

IBM System z10 EC GA2

IBM System z10 BC



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IBM System z10 BC Availability Dates

IBM System z10 BC Key Dates

- **IBM System z10 Business Class (z10 BC) Announce – October 21, 2008**
 - First Day Orders
 - Resource Link™ support available
 - Capacity Planning Tools (zPCR, zTPM, zCP3000)
 - SAPR Guide and SA Confirmation Checklist available
 - SAPR Guide, SA08-006-00
- **Planned Availability dates**
 - **October 28, 2008**
 - **System z10 BC Model E10***
 - **Driver Level 76**
 - **z10 BC features and functions***
 - **z890 upgrades to z10 BC***
 - November 30, 2008
 - z9 BC upgrades to z10 BC
 - January 28, 2009
 - z10 BC model capacity conversions
 - z10 BC MES features
 - z10 BC E10 to z10 EC™ Model E12
 - STP Enhancements on System z9, z990, z890
 - OSA-Express QDIO data connection isolation for the z/VM® environment (4Q08)
 - Non-raised floor option
 - 1H2009
 - **SOD - PSIFB on z10 BC any z9 General Purpose Server**
 - June 30, 2009
 - **Memory size maximum of 248 GB**
- **New ITSO Redbooks® (Draft versions)**
 - z10 BC Technical Overview, SG24-7632 - October, 2008

***Note: November 14, 2008 for Korea**



IBM System z10 EC Key GA2 Dates

- **IBM System z10™ Enterprise Class (z10™ EC) GA2 Announce – October 21, 2008**
 - First Day Orders for GA2 Systems
 - Resource Link™ support available
 - Capacity Planning Tools (zPCR, zTPM, zCP3000) - updated
 - SAPR Guide and SA Confirmation Checklist available
 - SAPR Guide, SA06-016 - updated
- **Planned Availability Dates:**
 - **October 28, 2008**
 - **z10 EC Function and Features**
 - **Driver Level 76**
 - TKE 5.3 LIC (#0854) on z10 EC, z9 EC, z9 BC
 - TKE additional smart cards (#0884) on z10 EC, z9 EC, z9 BC
 - TKE smart card reader (#0885) on z10 EC, z9 EC, z9 BC
 - STP enhancements on z10 EC
 - January 28, 2009 Functions
 - OSA-Express QDIO data connection isolation for the z/VM® environment for System z10 and System z9
 - STP Enhancements on System z9
 - STP configuration and time information saved across Power-on-Resets or power outages on z990 and z890
 - January 28, 2009 Features
 - HCA2-O LR fanout card for 1x long reach InfiniBand (#0168) on z10 EC
 - OSA-Express3 1000BASE-T (#3367) and 10 GbE SR (#3371) on z10 EC
 - Capacity on Demand features (#9917 - #9929) on z10 EC
 - TKE 5.3 LIC (#0854) on z10 EC, z9 EC, z9 BC
 - TKE additional smart cards (#0884) on z10 EC, z9 EC, z9 BC
 - TKE smart card reader (#0885) on z10 EC, z9 EC, z9 BC
 - 1H2009
 - HMC feature #0090 on z10 EC, z9 EC, z9 BC
 - SOD - PSIFB on z10 BC any z9 General Purpose Server
 - ITSO Redbooks® (Draft versions) – All updated – October
 - z10 EC Technical Introduction, SG24-7515 - October 21, 2008
 - z10 EC Technical Guide, SG24-7516 - October 21, 2008
 - z10 EC Capacity on Demand, SG24-7504 – October 21,, 2008
 - System z I/O Connectivity Handbook, SG24-5444 – October 21, 2008



IBM System z10 BC and EC GA2 Announcement

z10 BC – Functions and Features Overview

One Hardware Model

New CPC and I/O Drawers

Faster Uni Processor – 3.5 Ghz

Up to 5 CPs

130 CP Capacity Settings

Replaceable Processor Unit and System Controller Single Chip Modules (SCMs)

