI - Self Timed Interconnect
- STSI - Store System Information
- SW - Software (programs and operating systems)

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Terminology

- SX - Short Wave Fiber (multimode fiber)
- TCA - Total Cost of Acquisition
- TDES - Triple Data Encryption Standard
- TKE - Trusted Key Entry
- TPF - Operating System
- TR - Token Ring
- TRLE - Transport Resource List Entry
- VA - Volt Amperes
- VM/ESA - Operating System
- VSE/ESA - Operating System
- WAN - Wide Area Network
- zAAP - zSeries Application Assist Processor
- z/OS - Operating System
- z/VM - Operating System

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Agenda

- **Introduction**
- **Book Structure**
- **Upgrades**
- **I/O**
- **Sysplex Considerations**
- **Statements of Direction**
- **Operating Systems**
- **Cryptography**
- **Hardware Management Console**
- **Physical Planning**
- **Reference Material**

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Introduction

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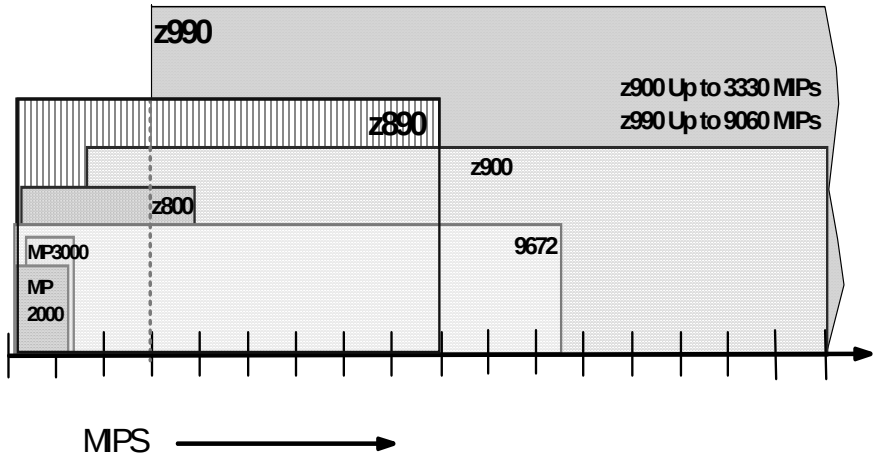
z890 Positioning



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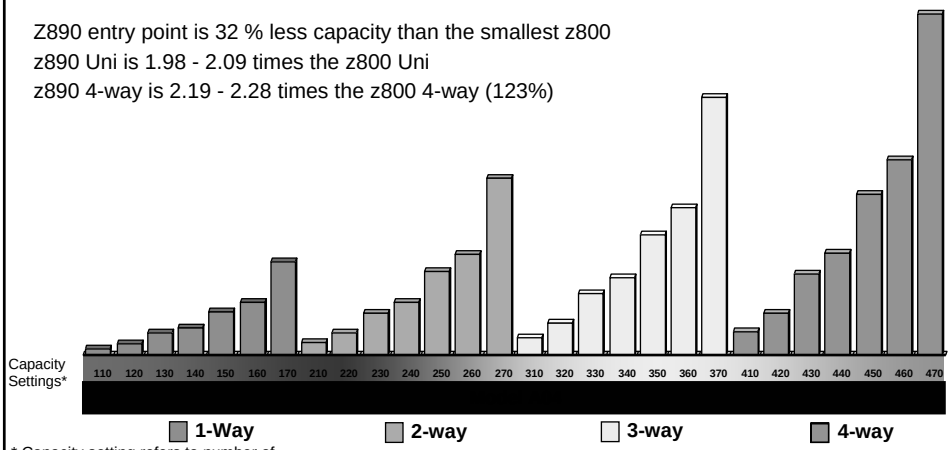
z890 Performance Comparison (28 levels of capacity)

Z890 entry point is 32 % less capacity than the smallest z800
z890 Uni is 1.98 - 2.09 times the z800 Uni
z890 4-way is 2.19 - 2.28 times the z800 4-way (123%)



* Capacity setting refers to number of installed CPs and the capacity. Reported by STSI instruction.

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z890 MSU's

1-Way			2-Way			3-Way			4-Way		
Feature Code	MSU	Capacity Setting	Feature Code	MSU	Capacity Setting	Feature Code	MSU	Capacity Setting	Feature Code	MSU	Capacity Setting
6110	4	110	6210	8	210	6310	11	310	6410	15	410
6120	7	120	6220	13	220	6320	20	320	6420	26	420
6130	13	130	6230	26	230	6330	38	330	6430	49	430
6140	17	140	6240	32	240	6340	47	340	6440	62	440
6150	26	150	6250	50	250	6350	74	350	6450	97	450
6160	32	160	6260	62	260	6360	91	360	6460	119	460
6170	56	170	6270	107	270	6370	158	370	6470	208	470

Note: For MSU values, refer to: ibm.com**/servers/eserver/zseries/library/swpriceinfo/**

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z890 System Overview

One Frame System

- **Processor -- 2086 Model A04**
  - 1 flexible model
  - 64-bit z/Architecture
  - Up to 5 PUs (in single book)
    - up to 4 PUs characterizable
  - CMOS9S-SOI Technology
  - SuperScalar
  - Crypto assist for DES and SHA in every PU
  - Capacity Upgrade on Demand
  - On/Off Capacity on Demand
    - For CPs, IFL, ICF, zAAP
  - Capacity Backup (CBU)
  - Customer Initiated Upgrade (CIU)
  - Air cooled
  - Up to 30 LPs active
  - Optional ETR attachment
- **Memory**
  - Maximum system memory 32 GB
    - Minimum system memory 8 GB
  - Card sizes 8, 16, 32 GB

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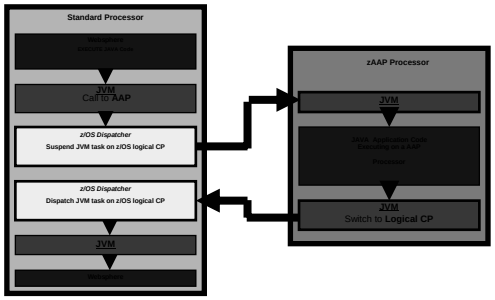
zSeries Application Assist Processor (zAAP or AAP)

- A new zSeries Application Assist Processor for Java (zAAP)
  - zAAPs are designed exclusively for z/OS and z/OS.e Java code execution
  - z/OS & z/OS.e JVMs assists with the execution of Java code from CP's to zAAPs



- Provides a true Single Tier integrated application and database server
  - Potential performance and QoS improvement over typical 2-tier front-end application server TCP/IP connected back-end data server platforms

- The zAAP assists reduce the CP time needed to run WebSphere applications, freeing capacity for additional workloads

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zAAP Characteristics

- Orderable by feature code (FC6520), up to one for each CP

- The zAAP assist can run all Java code

- Users can manage the use of CPs such that Java code runs only on a CP, only on a zAAP, or on both, when zAAPs are busy

- Subsystems that will exploit zAAPs include:
  - WAS 5.1
  - CICS/TS 2.3
  - DB2 V8
  - IMS V8
  - WebSphere WBI for z/OS

- Required Software
  - z/OS 1.6 and z/OS.e 1.6
  - JVM 1.4.1
  - SDK 1.4.1
  - IBM, Vendor and Customer Java

CP's + zAAP's

0-way	1-way	2-way	3-way	4-way
0+0	1+0	2+0	3+0	4+0
	1+1	2+1	3+1	
		2+2		

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zAAP Design

- **The IBM JVM is the only authorized zAAP user**
  - The IBM JVM requests zAAP switch authorization on initial entry
    - zAAP authorization: a JVM ONLY usage check is performed
    - Other programs attempting zAAP authorization will be rejected (no-op)
  - Java – Xifa: <option> my.class argument1 argument2… (uss command line)
    - -Xifa:on - default
    - -Xifa:force - like on, but will always try to switch even if no zAAP
      - useful for figuring out how much CPU time could be saved
    - -Xifa:off - don't use the zAAP
    - Plus PARMLIB(IEAOPT) options
- **Managed by resource pool as ICF/IFL**

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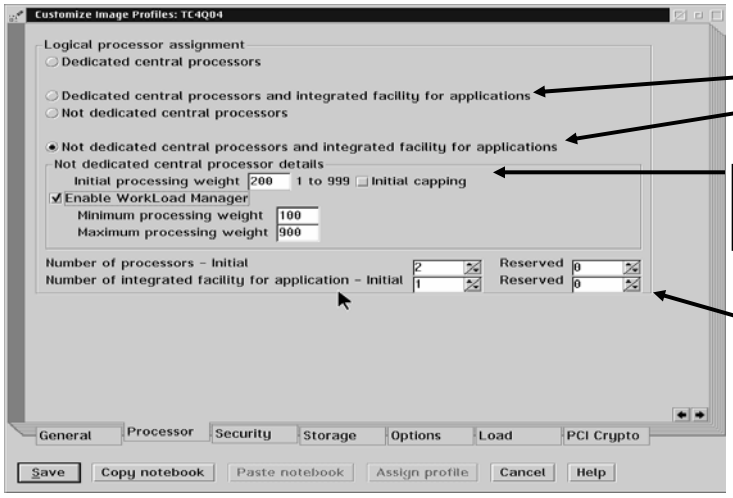
z890 ESA/390 Partition for z/OS - zAAP support



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zAAP Benefits

- **Help improve standard CP and system productivity**
  - zAAPs can reduce CP capacity requirements for JAVA based applications which may free up capacity for other workloads
- **Help simplify and reduce server infrastructures and improve operational efficiencies**
  - Help reduce hardware/network latency as might be seen in distributed web application environments
  - Integrate web applications with mission critical database workloads
- **zAAPs may be able to deliver significant TCA savings**
  - Reduced need for networking infrastructure
  - Low acquisition cost and operating cost ($125K per zAAP)
  - No effect on software MSU costs
  - No additional IBM software charges

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zAAP Projection Tool

- **"zAAP Projection Tool for Java 2 Technology Edition, SDK1.3.1 Users"**
- **URLs:**
  - www6.software.ibm.com/dl/zosjava2/zosjava2-p
  - ibm.com/servers/eserver/zseries/software/java/
- **Referred to in:**
  - z/OS R6 Introduction and Release Guide
  - R6 Hot Topics
- **White Paper:**
  - http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP100417

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zAAP Performance White Paper

Title: z/OS Performance: Capacity Planning Considerations for zAAP Processors
http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP100417

Provide several alternatives to estimate the potential to exploit the zAAP

1. **The first portion of the paper will show the results of measurements done inside of IBM with various Java based workloads. These results can be used to estimate the typical ratios of Java to non-Java processor consumption for different workload types.**

2. **The next section of the paper will explain a technique which can be used for workloads currently in the development phase. These workloads are typically run for short periods of time to allow measurements to be made.**

3. **The final section of the paper will explain a technique which can be used for workloads currently running in a production environment. These are workloads which run for extended periods of time, often in a 24 by 7 environment.**

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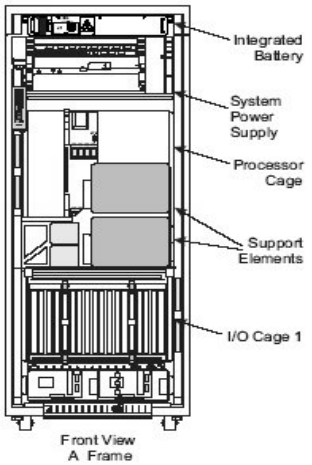
z890 System Overview



- **I/O**
  - ►64-bit Architecture (42/48-bit I/O addressing in hardware)
  - ►Up to 8 x 2 GB/s Self-Timed Interconnects (STIs)
    - –7 I/O Domains plus 1 STI for ICB-3/ICB-4
  - ►Up to 2 Logical Channel SubSystems (LCSS)
    - –Up to 256 channels per LCSS, 512 total
    - –Spanning allowed between LCSS's
    - –Dynamic I/O support for 2 LCSS's
  - ►Up to 40 OSA-Express or OSA-Express2 network connectors
    - –24 on Capacity Setting 110
    - –Checksum Offload in hardware
    - –Intrusion Detection
    - –OSA-Integrated Console Controller (ICC)
  - ►Up to 40 FICON™ Express Channels
    - –32 on Capacity Setting 110
  - ►SCSI over Fibre Channel (FCP for Linux)
    - –IPL from FCP disk for Linux and SA dump
  - ►Up to 16 HiperSockets
- Crypto function
  - –CPACF in every PU
  - –PCICA
  - –PCIXCC
  - –PCIXCC2
  - –TKE 4.1
  - –No CHPID numbers required
- Parallel Sysplex®
  - ►ICB-4 (2 GB/s), ICB-3, ISC-3, IC, CF Duplexing

NEW!