**Up to 120 GB Customer Memory
(248 GB, June, 30, 2009)**

Separate 8 GB of fixed HSA

HiperDispatch

Capacity Provisioning Support

Large Page Support (1 MB)

Hardware Decimal Floating Point



Hot Pluggable I/O Drawer

**InfiniBand® (IFB)
I/O interconnect**

InfiniBand Coupling Links

**STP over Coupling Links
including InfiniBand**

**FICON Express4 Performance
Improvement**

New Family of OSA-Express3

HiperSockets Layer 2 Support

**Enhanced CPACF with SHA 512,
AES 192 and 256-bit keys**

**CBU & On/Off CoD Increased
Functionality and Flexibility**

Scheduled Outage Reduction

Improved RAS

Power Monitoring Support

No support for Japanese Compatibility Mode (JCM)
No support for MVS™ Assist instructions

z10 BC and EC GA 2 – Functions and Features Overview

Plan Ahead memory

**Capacity Provisioning
Enhancements – Capacity
Tokens**

**Run production workload with
CBU test. T & Cs apply**

**LPAR Dynamic PU
reassignment**

Change weights of LPARs

CPU Measurement Facility

HMC Console Messenger

**HMC and z/VM System
Management**



NTP Server on HMC

CFCC Level 16

STP Enhancements

PSIFB replacement for ISC-3

**High Performance FICON for
System z**

**Crypto TKE 5.3
Enhancements**

z/VM Image Mode

**OSA QDIO Connection
Isolation**

If it's "mainframe-like" it's not a "Mainframe"

z10 BC Overview



- **Machine Type**
 - 2098
- **Single Model – E10**
 - Single frame, air cooled
 - Non-raised floor option available
- **Processor Units (PUs)**
 - 12 PU cores
 - 2 SAPs, standard
 - **Zero spares when all PU cores characterized**
 - Up to 10 PU cores available for characterization
 - Central Processors (CPs), Integrated Facility for Linux (IFLs), Internal Coupling Facility (ICFs), System z10 Application Assist Processors (zAAPs), System z10 Integrated Information Processor (zIIP), optional - additional System Assist Processors (SAPs)
- **Memory**
 - System Minimum of 4 GB
 - Up to 128 GB for System, including HSA (up to 256 GB, June 30, 2009)
 - 8 GB Fixed HSA, standard
 - Up to 120 GB for customer use (**up to 248 GB, June 30, 2009**)
 - 4, 8 and 32 GB increments (**32 GB increment, June 30, 2009**)
- **I/O**
 - Up to 12 I/O Interconnects per System @ 6 GBps each
 - 2 Logical Channel Subsystems (LCSSs)
 - Fiber Quick Connect for ESCON and FICON LX
 - **New OSA-Express3 Features**
 - ETR Standard

z10 BC – Under the covers Front View

Power Supplies

Internal Battery (optional)