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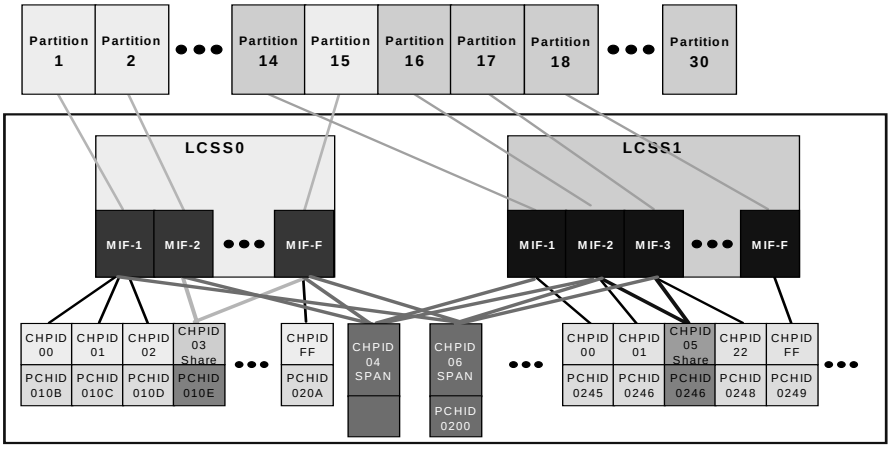
z890 Channel Subsystem



256 channels per logical channel subsystem

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Channel Maximums

	Z890 (6110)	Z890	Z800	Z990
LPARs	15	30	15	20
I/O Slots	16	28	16	84
LCSS	2	2	1	4
Channels	256	512	256	1024
ESCON	240	420	240	1024
FICON Exprs	32	40	32	120
OSA-Express	24 ports	40 ports	24 ports	48 ports
OSA-Express2	24 ports	40 ports	0	48 ports
HiperSockets	16	16	4	16
ISC-3	48	48	24	48
ICB-3	16	16	5 (6 on 0CF)	16
ICB-4	8	8	0	16
IC	32	32	32	32
OSA-E ATM	0	0	24	0

Capacity Setting 110

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z890 Book Structure

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What does z890 look like?

- Always one frame
  - Slightly shorter than a G5/G6
  - Slightly taller than z800
  - Smaller floor space clearance dimensions than a z800
- All new CEC cage
  - Top of the Frame
- One processor book
- I/O Cage
  - One, same as z990 Cargo cage
    - –28 I/O Slots for zSeries I/O cards
  - No longer available
    - –z900 style "compatibility" cage
    - –Older S/390 9672 I/O cards
    - –ICB-2, OSA-2 FDDI
    - –OSA-Express ATM 155

Front View

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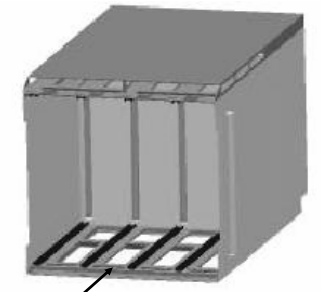
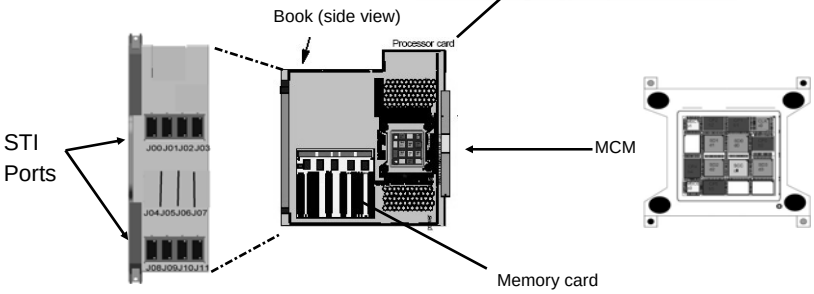
z890 CEC Cage

- Single book
- Multichip module with 5 processor units
- One memory card - 8, 16 or 32 GB each (8,16,24, 32 offered)
- Channel busses - 2.0 GB/sec
- 8 Self-Timed Interconnect (STI) ports
- 2 Memory Bus Adapters (MBA)



Power DCAs, OSC and ETR slots in the rear



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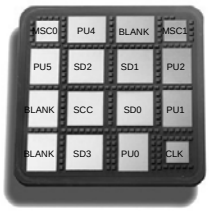
z890 5-way MCM

- Advanced 93mm x 93mm MCM
  - ►100 Glass Ceramic layers
  - ►16 chip sites, 13 in use
  - ►0.4 km of internal wire
  - ►46% smaller than IBM zSeries 900 (z900)
  - ►23% more I/O connections
  - ►133% I/O density improvement
  - ►5,184 LGA connectors vs 1,849 pins for z800



Note: MBA not on MCM

- CMOS 9S-SOI chip Technology
  - ►PU, SC, SD and MSC chips
  - ►Copper interconnections, 8 copper layers
  - ►5 PU chips/MCM
    - •14.1 mm x 18.9 mm
    - •122 million transistors/PU
    - •L1 cache/PU
      - ◆256 KB I-cache
      - ◆256 KB D-cache
    - •1.0 ns Cycle Time
  - ►4 System Data (SD) cache chips/MCM
    - •17.5 mm x 17.5mm
    - •World's densest chip
    - •L2 cache
      - ◆521 million transistors/chip
      - ◆32 MB
  - ►One Storage Control (SC) chip
    - –17.3mm x 17.3mm
    - –98 million transistors
    - –Densest I/Os
    - –3692 Power Signal I/Os
    - –L2 access to/from MBAs (off MCM)
  - ►Two Storage Control (MSC) chips
    - –Memory cards (L3) interface to L2
  - ►One Clock (CLK) chip - CMOS 8S
    - –Clock and ETR Receiver

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Upgrades

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z890 Upgrades/Downgrades (any to any)

1-Way		2-Way		3-Way		4-Way	
Feature Code	Capacity Setting	Feature Code	Capacity Setting	Feature Code	Capacity Setting	Feature Code	Capacity Setting
6110	110	6210	210	6310	310	6410	410
6120	120	6220	220	6320	320	6420	420
6130	130 →	6230	230	6330	330	6430	430
6140	140	6240	240	6340	340	6440	440
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6160	160	6260	260	6360	360	6460	460
6170	170	6270	270	6370	370	6470	470

- Any horizontal upgrade is concurrent (i.e. 6140 to 6240)
- Others (vertical or diagonal) require an IPL (except z/VM)
- OA07510 (z/OS 1.4 +) permits all upgrades as concurrent
- z/VM 5.1 concurrent upgrades for z/OS 1.4+ and Linux guests
- Capacity setting is reported by the STSI instruction
- 6070 = zero CP's (ICF's or IFL's only)

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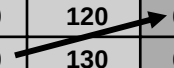

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1-Way		2-Way		3-Way		4-Way	
Feature Code	Capacity Setting	Feature Code	Capacity Setting	Feature Code	Capacity Setting	Feature Code	Capacity Setting
6110	110	6210	210	6310	310	6410	410
6120	120	6220	220	6320	320	6420	420
6130	130	6230	230	6330	330	6430	430
6140	140	6240	240	6340	340	6440	440
6150	150	6250	250	6350	350	6450	450
6160	160	6260	260	6360	360	6460	460
6170	170	6270	270	6370	370	6470	470

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Upgrade/Downgrade Dates

1-Way		2-Way		3-Way		4-Way	
Feature Code	Capacity Setting	Feature Code	Capacity Setting	Feature Code	Capacity Setting	Feature Code	Capacity Setting
6110	110	6210	210	6310	310	6410	410
6120	120	6220	220	6320	320	6420	420
6130	130	6230	230	6330	330	6430	430
6140	140	6240	240	6340	340	6440	440
6150	150	6250	250	6350	350	6450	450
6160	160	6260	260	6360	360	6460	460
6170	170	6270	270	6370	370	6470	470

- Horizontal – July 30, 2004
- Vertical – July 30, 2004
- Diagonal – July 30, 2004

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z890 Configuration Rules

- 5 PU's
  - Total (CP, SAP, ICF, IFL, zAAP, spares, On/Off CoD or CBU) activated cannot exceed 5
- Mandatory
  - 1 SAP and one other PU type - CP, ICF, IFL
  - Can be all CP, ICF or IFL, but not all zAAPs
    - A zAAP requires a "partner CP" (1:1) ratio
      - z890 maximum zAAP = 2
- Unconfigured PU's are spares
- **Capacity Setting "xyz"** for software pricing
  - Preceded by a 6 (feature code) - 6xyz
  - X indicates number of CPs (6270)
  - Y indicates capacity setting (6270)
  - Z indicates (6270, 6271, 6272)
    - 0 = CP
    - 1 = On/Off CoD Use Day
    - 2 = Downgrade Record
  - 6070 for no CPs (ICFs, IFLs only)

1-Way		2-Way		3-Way		4-Way	
Feature Code	Capacity Setting	Feature Code	Capacity Setting	Feature Code	Capacity Setting	Feature Code	Capacity Setting
6110	110	6210	210	6310	310	6410	410
6120	120	6220	220	6320	320	6420	420
6130	130	6230	230	6330	330	6430	430
6140	140	6240	240	6340	340	6440	440
6150	150	6250	250	6350	350	6450	450
6160	160	6260	260	6360	360	6460	460
6170	170	6270	270	6370	370	6470	470

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Downgrade History Marker of “high watermark”

1-Way		2-Way		3-Way		4-Way	
Feature Code	Capacity Setting	Feature Code	Capacity Setting	Feature Code	Capacity Setting	Feature Code	Capacity Setting
6110	110	6210	210	6310	310	6410	410
6120	120	6220	220	6320	320	6420	420
6130 ←	~~130~~	6232	230	6330	330	6430	430
6140	140	6240	240	6340	340	6440	440
6150	150	6250	250	6350	350	6450	450
6160	160	6260	260	6360	360	6460	460
6170	170	6270	270	6370	370	6470	470

FC6232 reflects the downgrade history

If upgraded later to a CP =< FC6230 again, only a service charge is required.

Conversions are not supported.

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Z800 to z890 Upgrades – Frame roll MES

To ANY Capacity Setting

E-Config will default to the next closet Capacity setting model, but the user may change to any capacity setting desired.

Models

0X2, 0A2, 002, 003, 004

Model A04

The z800 serial number is preserved on the z890

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z800 to z890 Features that carry forward on upgrade

- OSA-Express
  - ►All except ATM 155
- FICON Express
- ESCON
- ICB-3
- FC0218, ISC-3 Daughter card
- RPQ 8P2197 ISC-3 Daughter card (10-20 km)
- PCICA
- TKE 3.x for legacy control only
  - ►If PCIXCC is ordered, TKE must be updated with TKE 4.1
    - –Could be a multi-step upgrade depending on level of 3.x
- TKE 4.0 (for legacy)
  - ►If PCIXCC is ordered, TKE must be updated with TKE 4.1
- TKE features (Token Ring/Ethernet adapters)
- HMC's
  - ►FC0073
  - ►FC0074
  - ►FC0075
- FC0089 Ethernet Hub for HMC network
- On/Off CoD if applicable

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z800 to z890 to z990 Upgrades

- z800
  - ►Model 0X2
  - ►Model 0A2
  - ►Model 002
  - ►Model 003
  - ►Model 004
- z890
  - ►starting with capacity setting of...
  - 170 (1-way)
  - 250 (2-way)
  - 330 (3-way)
  - 430 (4-way)
  - 070 (0-way) to A08 (0-way)
- z990
  - ►Model A08
  - ►(1 to 8-way)

- Any z890 >243 MIPs to z990 Model A08
- No upgrade from any IBM S/390® 9672, Multiprise or IBM @server zSeries 900 (z900)

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Availability Dates

General Availability	**May 28, 2004**
z800 to z890 Upgrades	**May 28, 2004**
zAAP	**June 30, 2004**
Feature MES	**July 30, 2004**
z890 Upgrades/Downgrades	**July 30, 2004**
z890 to z990 Upgrades	**August 31, 2004**
OSA GbE (1364/1365) for z800	**3Q04**

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z890 Memory Planning

- **Memory scrubbing**
- **Redundant memory throughout to minimize memory outages.**
- **No spare DIMMs. Memory card replacement requires an outage**
- **HSA is LARGE (1.0 to 2.0 GB)**
  - **FIX**
    - **MCL F35031.029**
    - **MCL F35031.032**
  - **768 MB to 1897 MB**

Memory Cards	PU's	Card Feature Code	LICC enabled feature code	Memory Size	Memory Cards
8 GB	1-4	FC2008	FC3102	8 GB	1
16 GB	1-4	FC2016	FC3104	16 GB	1
32 GB	1-4	FC2032	FC3106	24 GB	1
32 GB	1-4	FC2032	FC3108	32 GB	1

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z890 Memory Upgrades

From	To		
8 GB	**16**	**24**	**32**
16 GB	**-**	**24**	**32**
24 GB	**-**	**-**	**32**
32 GB	**-**	**-**	**-**

RED = Disruptive **Green = Concurrent**

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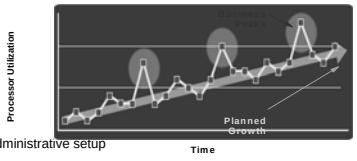
z890 Upgrade Options



- **On/Off Capacity on Demand - Temporary upgrade (FC9898 & FC9896)**
  - Nondisruptive* temporary addition of CPs, IFLs, ICFs and zAAPs
  - "Right to use" feature - Orderable as MES or with new build to initiate contract and administrative setup
  - Customer orders and installs upgrade via Resource Link and IBM RSF
  - Nondisruptive removal when capacity is no longer wanted
  - **OCTOBER 29, 2004**
    - **On/Off CoD TEST up to 24 hours with NO CHARGE from IBM**
    - **Order can remain on RETAIN for an extended period (was 30 days)**

- **CIU – Customer Initiated Upgrade - Express - Permanent upgrade (FC9898)**
  - Customer capability to order and install permanent upgrade
  - Any LICCC enabled engine
  - Memory increment from 24GB to 32GB
  - CIU feature - MES ordered to initiate contract and administrative setup
  - Customer orders and installs upgrade via Resource Link and IBM RSF

- **CBU – Capacity Backup - Temporary emergency capacity upgrade****
  - Nondisruptive temporary addition of CPs ONLY in an emergency situation
  - Not applicable to zAAPs, IFL's, ICF's
  - CBU contract required to order CBU features and CBU LIC CC
  - Customer activates upgrade for test or temporary emergency
  - Nondisruptive downgrade after test or recovery completed

Free 24 hour test

"Right to Use" features for On/OFF CoD + CBU can be loaded simultaneously

* For z890 CPs only for horizontal upgrade. OS may require IPL for vertical or diagonal upgrades (see APAR OA07510)

** For z890 - To FULL size engines only

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On/Off Capacity on Demand

From	To
110	120, 210
120	130, 210, 220, 310
130	140, 150, 220, 230, 320, 410, 420
140	150, 160, 230, 240, 320, 420
150	160, 240, 250, 330, 340, 420, 430
160	170, 240, 250, 260, 330, 340, 430, 440
170	260, 270, 350, 360, 440, 450
210	220, 310, 410
220	230, 320, 410, 420
230	240, 250, 330, 340, 420, 430
240	250, 260, 330, 340, 430, 440
250	260, 350, 360, 440, 450
260	270, 350, 360, 440, 450, 460
270	370, 460, 470

From	To
310	320, 410
320	330, 420
330	340, 350, 430, 440
340	350, 360, 430, 440
350	360, 450, 460
360	370, 450, 460
370	470
410	420
420	430
430	440, 450
440	450, 460
450	460
460	470
470	n/a

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Capacity Back Up

From	To
110	270, 370, 470
120	270, 370, 470
130	270, 370, 470
140	270, 370, 470
150	270, 370, 470
160	270, 370, 470
170	270, 370, 470
210	370, 470
220	370, 470
230	370, 470
240	370, 470
250	370, 470
260	370, 470
270	370, 470

From	To
310	470
320	470
330	470
340	470
350	470
360	470
370	470
410	n/a
420	n/a
430	n/a
440	n/a
450	n/a
460	n/a
470	n/a

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I/O

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Baby Shark – 2105-750

	ESS Model 750	ESS Model 800/800t
Processor	2-way (600 MHz)	4-way / 6-way (600 MHz / 750 MHz)
Cache	8 GB	8 to 64 GB
Host adapters	2 to 6	2 to 16
- Fibre Channel / FICON (2Gb)	Yes	Yes
- ESCON	Yes	Yes
- SCSI	No	Yes
Expansion enclosure	No	Yes
Disk drives	16 to 64 up to 4.6TB physical capacity (increments of 16)	32 to 384 (increments of 16)
Standby Capacity on Demand	Yes (maximum of 16 CoD drives)	Yes (maximum of 48 CoD drives)
Disk drives		
- 18.2GB (10K and 15K rpm)	No	Yes
- 36.4GB (10K and 15K rpm)	No	Yes
- 72.8GB (15K rpm)	No	Yes
- 72.8GB (10K rpm)	Yes	Yes
- 145.6GB (10K rpm)	Yes	Yes
Physical capacity	1.1 TB to 4.6 TB physical capacity	582 GB to 55.9 TB
Device adapters	2 to 8 (increments of 2)	8
Mounting kits	1	2 to 6
Power	Three-phase	Three-phase

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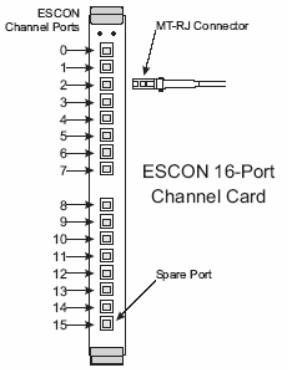
zSeries 16 port ESCON Card

- **High density package**
  - Carry forward from z800
  - 16-port feature (FC 2323)
    - Ordering increment, four channels (FC 2324)
  - At least one spare channel port per card
  - Active ports - LIC CC controlled
  - Active channels balanced across all installed features
  - After the first pair, ESCON features are installed in increments of one
- **Small form factor MTRJ connector**
  - 62.5 micron multimode fiber
  - Conversion kit available from IGS for existing ESCON duplex fiber infrastructure

- **Fiber Quick Connect (FQC)**
  - Factory installation of direct-attach fiber harness
  - Supports all installed ESCON features
    - New builds or conversions to z890
  - Enables attachment to fiber trunking



Note: ESCON Director 9032-005 to be withdrawn from marketing December 31, 2004

Number of Channels	Cards
4 - 28	2
32 - 44	3
48 - 60	4
. . .	. . .
244 - 268	18
. . .	. . .
408 - 420	28

Number of Channels	Cards
4 - 28	2
32 - 44	3
48 - 60	4
. . .	. . .
228 - 240	16

Capacity Setting 110

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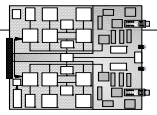
zSeries FICON Express



- **FICON Express LX (long wavelength) - FC 2319**
  - Carry forward from z800
  - Supports 9 micron single mode fiber
- **FICON Express SX (short wavelength) - FC 2320**
  - Carry forward from z800
  - Supports 50 or 62.5 micron multimode fiber
  - Not Compatible with FICON Bridge (FICON Bridge is LX only)
- **Port capacity**
  - Maximum of 20 features / 40 ports (32 on Capacity Setting 110)
  - All ports on each card identically configured (LX or SX)

- **Modes of Operation: applicable to each port**
  - FCV (FICON Bridge Converted); applicable to LX feature only
    - FICON to FICON Bridge on ESCON Director Model 5
  - FC (Fibre Channel)
    - Native FICON
    - FICON Channel-To-Channel
  - FCP (Fibre Channel Protocol)
    - Support of SCSI devices in Linux environments
- **Bandwidth**
  - 1 or 2 Gbps link data rate
  - Auto-negotiated with device
- **Service Enhancement (NEW)**
  - Support for FCP Concurrent Patch (z890/z990 only)
  - CNFG ON/OFF - Not required for most LIC changes
- **Improved Performance (NEW)**
  - Z890/z990 only
  - Data with small blocksizes (4K) could see improvement relative to z800/z900 up to 15 percent

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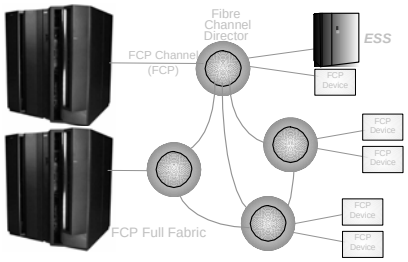
zSeries SCSI IPL Feature

- **SCSI IPL is available as an optional, no-charge feature FC9904 for all zSeries**
  - Ficon Express channel is required
- **FCP without SCSI IPL Feature**
  - Allows Linux data to be stored on SCSI or FCP device
  - Linux IPL to SCSI disk results in an error
    - An ECKD device is required
- **FCP with SCSI IPL Feature**
  - Allows Linux data to be stored on SCSI or FCP device
  - Allows Linux to install and load (IPL) on SCSI or FCP disk
    - IPL from both LPAR and/or z/VM guests
      - For z/VM guest IPL, z/VM 4.4 is required.



- **Standalone dump program can be loaded SCSI or FCP disk in order to dump the contents of a logical partition, and the dump data can be written to this same disk.**
- **Linux LPARs can be started and run completely from SCSI or FCP disk**
  - z/VM continues to require ESCON or FICON attached disk or tape for its own IPL, storing of guest dumps, and other functions
    - Except for z/VM 5.1 (available 09/24/2004)
      - Emulates FBA 9336-20 on SCSI disk

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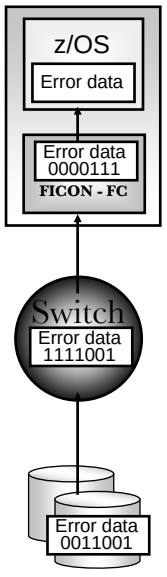
FICON Purge Path Extended for native FICON (CHPID type FC)

- **Designed to enhanced FICON problem determination**
- **Error-recovery function is extended**
  - Transfers error-related data and statistics
    - Between the channel and entry switch
    - Control unit and its entry switch
    - To the host z/OS operating system
      - Reported in EREP
- **Exclusive to z990 and z890**
- **Supported by z/OS and z/OS.e V1.4, and later, with PTFs for APAR 0A06846 and EREP APAR IR51695**
- **Requires supporting LIC on control units**



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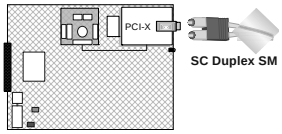
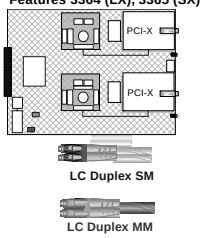
OSA-Express2

- **Newest member - 10 Gigabit Ethernet LR (long reach)**
  - One port per feature
  - 9 micron single mode fiber, SC Duplex connector
- **New - Gigabit Ethernet features**
  - Gigabit Ethernet LX (Long wavelength)
    - 9 micron single mode fiber, LC Duplex connector
  - Gigabit Ethernet SX (Short wavelength)
    - 50 or 62.5 micron multimode fiber, LC Duplex connector
  - Designed to achieve line speed - 1 Gbps in each direction
- **Support offered by both 10 GbE and GbE:**
  - Queued Direct Input/Output (QDIO) for TCP/IP traffic only
    - Use TN3270 or Enterprise Extender for SNA traffic
  - **Layer 2 support** for flexible and efficient data transfer
  - **640 TCP/IP stacks** for improved virtualization
  - **Large send** for CPU efficiency
  - **Concurrent LIC update** to help minimize network traffic disruption
- **CHPID type for all features and functions listed is OSD**
- **Availability – January 28, 2005**

10 Gigabit Ethernet Feature 3368



Gigabit Ethernet Features 3364 (LX), 3365 (SX)



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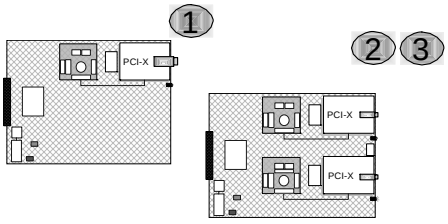
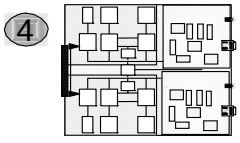
OSA-Express2 & OSA-Express features

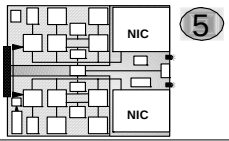
- **Up to 40 network connections - z890**
  - 24 on z890 capacity setting 110
- **Choose from 5 features**
  - OSA-Express2 10 GbE, GbE LX and SX
  - OSA-Express 1000BASE-T Ethernet
    - Same Cat 5 cable as Fast Ethernet
  - Token-Ring (4/16/100 Mbps)
    - Cat 5 copper cable



- **Modes of Operation for 1000BASE-T Ethernet, Token-Ring**
  - QDIO = TCP/IP traffic only
    - TN3270 or Enterprise Extender for SNA traffic
  - Non-QDIO = TCP/IP and/or SNA/APPN®/HPR
  - OSA-ICC for 1000BASE-T only



- **SOD - z990/z890 are the last zSeries servers to support Token-Ring OSA - new build, upgrade, MES, or carry forward**



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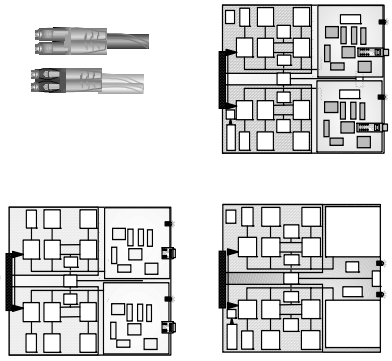
OSA-Express

- **Maximum of 20 features / 40 ports per system**
  - 12/24 on Capacity setting 110
- **New Gigabit Ethernet features with**
  - New Checksum offload for z/OS V1R5, z/OS.e V1R5
  - Intrusion detection
  - New connector type, LC Duplex
- **Gigabit Ethernet LX - FC 1364**
  - 9 micron single mode fiber
- **Gigabit Ethernet SX - FC 1365**
  - 50 or 62.5micron multimode fiber
  - GbE LX and SX capable of achieving 1.2 Gbps* using jumbo frames
- **New 1000BASE-T Ethernet (10/100/1000 Mbps) - FC 1366**
  - Capable of achieving line speed
  - Category 5 copper
  - OSA-ICC Support
  - Supports the following in QDIO mode when operating at 1000 Mbps (1 Gbps)
    - Jumbo frames
    - Checksum offload for z/OS V1R5, z/OS.e V1R5
    - Intrusion detection
- **Token-Ring (4/16/100 Mbps) - FC 2367**
  - Capable of achieving line speed
  - Carry forward from z800
  - Intrusion detection

NEW!