CPC (SCMs, Memory, MBA, HCA and FSP) Drawer

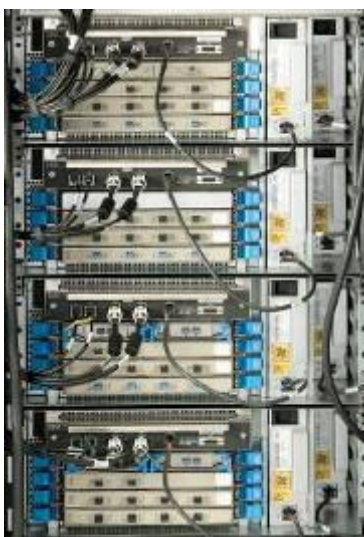
2 x Support Elements

I/O Drawer #3

I/O Drawer #2

I/O Drawer #1

I/O Drawer #4



4 x I/O Drawers

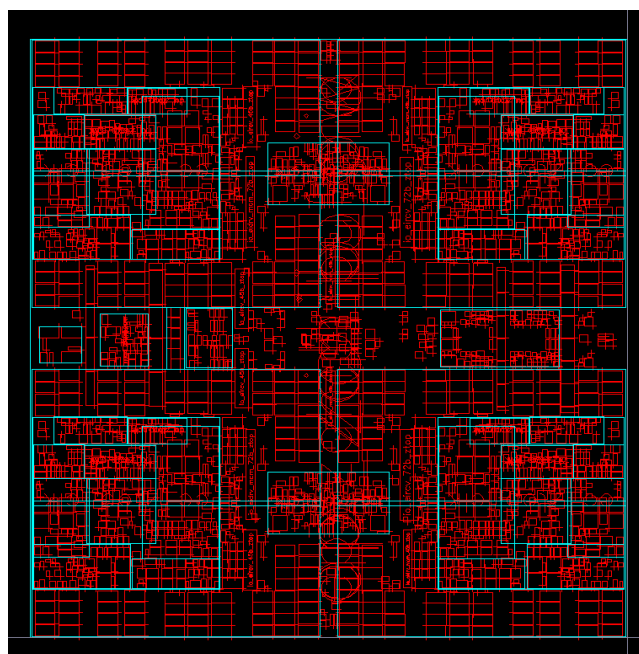
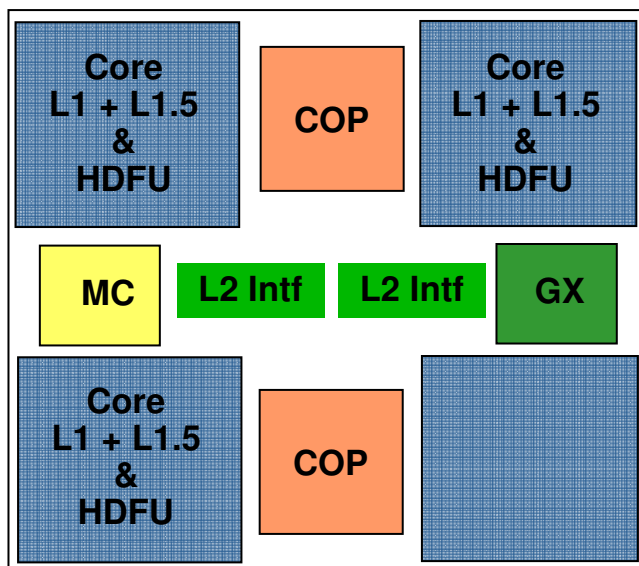


Fiber Quick Connect (FQC) Feature (optional – not shown)