The total quantity of FICON Express, OSA-E, OSA-E2, PCICA, and PCIXCC cannot exceed 20 features per server

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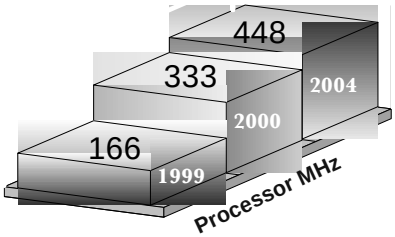
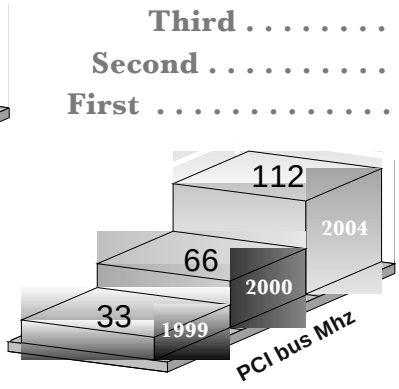
OSA-Express2 – Third Generation OSA-Express





- OSA-Express2 is the **3rd generation** of Ethernet technology to deliver the throughput to help satisfy bandwidth-hungry applications
- OSA-Express2 GbE is designed to achieve line speed - 1 Gbps in each direction

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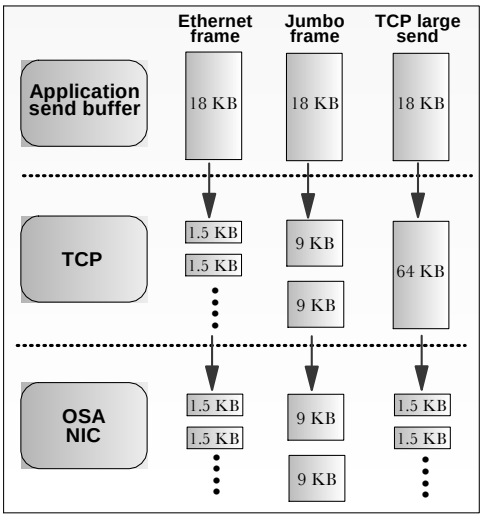
OSA-Express2 Large Send Support

- **OSA-Express2 (GbE and 10 GbE)**
  (Planned January 28, 2005)
- **Segmentation of IP packets done by OSA NIC, not IP stack**
- **Offloads the TCP segmentation processing from host TCP/IP stack**
- **Host code path length reduced**
- **Sends 64 KB blocks to OSA**
- **Processing performed by OSA NIC**
  - TCP/IP checksum processing
  - TCP packet processing
  - Sends out 1.5 KB packets (1492 byte)
- **For outbound traffic only**
- **For IPv4, IPv6**
- **For unicast datagrams**
- **QDIO mode only (CHPID type OSD)**
- **Supported by Linux on zSeries with code IBM intends to deliver Open Source in early 2005**



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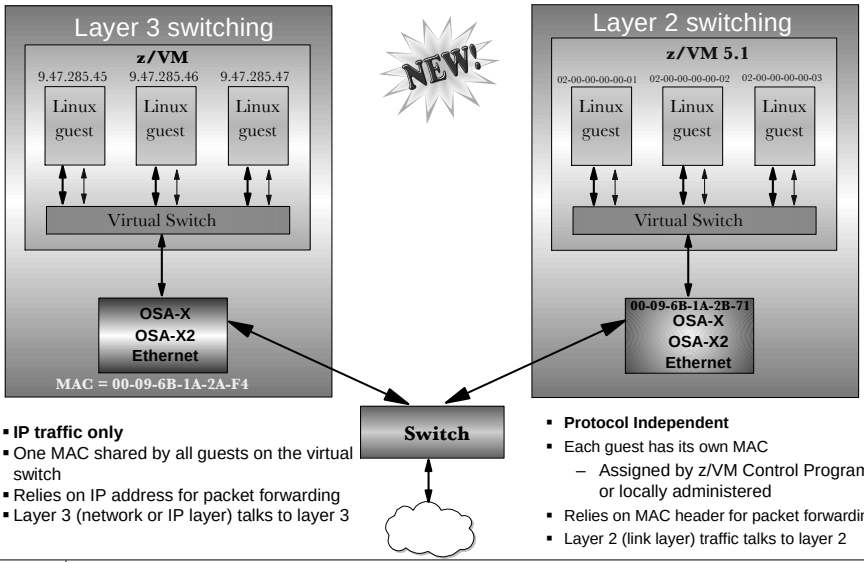
Link layer transport for protocol-independent data transfer



- **IP traffic only**
- One MAC shared by all guests on the virtual switch
- Relies on IP address for packet forwarding
- Layer 3 (network or IP layer) talks to layer 3

- **Protocol Independent**
- Each guest has its own MAC
  - Assigned by z/VM Control Program or locally administered
- Relies on MAC header for packet forwarding
- Layer 2 (link layer) traffic talks to layer 2

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OSA-Express2 and OSA-Express Layer 2 Support

- **Function and Potential Benefits**
  - Provides protocol independence for network traffic
    - IPX, NetBios, SNA, AppleTalk, Decnet, IPv4, IPv6
  - May facilitate server consolidation onto z990 and z890
  - May reduce CPU utilization for router images/LPAR/guests
  - May reduce network configuration complexity

- **Support and Requirements**
  - Requires z890/990 hardware LIC support for GA2/4
    - z890/990 OSA-Express Ethernet (October 29, 2004)
      - All Ethernet features **EXCEPT** Fast Ethernet (FC #2366)
    - All z890/990 OSA-Express2 Ethernet (Planned January 28, 2005)
  - Requires z/VM 5.1
    - OSA-Express: APAR VM63538 (Planned December 3, 2004)
    - OSA-Express2: With additional service (Planned January 28, 2005)
  - Requires Linux with code IBM plans for Open Source delivery in:
    - October 2004 for kernel 2.4
    - Early 2005 for kernel 2.6
  - See 2084DEVICE or 2086DEVICE PSP for any additional service required

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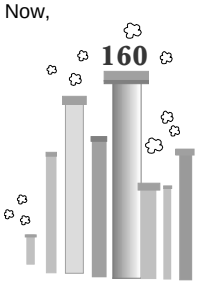
OSA-Express Stack Utilization Improvement

- **Function and Potential Benefits**
  - OSA-Express features support 160 TCP/IP stacks. Previously, to use all those stacks, the CHPID had to be shared by multiple logical partitions (LPARs). There was a restriction (only allowing a single control unit definition per CHPID) that limited the number of stacks to 84 per LPAR. That restriction is lifted. Now, a single LPAR can contain all 160 stacks offered by OSA-Express.
  - Provides flexibility for OSA-Express configuration, especially with z/VM
  - Note: OSA-Express2 supports 640 stacks per LPAR.



- **Support and Requirements**
  - Requires z890/990 hardware LIC support for GA 2/4 (October 29, 2004)
  - OSA-Express features Gigabit Ethernet (any), 1000Base-T Ethernet, Fast Ethernet, or Token-Ring configured as OSD (TCP/IP only)
  - Requires z/OS and z/OS.e 1.6 with service for HCD APAR OA03689
  - z/VM 3.1, 4.3 or later with service for APARs VM63524 and PQ91421 (Planned January 28, 2005)
  - See 2084DEVICE or 2086DEVICE PSP for any additional service required
  - Linux on zSeries current distributions:
    - SUSE SLES 8 or 9, Red Hat RHEL 3, or Conectiva CLEE

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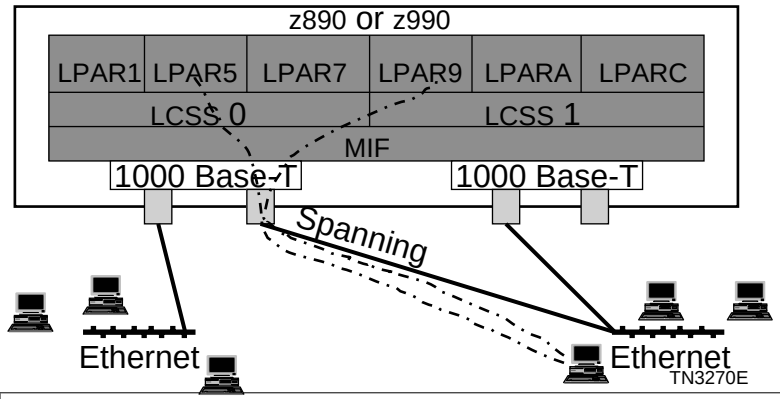
OSA-Integrated Console Controller (OSA-ICC)

- Console Controller for z990 and z890
  - System Console (IPL) and operations support for multiple LPARs
  - 120 Sessions per port (2 ports per feature)
  - **Exclusive to OSA-Express 1000BASE-T Ethernet**
- Minimum software:
  - z/OS V1.3, z/VM V4.4, VSE/ESA™ V2.6, TPF 4.1
- Supports Ethernet-attached TN3270E emulated sessions
- Can coexist in configurations using prior IBM 2074 models and older 3174 controllers



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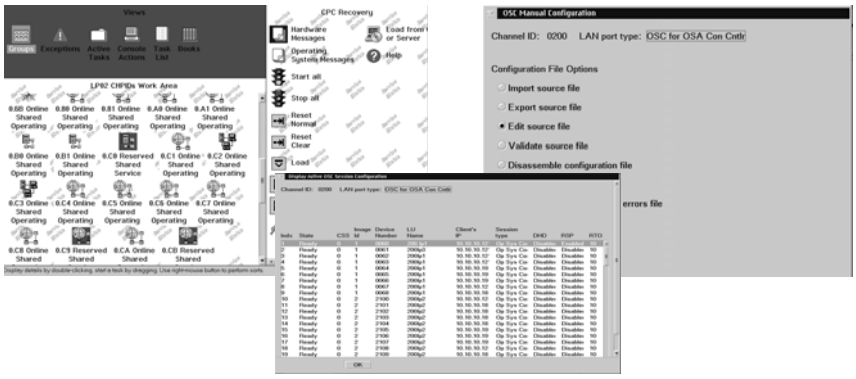
OSA-ICC Resources



- SA22-7990 OSA-ICC User's Guide
- SG24-6364 OSA-ICC Implementation Redbook
- http://w3-1.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/FLASH10295

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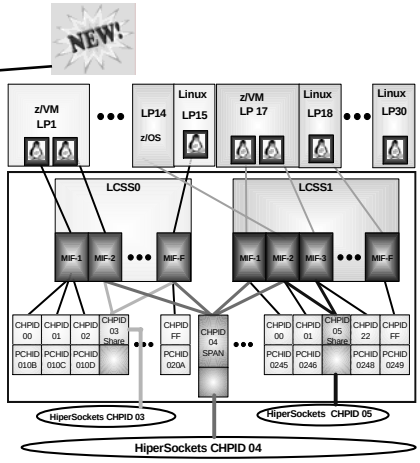
HiperSockets

- **Four times the connectivity of z800/z900**
  - From 4 to 16 HiperSockets
  - Connect four times more TCP/IP stacks
    - Increased number of communication queues (from 1,024 to 4,096)
  - Support for multiple LCSS
    - Single LP can connect to 16 HiperSockets
- **Support for spanned CHPIDs across multiple LCSS**
  - One HiperSocket can be shared by up to 30 LPARs
- **Support for 64-bit HSA address space**
- **Virtual LAN (IEEE 802.1q) support**
- **Broadcast for IPv4**
- **Support of additional IP assist features for IPv6**



Very High Speed Interconnection between programs running z/OS, z/VM , VSE/ESA or Linux®

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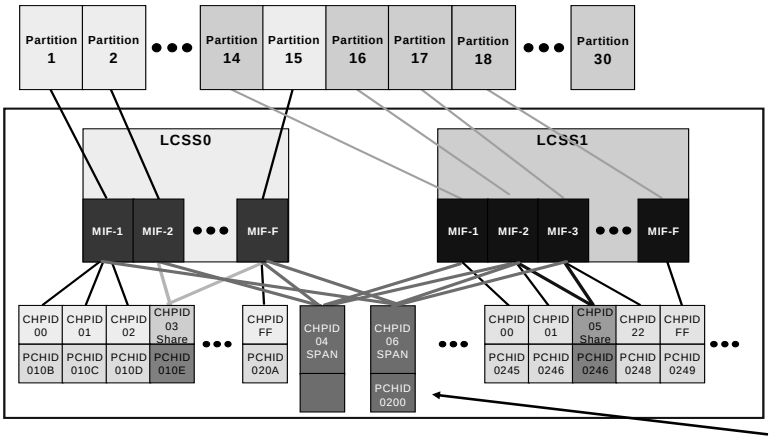
Spanned Channel Support



- CHPID 04 shows example of a spanned channel (HiperSockets or Internal Coupling links)
- CHPID 06 shows example of a spanned channel (FC, FCP, OSE, OSD, OSC, CBP, CBS, CFP, CFS)
  - Not supported: ESCON, FICON Conversion, Coupling Receiver (CBR, CFR)

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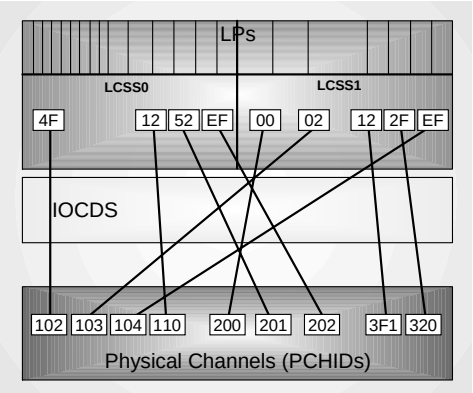
CHPID Mapping Tool

- **Ease of use tool to simplify mapping of CHPIDs to PCHIDs**
- **Availability and manual mapping functions**
- **Tool used with HCD/HCM for assigning PCHIDs to CHPIDs**
  - Requires changes to current HCD process
- **Supports channel MESs**
  - CHPID to PCHID mapping contained in IOCP
- **"Mandatory"**
- **Customer Responsibility!**



www.ibm.com/servers/resourcelink

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Sysplex Considerations

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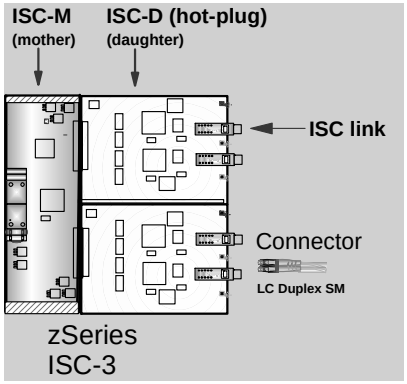
zSeries Coupling Links for Parallel Sysplex

- **InterSystem Channel-3**
  - ISC-3 links ordered in increments of one
  - Activated links balanced across features
  - Maximum of 12 features / 48 links
- **Two modes of operation**
  - Peer Mode (2 Gigabits per second - Gbps)
  - Compatibility Mode (1 Gbps)
- **Feature Codes**
  - ISC-3 FCs 0217(ISC-M) 0218 (ISC-D / ISC link)
  - FC0218 carry forward from z800
  - Activate link - FC 0219
  - Four ports per feature (two ports per ISC-D)
  - Supports 9 micron single mode fiber
- **ISC-3 Peer Mode Supported Distance Increased**
  - 100 km with repeaters
    - Peer Mode ONLY



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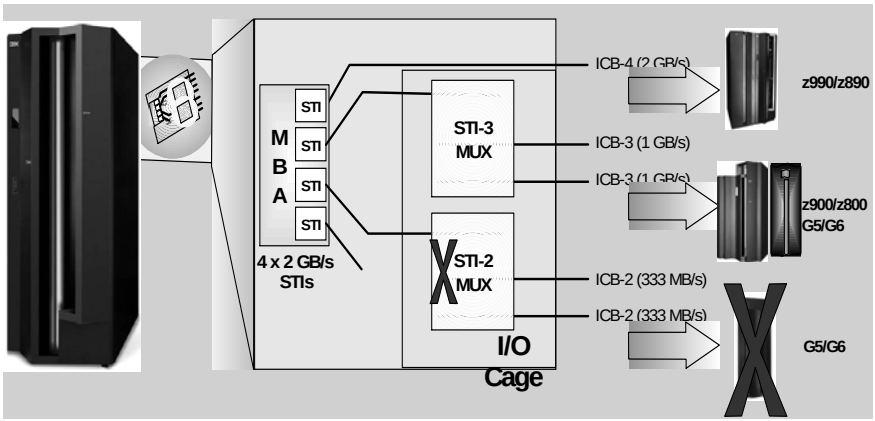
ICB-3 & ICB-4 Support



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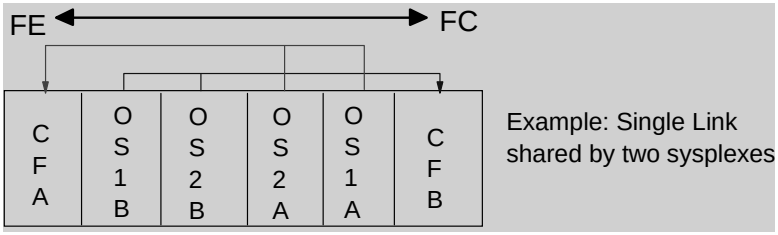
Internal Coupling Links - IC

- **Defined as ICP in HCD/HCM/IOCP**
  - Peer mode only
- **Avoid over defining**
  - Uses real CP resources
  - Maximum: (#CPs + #ICFs) -1
  - Recommended maximum is two links per sysplex
    - Two links requires four CHPIDs
    - Can use the bi-directional capability

ibm.com/support/techdocs/atsmastr.nsf/WebIndex/FLASH10271



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z890 CF Link to G5/G6 and z800/z900

Connectivity Options	z890/z990 ISC-3	z890 ICB-2	z890/z990 ICB-3	z890/z990 ICB-4
G5/G6 ISC	1 Gbit/sec Compat Mode	Not Supported	n/a	n/a
z900/z800 ISC-3	2 Gbit/sec Peer Mode*	Not Supported	n/a	n/a
z890/z990 ISC-3	2 Gbit/sec Peer Mode	Not Supported	n/a	n/a
G5/G6 ICB	n/a	Not Supported	n/a	n/a
z900 ICB-2	n/a	Not Supported	n/a	n/a
z990 ICB-2	n/a	Not Supported	n/a	n/a
z900/z800 ICB-3	n/a	Not Supported	1 GByte/sec Peer Mode	n/a
z990 ICB-3	n/a	Not Supported	Requires IO Slot ICB-4 Preferred	n/a
z890/z990 ICB-4	n/a	Not Supported	n/a	2 GBytes/sec Peer Mode

* RPQ - 20Km for 1Gbit/sec in peer or compatibility mode

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zSeries Coupling Link Maximums

Link Type	z890	z890 Capacity Setting 110	z800	z990
IC	32	32	32	32
ISC-3	48*	48*	24	48*
ICB-2	0	0	0	8
ICB-3	16	16	5 (6 for 0CF model)	16
ICB-4	8	8	0	16
Maximum Number of *All Links*	**64**	**64**	**26**	**64**

* Up to 32 ISC-3's in compatibility mode

ICB-2 is NOT supported on z890

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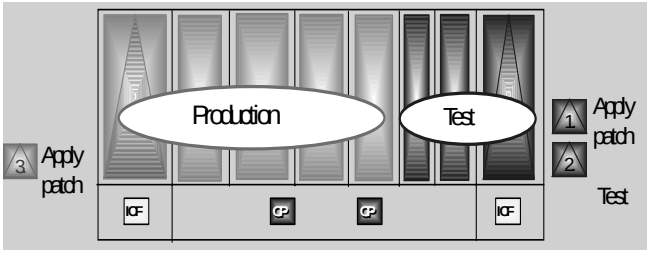
Parallel Sysplex Enhancements – CFCC Level 13

- **Support for up to 48 links**
- **Availability enhancement**
  - CFCC Patch Apply enhancement (DRIVER 55 – z890 & z990 only)
    - Disruptive patches affect one CF LPAR at a time
    - Rolling patch on separate CF LPARs without the need for a System Power On Reset
    - Excellent for testing in test sysplexes without impact to production



NEW!

- **Performance enhancements**
  - DB2 data sharing
    - Potentially improved performance for "Cast out process" when using large DB2 buffer pools
  - APAR OA01517 enables exploiters to request placement into a CF with CFCC Level 13, but it's not a requirement

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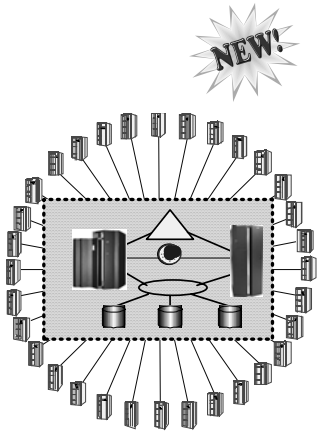
z990 CFCC Level 14 – z890/990 GA2/4

- **Function and Potential Benefit**
  - Contains improvements to the CF dispatcher and internal serialization mechanisms designed to better manage coupled workloads
- **Requirements and Support**
  - Requires z890/990 hardware LIC support for GA2/4 (October 29, 2004)
  - z/OS 1.3 or z/OS.e 1.3 and higher
    - Optional APAR fix OA08556 to improve performance when duplexing structures
  - z/OS 1.4 and higher
    - Optional APAR fix OA09742 to allow sysplex connectors to request structure allocation in a Level 14 Coupling Facility
  - z/VM 3.1 and z/VM 4.3 and higher for virtual CF support
- **CF Storage Sizing with CFCC level 14**
  - May increase storage requirements
  - Use CFSSIZER tool to determine: www.**ibm.com**/servers/eserver/zseries/cfsizer/



1 to 32 Systems

zSeries continues to meet the requirements for advanced clustering

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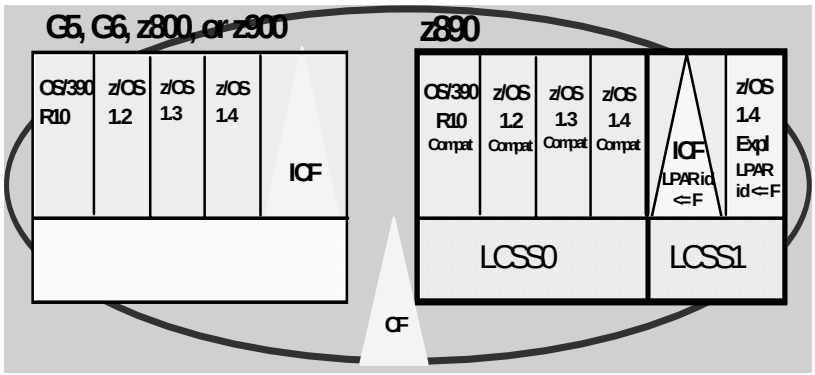
Parallel Sysplex Coexistence with z890



Compatibility NOT required, but strongly recommended

Compatibility (or Exploitation) required on all z890 images

Recommendation: Rollout Compatibility level software to all images in the Sysplex

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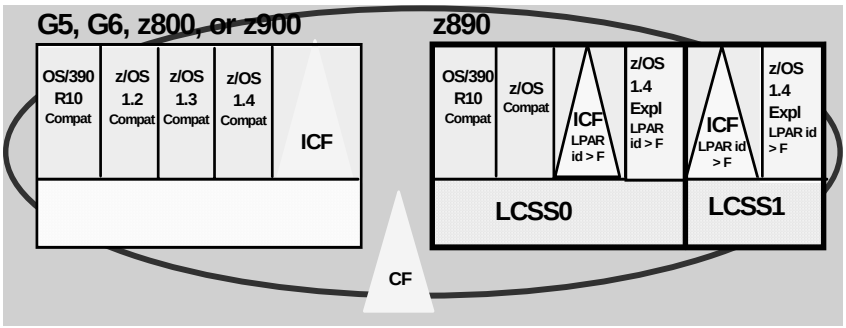
Parallel Sysplex Coexistence with z890 - continued



Compatibility IS required

Compatibility (or Exploitation) required on all z890 images

Restriction: Cannot assign LPAR ID > 15 to CF LPARs until Compatibility software rolled out across all images in the Sysplex

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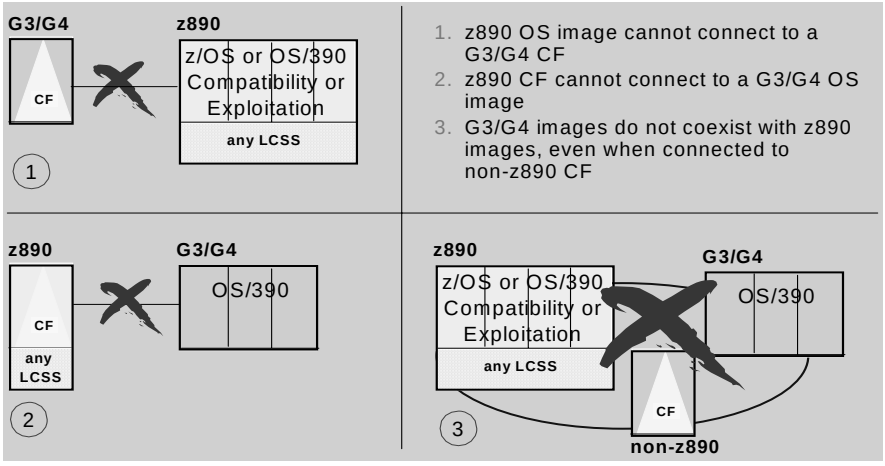
Parallel Sysplex coexistence with 9672 G5 or higher



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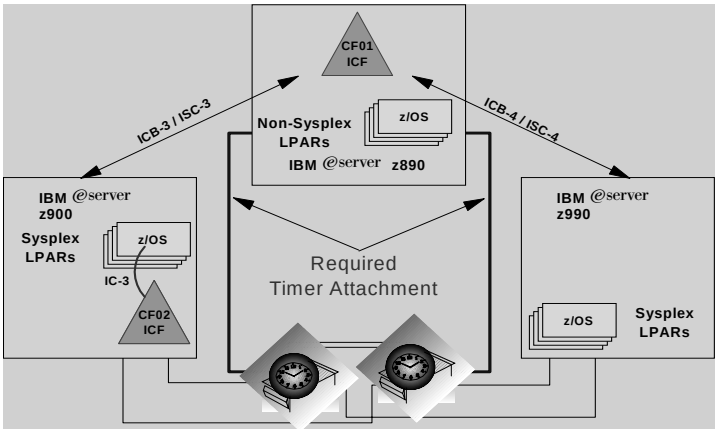
Message Time Ordering - MTO



Requires z/OS and OS/390 APAR - OW53831

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Statements of Direction

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Statements of Direction

- **Token Ring on HMC, SE, TKE workstations and IBM 2074 Console Controller to be discontinued: The z890 and z990 are the last zSeries servers to offer Token Ring on these devices.**
- **HMC's are to become "closed" platforms**
  - This has implications for customers using the ESCON Director Console or Sysplex Timer Console installed as an application on HMC's.
    - The ESCON Director and Sysplex Timer will require a separate console that supports Token Ring ===>> BUY A CONSOLE NOW !
  - Support for 9672 G5 and above
  - TCP/IP only
- **OSA-Express Layer 2 Support (QDIO mode only) – Satisfied October 2004**
  - Allowing protocol-independant network connectivity
  - Initially available to z/VM and Linux
- **Future zSeries processors will not use ISC-3 to connect to 9672 G5/6 HiperLinks (ISC-2)**

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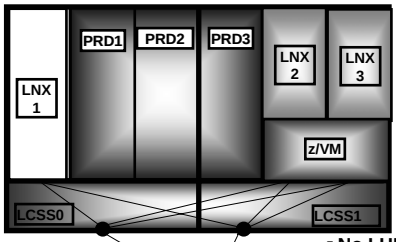
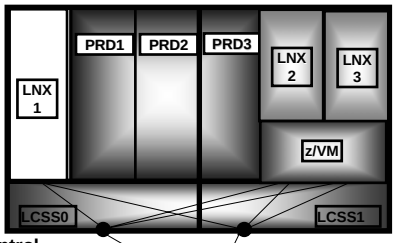
FCP LUN Access Control

Preview*

Without LUN Access Control



With LUN Access Control



- **No LUN Access Control**
  - Image access to shared FCP channel allows read-write access to all LUNs not masked
  - No concurrent LUN sharing
- **With LUN Access Control**
  - Image defined LUN access on shared FCP channel
  - Read-only LUN sharing

* Planned availability to be announced

LNX1 LNX1 LNX1
LNX2 LNX2 LNX2
LNX3 LNX3 LNX3

LNX1 LNX2 LNX3
LNX2
LNX3

Read-only sharing

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Operating Systems

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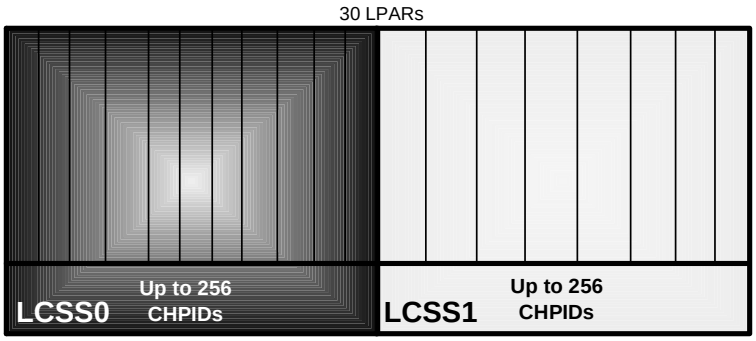
Multiple Logical Channel Subsystems and up to 30 LPARs



2 Logical Channel SubSystems (LCSS)

30 LPARs across 2 LCSS

or

15 LPARs per LCSS

Maximum of 15 LPARs on Capacity Setting 110 (FC6110)

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Compatibility versus Exploitation

- **Compatibility**
  - Can use HCD to create an IODF with multiple LCSSs
  - Software ACTIVATE can be performed
    - Number of defined LCSSs is irrelevant
  - Can only perform a hardware ACTIVATE if:
    - The changed/new resources are restricted to LCSS-0
  - POR is required for activating IODF:
    - with additional LCSSs
    - with new LPARs
    - with changed/new resources in LCSS-1
  - Sysplex Considerations

- **Exploitation**
  - Can perform full hardware ACTIVATE
    - With multiple LCSSs defined
  - Run in LCSS-1
  - > 15 LPARs
  - Dynamic I/O changes in LCSS-1
  - Extended Channel Measurement Block (ECMB) support
  - 48 ISC Links
  - QDIO Multiple Control Units
  - CF Level 13

http://www-1.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/FLASH10236

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z890 Operating Systems

Operating System	ESA/390 31-bit	z/Arch 64-bit	Compatibility	Exploitation
OS/390 V2.10 (09/30/2004 support withdrawn)	Yes	Yes	Yes [1]	No
z/OS V1.2 (10/2004 support withdrawn)	No	Yes	Yes [1]	No
z/OS V1.3 & z/OS.e V1.3	No	Yes	Yes [1]	No
z/OS V1.4 & z/OS.e V1.4 + Plus N/C Feature	No	Yes	Yes [2]	Yes [2]
z/OS V1.5, 1.6, 1.7 & z/OS.e V1.5, 1.6, 1.7	No	Yes	Included	Included
Linux for S/390	Yes	No	Yes	Yes
Linux for zSeries	No	Yes	Yes	Yes
z/VM V3.1	Yes	Yes	Yes	No
z/VM V4.2 & V4.3	Yes	Yes	Yes	No
z/VM V4.4	Yes	Yes	Included	Included
z/VM V5.1	Yes	Yes	Included	Included
VSE/ESA V2.6, V2.7	Yes	No	Yes	No
z/VSE V3.1	Yes	No	Yes	Yes
TPF V4.1 (ESA Mode only)	Yes	No	Yes	No

1 - Web Deliverable

2- Orderable Feature

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Cryptography

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Cryptography

- **CP Crypto Assist for Cryptographic Functions (CP Assist)**
  - High performance clear key DES and SHA-1 engine in every CP
    - Shipped with SHA-1 enabled. DES & TDES require enablement FC3863
    - CHPID no longer required
- **PCI Cryptographic Accelerator (PCICA) -- increments = 0, 1 or 2 features (2 engines per card)**
  - High performance Public Key (SSL) Acceleration
  - Carried forward on z800 upgrades
- **PCIXCC and PCIXCC2 Cryptographic Coprocessor -- increments = 0, 2, 3 or 4 features**
  - I/O Cage installable PCIXCC feature
    - Adds security rich functions previously found in CCF and PCICC
  - CHPID not required
  - Service offering for User Defined eXtensions (UDX)

- **New function**
  - 19 digit Personal Account Numbers
  - TKE 4.1 Operational Key Entry
  - EMV (Europay Mastercard and Visa) 2000 Standard
  - PKE/PKD Service Enhancements
  - Double Length Derived Unique Key Per Transaction (DUKPT) – PCIXCX

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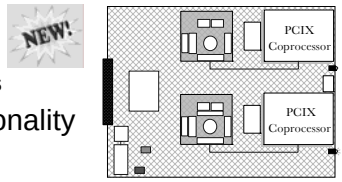
The total quantity of FICON Express, OSA-Express, PCICA, and PCIXCC cannot exceed 20 features per server

Crypto Express2 (FC0863)



- **Dual Integrated Cryptographic Coprocessors**
  - Provides PCIXCC and PCICA functionality
- **Improved throughput over the PCIXCC**
- **Scalable (no CP affinity) - 0 to 8 features**
  - The total number of Crypto Express2, PCICA and PCIXCC features cannot exceed 8 features per server
  - Minimum purchase increment is two (Crypto Express2 and/or PCIXCC)
- **Current applications expected to run without change**
- **Connection to STI interface; no external cables**
- **Fully programmable, User Defined Extensions (UDX) support**
- **Designed for FIPS 140-2 Level 4 Certification**
- **Trusted Key Entry (TKE) 4.X support**
  - Secure operational and master key loading
  - Smart Card Reader support (TKE 4.2 only)

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Crypto Express2 Support Requirements

- **z890 or z990 hardware LIC support for GA2/4 (Planned January 28, 2005)**
- **z/OS 1.2 or z/OS.e 1.3 or later with Web Deliverable:**
  - z990 Cryptographic support OR
  - z990 and z890 Enhancements to Cryptographic Support
- **z/VM 5.1 or later with service (Planned January 28, 2005)**
  - Support for z/OS and Linux on zSeries guests
- **VSE/ESA 2.7 and IBM TCP/IP for VSE/ESA 1.5**
- **Linux on zSeries with code IBM plans to deliver Open Source in:**
  - October 2004 for kernel 2.4
  - Early in 2005 for kernel 2.6
- **NOTE: z/VM, VSE/ESA and Linux support clear key SSL ONLY.**
- **See the 2084DEVICE or 2086DEVICE PSP for any additional service.**

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19-digit Personal Account Numbers on z890/990

- **Function and Potential benefits**
  - Designed to meet the industry requirement for Card Validation Value (CVV) generate and verification services for 19-digit Personal Account Numbers (PANs).
    - Old: 13-digit & 16-digit PANs
    - New: 19-digit PAN
  - Designed to increase anti-fraud security
- **Requirements and Support**
  - Exclusive to z890 and z990 PCIXCC and Crypto Express2
  - PCIXCC with z890 or z990 hardware LIC support for GA2/4 (October 29, 2004) **OR**
  - Crypto Express2 with z890 or z990 hardware LIC support for GA2/4 (Planned January 28, 2005)
  - Requires z/OS or z/OS.e 1.6 with the **ICSF 64-bit Virtual Support for z/OS 1.6 and z/OS.e 1.6 Web deliverable planned for December 17, 2004.**
  - See the 2084DEVICE or 2086DEVICE PSP for any additional service required

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2048-bit clear and secure key RSA operations

- **Function and Potential Benefits**
  - 2048-bit clear and secure key RSA management capability
    - Support of new Automated Teller Machine (ATM) standards
  - The 2048-bit functional control vector will support four ICSF services: Public Key Decrypt, Symmetric Key Import, Symmetric Key Export, and Symmetric Key Generate
  - Designed to increase anti-fraud security
- **Requirements and Support**
  - PCICC with **Feature #0867 for z800 and z900** (**Not applicable to CCF**) **OR**
  - PCIXCC on z890 or z990 **OR**
  - Crypto Express2 with z890 or z990 hardware LIC support for GA2/4 (Planned Jan 28, 2005)
  - On z800 or z900 with PCICC: z/OS 1.3 or z/OS.e 1.3 or later
  - On z890 or z990: z/OS 1.3 or z/OS.e 1.3 or later with:
    - For PCIXCC: z990 Cryptographic Support
    - For Crypto Express2 and PCIXCC: z990 and 890 Enhancements to Cryptographic Support
  - On z800 or z900 with PCICC, z/VM 4.3 or later for Linux on zSeries guests.
  - On all hardware, z/VM 5.1 for support of z/OS and Linux on zSeries guests.
    - For Crypto Express2, with service planned January 28, 2005
  - See 2084DEVICE or 2086DEVICE PSP bucket for any required service
  - For Crypto Express2, Linux on zSeries with code IBM plans to deliver Open Source in:
    - October 2004 for kernel 2.4
    - Early in 2005 for kernel 2.6
  - For PCIXCC or PCICC, Linux on zSeries with clear key RSA support:
    - SUSE SLES 8 or 9, Red Hat RHEL 3, Turbolinux TLES 8, or Conectiva CLEE

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Less than 512-bit clear key RSA operations on z890/990

- **Function and Potential Benefits**
  - Designed to allow clear key RSA operations using keys less than 512-bits including ICSF Callable services and their corresponding verbs: Digital Signature Verify (CSNDDSV), Public Key Encrypt (CSNDPKE), and Public Key Decrypt (CSNDPKD).
  - May allow the migration of some additional cryptographic applications to z890 and z990 servers without rewriting the applications.
- **Requirements and Support**
  - **Currently Available for PCICC on z800 and z900**
  - New for z890 and z990 PCIXCC and Crypto Express2
  - PCIXCC with z890 or z990 hardware LIC support for GA2/4 (October 29, 2004)
    OR
  - Crypto Express2 with z890 or z990 hardware LIC support for GA2/4 (Planned January 28, 2005)
  - z/OS 1.3 or z/OS.e 1.3 or later with Web Deliverable:
    - For PCIXCC: z990 Cryptographic Support
    - For Crypto Express2 and PCIXCC: z990 and 890 Enhancements to Cryptographic Support
  - z/VM 5.1 or later with service (Planned January 28, 2005)
    - Support for z/OS guests
  - See the 2084DEVICE or 2086DEVICE PSP for any additional service required

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Trusted Key Entry – TKE Workstation

- **TKE 4.2 Workstation support (FC0853) - New Build after Jan. 2005**
  - Smart Card Reader (FC0887)
    - Additional Cards (FC0888)
- **TKE 4.1 Workstation support (FC0852) - Prior to January 2005**
- **TKE 4.0 Workstation support (FC0851) - Carry forward from z800**
  - MCL update to 4.1 required to control PCIXCC
- **TKE 3.x Workstation support - Carry forward to control legacy systems only**
  - MCL update to TKE 4.1 control PCIXCC
    - Previous TKE upgrades required ordering a new TKE workstation
- **Read the 'Migration and Use' chapters of the ICSF Systems Programmer's Guide (SA22-7540) for tips on PCIXCC**
  - Appendix E

NOTE: TKE customers will now need to enable TKE commands from the SE panel for each PCIXCC before using TKE commands. No impact to non-TKE customer.

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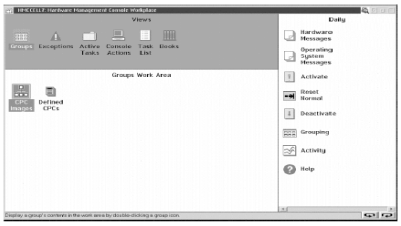
Hardware Management Console



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zSeries Hardware Management Console

- **Supported HMCs are 0073, 0074, 0075, 0076, 0077, 0078, 0079, 0080**
  - FC0073 - G1-G6, C02-C05, 2003, 7060, all zSeries
  - FC0074, FC0075 - G4, G5, G6, C05, 7060, all zSeries
  - **FC0076** - G5, G6, all zSeries
    - Feature Code to exchangeT/R-Ethernet for Dual-Ethernet on FC0075
  - **FC0077** - Dual-Ethernet - G6, all zSeries
  - **FC0078** - Ethernet and Token-Ring - G6, all zSeries
  - **FC0079 - Dual Ethernet – G6, all zSeries** (November 2004)
  - **FC0080 - Ethernet and Token Ring – G6, all zSeries** (November 2004)
  - **FC6094 - 17 inch Flat Panel** (November 2004)
  - **FC6095 - 20 inch Flat Panel** (November 2004)
- Can now order up to 10 HMC's (November 2004)
- **HMC Version Code 1.8.2 supports...**
  - G6 / Driver 26
  - z900/z800 / Driver 3G
  - z890 / Driver level 55 (GA)
- ***Last zSeries to offer Token-Ring connection to HMC/SE or TKE***
  - *Migrate to Ethernet in the future*
    - *ESCON Director and Sysplex Timer Console networks will remain Token-Ring*
    - *Future server HMC will not permit ESCON Director or Sysplex Timer Console function*

- New build - MAU supplied in Frame if Token Ring is ordered
- Ethernet Switch (16 port)
  - FC0089
  - 10/100 mbps
  - Carry forward FC0089 from z800 (8-port)

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Migration Planning

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Channels not support on the z890

- **No Internal-Disk**
  - Consider the IBM 2105-750
  - Consider IBM Certified used DASD
- **No emulated I/O**
  - Use OSA-ICC or IBM 2074
- **Parallel channels**
  - Same as z800
  - Use Optica ESCON® Converter or IBM 9034
- **OSA-Express Fast Ethernet adapters**
  - Carried forward on upgrades - not orderable on new builds
  - Use 1000BASE-T Ethernet for new builds
- **PCICC cards**
  - No carry forward
  - Replaced by PCIXCC for most commonly used functions

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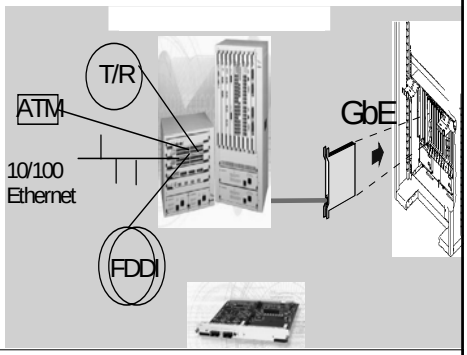
Channels not support on the z890

- **OSA-2 adapters**
  - Use equivalent OSA-Express adapter
    - May require a different connector
  - No equivalent OSA-Express for FDDI OSA-2
    - Use multiprotocol switch or router with appropriate network interface
  - ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP100340

- **OSA-Express adapters**
  - OSA-Express ATM adapters
    - Not available on upgrades or new builds
    - Use multiprotocol switch or router with appropriate network interface (e.g., 1000BASE-T or Gigabit Ethernet)



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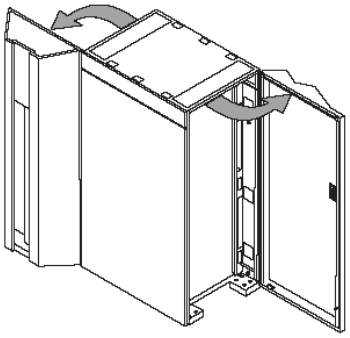
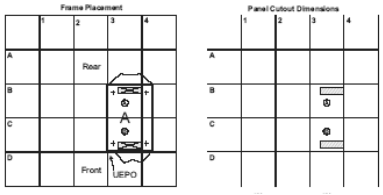


Physical Planning



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Physical Planning – IMPP (GC28-6828)

- **All systems are air cooled, one frame systems**
  - raised floor (recommended) or non-raised floor
- **Height reduction (FC9975 no charge)**
  - Accommodates door height restrictions
  - IBF batteries will come unplugged if height reduction is ordered
- **Optional Internal Battery Feature-IBF (FC3210 chargeable)**
  - Installed as a pair (top - front and back)
  - No width reductions are required
  - Can be added later via MES
- **Power - Dual power cables (Hubbell) 50/60Hz**
  - 3 Phase, 200V-480V
  - 1 Phase, 200V-415V
  - Cabled in upper CEC cage

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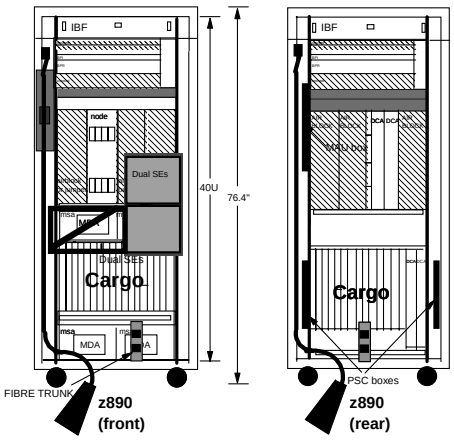
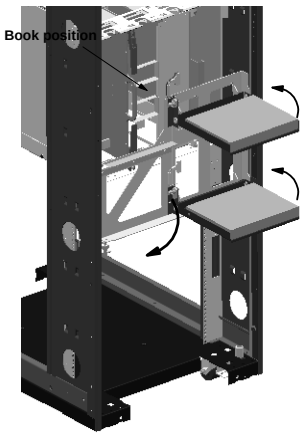
A look inside



z890 SE trays



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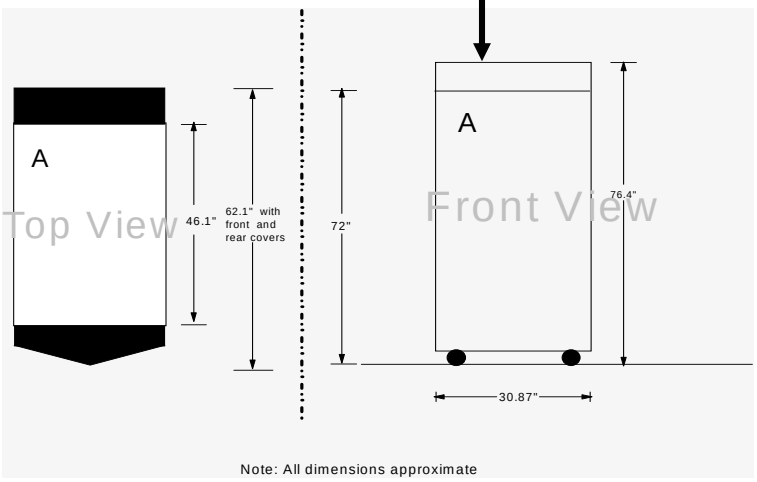
Dimensions

Top section can be removed for shipping, but only if really necessary.



Note: All dimensions approximate

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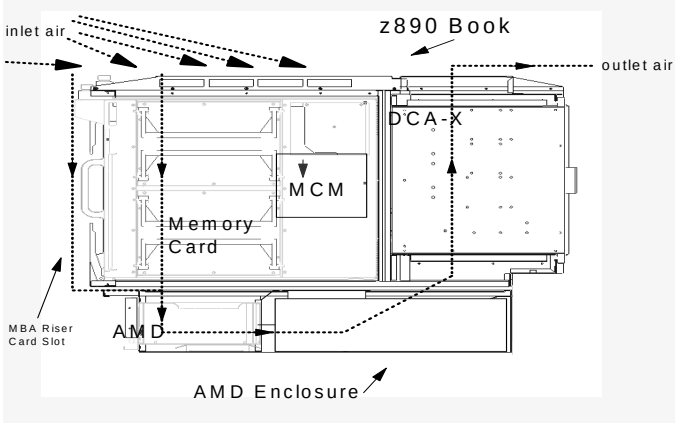
Heat Exchange



Cold air in from the front.

Heated air out through the back.

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G5/G6, MP3000, z800, z890 Physical Characteristics

	G5 / G6 Minimum 1 Frame System	G5 / G6 Maximum 2 Frame System	Multiprise 3000 1 Frame System Maximum	z800 Maximum	z890 Minimum	z890 Maximum
Power 50/60 Hz, kVA	0.6 / 1.0	5.5 / 5.5	1.32	2.95KW	1.5	4.7
Heat Output KBTU/hr	2.0 / 2.5	18.8 / 18.8	4.5	10.0	5.12	16.05
Air Flow CFM Air Flow m*3/min	290 / 290 7.1 / 7.1	1400 / 1400 38.6 / 38.6		400 11.1	640 17.64	640 17.64
Floor Space - Sq. meters - Sq. feet	1.0 / 1.6 10.4 / 16.4	1.8 / 1.8 19.7 / 19.7		0.83 8.9	1.24 13.33	1.24 13.33
Including service clearance - Sq. meters - Sq. feet	2.5 / 2.5 27.4 / 27.4	4.8 / 4.8 51.9 / 51.9		6.0 64.5	3.03 32.61	3.03 32.61
Approximate weight - kg - lbs	612 / 612 1346 / 1346	938 / 938 2057 / 2057	236 520	545 1201	674 1482	785 1730
Approximate height - cm - inches	199.8 78.7	199.8 78.7	80 31.5	181.1 71.3	194.1 76.4	194.1 76.4

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Reference

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z890 Publications via ResourceLink

- Agreement for Licensed Internal Code SC28-6822
- Application Programming Interfaces SB10-7030
- Capacity Backup User's Guide SC28-6823
- CHPID Mapping Tool User's Guide SC28-6825
- CF Channel I/O Interface Physical Layer SA23-0395
- ESCON and FICON Channel-to-Channel SB10-7034
- ESCON Physical Layer SA23-0394
- FICON I/O Interface Physical Layer SA24-7172
- Hardware Management Console Operations Guide (V1.8.2) SC28-6830
- Installation Manual for Physical Planning GC28-6828
- Installation Manual GC28-6826
- IOCP User's Guide SB10-7037
- Maintenance Information for Desktop Consoles GC38-3115
- Maintenance Information for Fiber Optic Links SY27-2597
- Maintenance Information for Thinkpad Consoles GC38-3117
- Parts Catalog GC28-6829
- Planning for Fiber Optic Links GA23-0367
- PR/SM Planning Guide SB10-7036
- Safety Notices G229-9054
- Safety Inspection GC28-6833
- Service Guide GC28-6827
- Standalone IOCP User's Guide SB10-7040
- SCSI IPL - Machine Loader Messages SC28-6839
- Support Element Operations Guide (Version 1.8.2) SC28-6831

- z890 Technical Introduction www.redbooks.ibm.com SG24-6310
- z890 SAPR Guide SA04-002

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End of Presentation

"I used to think that cyberspace was fifty years away.

What I thought was fifty years away, was only ten years away.

And what I thought was ten years away...It was already here. I just wasn't aware of it yet."
Bruce Sterling - Author

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Backup/Miscellaneous Material

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STSI Instruction - Interface change

- **Both SW model (capacity setting) and HW model are reflected in the result of a STSI instruction**
- **Prior to this, the result was only the SW model**

PROCESSOR STATUS

ID	CPU	SERIAL
0	+	00AB7A2086
1	+	00AB7A2086
2	+ A	00AB7A2086
3	+	00AB7A2086

zAAP

NEW!

CPC ND = 002086.A04.IBM.00.000000002AB7A
CPC SI = 2086.340.IBM.00.000000000002AB7A
CPC ID = 00
CPC NAME = TC9N01
LP NAME = TC9N01 LP ID = 0
CSS ID = 0

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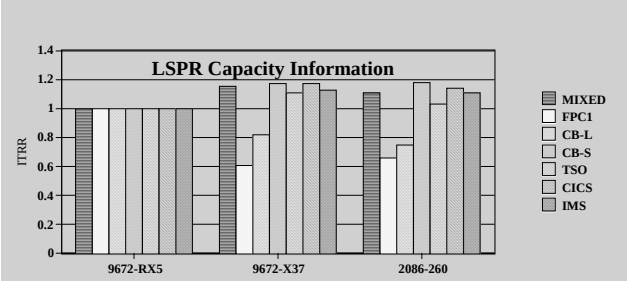
Capacity Planning Challenge – 9672 G4

- **MIP representations for processor sizing is dangerous and can cause a processor to be significantly undersized**
  - Seen when migrating from 9672 G4 to other platforms
    - G5 / G6 / z900 / z800 / z990/ z890
- **Workloads which look more like CB-L and CB-S will cause the capacity of the G5/6 or zSeries to be less than expected**
  - CB-S = Commercial Batch, formerly CB84
  - CB-L = Commercial Batch (heavy CPU), formerly CBW2



www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS135

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z/OS Support

		G3-G4	G5/G6 MP3000	z800 z900	z890 z990	End of Service	Coexistence Migration Policy	Ship Date
OS/390	2.8	x	x	x		09/02	1.2	09/99
	2.9	x	x	x		09/03	1.3	03/00
	2.10	x	x	x	x[C]	09/04	1.4	09/00
z/OS	1.1		x	x		03/04	1.4	03/01
	1.2		x	x	x[C]	10/04	1.5	10/01
	1.3		x	x	x[C]	03/05	1.6	03/02
	1.4		x	x	x	03/07	1.7*	09/02
	1.5		x	x	x	03/07*	1.8*	03/04
	1.6			x	x	09/07*	1.8*	09/04

Only z/OS 1.6 is orderable. The z/OS 1.4 exploitation feature remains orderable until 12/2006*.
x^C - Compatibility support – does not exploit new z990 features. **Web download available only until 12/31/2004***.
Bimodal Accommodation Offering is available for z/OS 1.2, 1.3, and 1.4. It is not available for later releases.
* - Planned date or release

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ICKDSF Release 17

- **IBM Device Support Facilities (ICKDSF) Release 17 is required to install, maintain, and use IBM Direct Access Storage on z890 servers**
- **This release of ICKDSF is also required to be installed on any other OS/390 or z/OS system that will be sharing the IBM Direct Access Storage with the OS/390 or z/OS systems running on the z890**
  - **Even z/VM systems**
- **This release of ICKDSF is included in the *z/OS V1R4 z990 Exploitation Support* feature, the *z990 Compatibility for Selected Releases*, and *z/OS.e V1R4 Coexistence Update*** (last two are web deliverables**)**
  - **If ICKDSF R17 is already installed - no need to reinstall**
- **For more information on ICKDSF Release 17, refer to Software Announcement 202-309 dated November 22, 2002**
- **See Washington Systems Center Flash10207 at www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/Flash10207**

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z/VM 4.4 - Exploitation of the z890 Server

- **Support for multiple Logical Channel SubSystems (LCSS)**
  - **Allows the definition of more than one channel subsystem**
  - **Each channel-subsystem image can be configured with up to 256 channel paths**
  - **Each logical partition has access to one channel-subsystem image**
  - **Dynamic-I/O configuration support has been extended to allow channel paths, control units, and devices to be dynamically added, changed, and deleted**
  - **I/O configuration can be dynamically changed with:**
    - **CP suite of interactive dynamic-I/O-configuration commands**
    - **HCM and HCD - new configuration-management tools**
- **Support for spanned channels**
  - **Helps enable inter-process communication (IPC) among Linux guests**
- **Extended Channel Measurement Data Support (ECMDS)**
  - **Improved capacity planning and I/O performance measurement**
- **Support for more than 15 Logical Partitions (LPARs)**
  - **Handles I/O-configuration definition and dynamic-I/O configuration logical partitions**
  - **CP Monitor will allow performance data to be collected and recorded**
- **z/VM V3.1, V4.2, and V4.3 support the z890 in compatibility mode**

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New - z/VM Version 5.1 – September 24, 2004

- Virtualization technology and Linux enablement
  - Deployment of a Linux server farm on z/VM using only SCSI disks
  - Improved cryptographic performance with PCIXCC support for Linux and z/OS guests
- Network virtualization and security
  - Enhanced network recovery and virtual switch failover support
  - Improved authorization for z/VM Guest LANs and virtual switches
- Technology exploitation
  - Support for the OSA-Express Integrated Console Controller
  - Support of Logical Channel SubSystems (LCSS)
  - Capability to route IPv6 packets and develop IPv6 applications
- Increased use of 64-bit functions
  - Still fully supports 24-bit and 31-bit application interfaces
  - Requires z/Architecture™ servers: z990, z900, z890, z800

Put the power of zSeries partitioning and z/VM virtualization technology to work for you and reap the benefits of the most advanced workload isolation, resource sharing, and utilization available in the computing industry today!

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Updated Engine-based Pricing for z/VM V5.1

- **Lower entry price point than z/VM V4**
- **Decreasing price curve as more engines are added**
- **Manage software costs better by using z/VM V5, Linux and IFLs to run new workload applications**
- **On/Off CoD -processor engine per-day basis**
- **z/VM V5 is able to aggregate licenses across machines within the enterprise**

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z/VM & VSE/ESA Support Summary Dates

		G3-G4	G5/G6 MP3000	z800	z890	z900	z990	End of Mkt	End of Service	Planned Ship Date
VSE/ESA	2.5	x	x	x		x	x[c]	12/01	12/03	9/00
	2.6	x	x	x	x[c]	x	x[c]	3/03		12/01
	2.7*		x	x	x	x	x			3/03
z/VSE	3.1		x	x	x	x	x			1H05[1]
z/VM	3.1*	x	x	x	x[c]	x	x[c]	8/04	12/05	02/01
	4.1		x	x	x[c]	x	x[c]	10/01	6/03	7/01
	4.2		x	x	x[c]	x	x[c]	5/02	12/03	10/01
	4.3		x	x	x[c]	x	x[c]	8/03	5/05	5/02
	4.4*		x	x	x	x	x	tbd	9/06	8/03
	5.1*			x	x	x	x	tbd	09/07	09/04

x[c] - Compatibility support

[1] – Planned availability

*Releases currently orderable

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z890: Software Support Summary

Operating Systems	ESA/390 (31-bit)	z/Arch. (64-bit)	Compatibility	Exploitation
OS/390 Version 2.10 * NO LONGER SUPPORTED *	Yes	Yes	Yes[3]	No
z/OS® Version 1 Release 2	No[1]	Yes	Yes[3]	No
z/OS Version 1 Release 3 (+ z/OS.e 1.3)	No[1]	Yes	Yes[3]	No
z/OS Version 1 Release 4 (+ z/OS.e 1.4) Web deliverable or feature required	No[1]	Yes	Yes[3]	Yes[3]
z/OS Version 1 Release 5 (+ z/OS.e 1.5)	No	Yes	Included[3]	Included[3]
z/OS Version 1 Release 6 (+ z/OS.e 1.6)	No	Yes	Included[3]	Included[3]
Linux for S/390	Yes	No	Yes	Yes
Linux for zSeries	No	Yes	Yes	Yes
z/VM® Version 3 Release 1	Yes	Yes	Yes	No
z/VM Version 4 Release 3	Yes	Yes	Yes	No
z/VM Version 4 Release 4	Yes	Yes	Included	Included
z/VM Version 5 Release 1 (09/24/2004)	no	Yes	Included	Included
VSE/ESA™ Version 2 Release 6, 7	Yes	No	Yes	No[2]
z/VSE*[4] 3.1	Yes	No	Yes	Yes
TPF Version 4 Release 1 (ESA mode only)	Yes	No	Yes	No

1 - ESA/390 31-bit mode permitted for migration and disaster recovery purposes only except z/OS.e
2 - VSE 2.7 exploits Thin Interrupts with 4Q04 SPE
3 - Web Deliverable for Secure Crypto
4 - z/VSE can execute in 31-bit mode only. It does not implement z/Architecture, and specifically does not implement 64-bit mode capabilities.
z/VSE is designed to exploit select features of IBM zSeries hardware.

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z/VM Support

		z990	z890	z900	z800	End of Service	Planned Ship Date
z/VM	3.1	x[c]	x[c]	x	x	12/05	02/01
	4.2*	x[c]	x[c]	x	x	12/03	10/01
	4.3	x[c]	x[c]	x	x	5/05	5/02
	4.4	x	x	x	x	9/06	8/03
	5.1	x	x	x	x	9/07	9/04

•x[c] - Compatibility support only – does not support 30 LPARs or OSA-Express – Integrated Console Controller. Supports up to four Logical Channel SubSystems but dynamic I/O configuration in only LCSS0.
•3.1 has been withdrawn from marketing effective August 27, 2004
•4.2 and 4.3 have been withdrawn from marketing
* Unsupported software releases but will run on specified servers

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OS/390 & z/OS Support for z890 Servers

- **z/OS and OS/390 supported levels for z890**
  - **z/OS 1.6 and z/OS.e 1.6 (planned availability Sept. 24, 2004)**
  - **z/OS 1.5 and z/OS.e 1.5 (available March 26, 2004)**
  - **z/OS 1.4 *plus* exploitation support feature**
    - **Provides compatibility and exploitation support**
  - **z/OS V1R2/R3, z/OS.e V1R3 *plus* compatibility code**
    - **Provides compatibility support only**
  - **z/OS.e V1R4 *plus* coexistence update feature**
    - **Provides compatibility and exploitation support**
  - **OS/390 V2R10**
    - **Provides compatibility support only**
- **Secure Cryptographic support is not integrated in the base operating system**
  - **Separate web download**
- **The software release will determine how to obtain the required software**
  - **Orderable via feature**
  - **Web download**

PTFs alone do not provide support

z/OS V1R1 is not supported

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Linux on IBM z890

- **Support for zSeries functions delivered as Open Source Contribution in June 2003 via -**
  http://www10.software.ibm.com/developerworks/opensource/linux390
- **Currently available distributions**
  - **SUSE SLES 7**
  - **SUSE SLES 8**
  - **Red Hat REHL 3.0**
  - **Turbolinux TLES 8**
  - **Conectiva CLEE**
- **January 2004 – to Developerworks web site**
  - **FCP SAN management - OSA Express 1000BASE-T Ethernet – New**
  - **PCI X Cryptographic Coprocessor (PCIXCC)**
  - **Linux kernel 2.2.16 and higher**

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z890 Linux Functions – cross reference

Function	SUSE SLES 7	SUSE SLES 8	Red Hat REHL 3.0	Turbolinux TLES 8	Conectiva CLEE
30 LPARS	X	X	X	X	X
Greater than one Logical Channel Subsystems	X	X	X	X	X
Hipersockets	X	X	X	X	X
Dynamic I/O support	X	X	X	X	X
Internal and external spanned channels	X	X	X	X	X
VLAN (IEEE 802.1q)		X	X	X	X
Broadcast for IPv4packet		X	X	X	X
16-port ESCON feature	X	X	X	X	X
FICON Express (CHPID type FC)	X	X	X	X	X
FICON Express (CHPID type FCP)		X	X	X	X
SCSI IPL for FCP		X		X	X
Cascaded FICON Directors		X	X	X	X
OSA-Express Token Ring	X	X	X	X	X
OSA-Express Gigabit and 1000BASE-T Ethernet	X	X	X	X	X
CP Assist for Cryptographic function (CPACF)		X		X	X
PCI Cryptographic Accelerator (PCICA)	X	X	X	X	X
Intrusion Detection Services		X	X	X	X

Not a complete list

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TPF 4.1

- Protect investments in your core TPF assets – z890 support
  - OSA-Integrated Console Controller
  - FICON and FICON Express™
  - OSA-Express
  - Up to 30 LPARs (PJ29309 required)
  - Server Consolidation

- Integrate TPF with your datacenter
  - WebSphere™ MQ
  - Web Services/SOAP/XML/IIOP and more
- Leverage your TPF investments with Linux on zSeries

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OSA-Express2 Support Requirements

- **OSA-Express2 Gigabit Ethernet requires:**
  - z890 or z990 hardware LIC support for GA2/4 (October 29, 2004)
  - z/OS 1.3 or z/OS.e 1.3 or later
  - z/VM 3.1 or z/VM 4.3 or later with service (Planned January 28, 2005)
  - VSE/ESA 2.6 or later
  - TPF 4.1 PUT13 with service for APAR PJ27333
  - Linux on zSeries with Gigabit Ethernet support:
    - SUSE SLES 8 or 9, Red Hat RHEL 3, Turbolinux TLES 8 or Conectiva CLEE
  - See the 2084DEVICE or 2086DEVICE PSP for any additional service required
- **OSA-Express2 10 Gigabit Ethernet requires:**
  - z890 or z990 hardware LIC support for GA2/4 (Planned January 28, 2005)
  - z/OS 1.3 or z/OS.e 1.3 or later
  - For Checksum Offload, z/OS or z/OS.e 1.5 or later
  - z/VM 3.1 or z/VM 4.3 or later with service (Planned January 28, 2005)
  - VSE/ESA 2.6 or later
  - TPF 4.1 PUT13 with service for APARs PJ27333 and PJ29930
  - Linux on zSeries with code IBM plans to deliver as Open Source in early 2005
  - See the 2084DEVICE or 2086DEVICE PSP for any additional service required

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New FICON and FCP Capabilities

- **LUN Access Control (<u>Preview only. Future hardware LIC update required</u>)**
  - Designed to allow:
    - Host-based control of operating system image access to SCSI devices as identified by their logical unit numbers (LUNs) on shared FCP channels.
    - Read-only sharing of LUNs among multiple operating system images
  - Expected to require a future z890 or z990 hardware update and:
    - Access Control Table XML program – Planned for download from Resource Link
    - z/VM 4.4 and later with service for APAR VM63328 (Expected same date as LIC update)
      - LUN Access Control for Linux guest LUNs
    - Linux on zSeries
      - For LUN Access Control, Linux on zSeries with LUN Access Control support:
        - > SUSE SLES 8 and SLES 9 or Conectiva CLEE
      - For read-only sharing, above with additional code IBM plans for Open Source delivery in early 2005.
- **FICON Purge Path Extended for channels in native (FC) mode**
  - Designed to provide enhanced FICON Express problem determination and error-recovery by providing end-to-end error-related information to the host operating system.
  - Requires z890 or z990 hardware LIC support for GA2/4 (October 29, 2004) and:
    - z/OS or z/OS.e 1.4 or later with service for APARs OA06846 and IR51695
    - See 2084DEVICE or 2086DEVICE PSP for any additional service required

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z990 Crypto – October 2004 announcement

Hardware / z/OS Crypto Support	G5/G6	z800/z900	z990 GA1	z990-GA2/GA3	z890-GA2 z990-GA4
Hardware	CCF PCICC	CCF PCICC PCICA	PCICA CPACF	PCIXCC PCICA CPACF	Crypto Express2 CPACF
Crypto Function	Clear key and Secure crypto	Clear key and Secure crypto	Clear key only	Clear key and Secure crypto	Clear key and Secure crypto
OS Support	OS/390 R10, z/OS 1.1+	CCF/PCICC: OS/390 R10, z/OS 1.1+ PCICA: z/OS 1.2+	z/OS 1.3 and 1.4	OS/390 2.10 and z/OS 1.2 to 1.6 Web deliverable	z/OS 1.3 to 1.6 Web deliverable

- CP Crypto Assist for Cryptographic Functions (CP Assist)
  - High performance clear key DES and SHA-1 engine in every CP
  - Some DES, TDES applications may also require PCIXCC or Crypto Express2
- Crypto Express2 (3rd Generation Crypto) NEW!
  - I/O Cage (STI) installable feature
  - Designed to add security-rich functions that previously required PCIXCC or PCICA
  - Designed provide the high performance SSL support that previously required PCICA

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Crypto Express2 Support Requirements

- **z890 or z990 hardware LIC support for GA2/4 (Planned January 28, 2005)**
- **z/OS 1.3 or z/OS.e 1.3 or later with Web Deliverable:**
  - z990 and z890 Enhancements to Cryptographic Support
- **z/VM 5.1 or later with service (Planned January 28, 2005)**
  - Dedicated-queue support for clear key and secure key functions for z/OS guests
  - Shared- and dedicated-queue support for clear key functions for Linux on zSeries guests, with up to 256 dedicated queues
- **VSE/ESA 2.7 and IBM TCP/IP for VSE/ESA 1.5**
  - Clear key functions only
- **Linux on zSeries with code IBM plans to deliver Open Source in:**
  - October 2004 for kernel 2.4
  - Early in 2005 for kernel 2.6
- **See the 2084DEVICE or 2086DEVICE PSP for any additional service.**

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z990: z/OS and OS/390 Cryptographic Support

- **Cryptographic Support Web deliverables (downloads)**
  www.**ibm.com**/servers/eserver/zseries/zos/downloads
  - **"z990 Cryptographic Support"** – GA2 (No longer available)
  - **"z990 and z890 Enhancements to Cryptographic Support"** – GA3 (May 28, 2004)
  - "**ICSF 64-bit Virtual Support for z/OS V1R6 and z/OS.e V1R6** – Planned December 17, 2004
- **Function**
  - Designed to enable both clear key and secure key cryptography
  - Unpriced Web deliverable allows a z990 server to support CP Assist for Cryptographic Function, PCICA, PCIXCC and Crypto Express2 hardware cryptography features
  - Supports:
    - z/OS 1.3 or z/OS.e 1.3 (z890 only) and later and, formerly, OS/390 2.10 and z/OS 1.2
    - TKE 4.2 LIC (FC0853) – Supports smart card reader **(z890/990 GA2/4 – October 2004)**
    - TKE 4.1 LIC (FC0852) – Supports operational key entry **(z990 GA3 – May 2004)**
    - TKE 4.0 LIC (FC0851) – Carry forward from z900
  - Reference "ICSF Systems Programmer's Guide", SA22-7520-06 or later **www.**ibm.com**/servers/eserver/zseries/zos/bkserv/r4pdf/crypto.html**
  - z/OS 1.4 level publications support all earlier releases

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