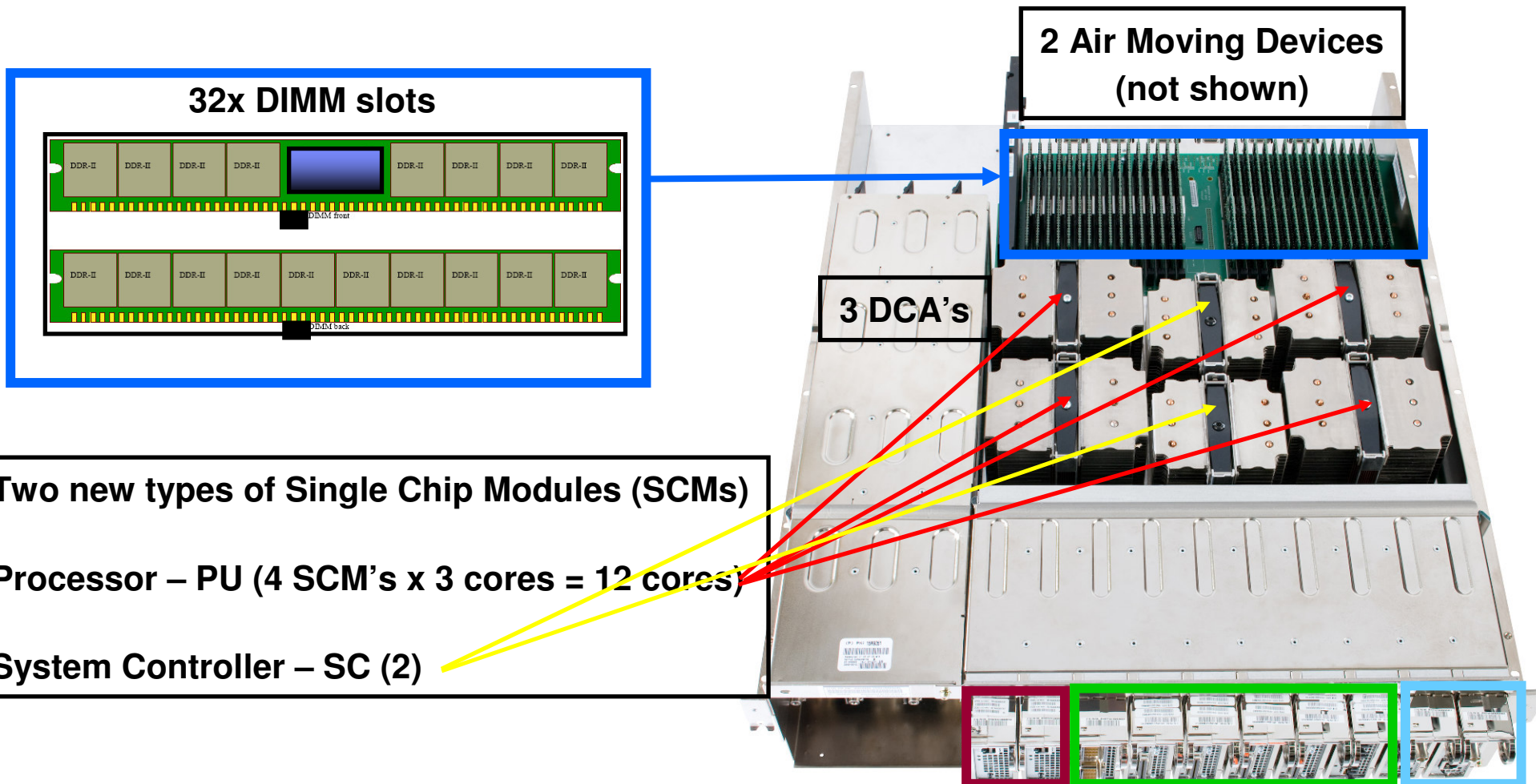
IBM System z10 BC Processor and Memory Structure

z10 BC – Enterprise Quad Core z10 PU Chip



- **Three active cores per PU**
 - 3.5 GHz
 - 0.286 ns cycle time
 - L1 cache/PU core
 - 64 KB I-cache
 - 128 KB D-cache
 - 3 MB L1.5 cache/PU core
 - Each core with its own Hardware Decimal Floating Point Unit (HDFU)
- **Two Co-processors (COP)**
 - Accelerator engines
 - Data compression
 - Cryptographic functions
 - Includes 16 KB cache
 - Shared by two cores
- **L2 Cache interface**
 - Shared by all cores
 - Even/odd line (256B) split
- **I/O Bus Controller (GX)**
 - Interface to fanout
 - Compatible with System z9 MBA
- **Memory Controller (MC)**
 - Interface to controller on memory DIMMs

z10 BC CPC and Memory Drawer Layout



- Two new types of Single Chip Modules (SCMs)
- Processor – PU (4 SCM's x 3 cores = 12 cores)
- System Controller – SC (2)

2 Flexible Support Processor (FSP) card slots providing support for the Service Network subsystem (hot swappable)

6 fanout card slots providing support for the I/O subsystem and/or coupling

2 card slots for the oscillator/ETR function (standard) – dynamic switchover support

z10 BC SCM Vs z10 EC MCM Comparison

z10 BC SCMs

- **PU SCM**
 - 50mm x 50mm in size – fully assembled
 - Quad core chip with 3 active cores
 - 4 PU SCMs per System with total of 12 cores
 - PU Chip size 21.97 mm x 21.17 mm
- **SC SCM**
 - 61mm x 61mm in size – fully assembled
 - 2 SC SCMs per System
 - 24 MB L2 cache per chip
 - SC Chip size 21.11 mm x 21.71 mm

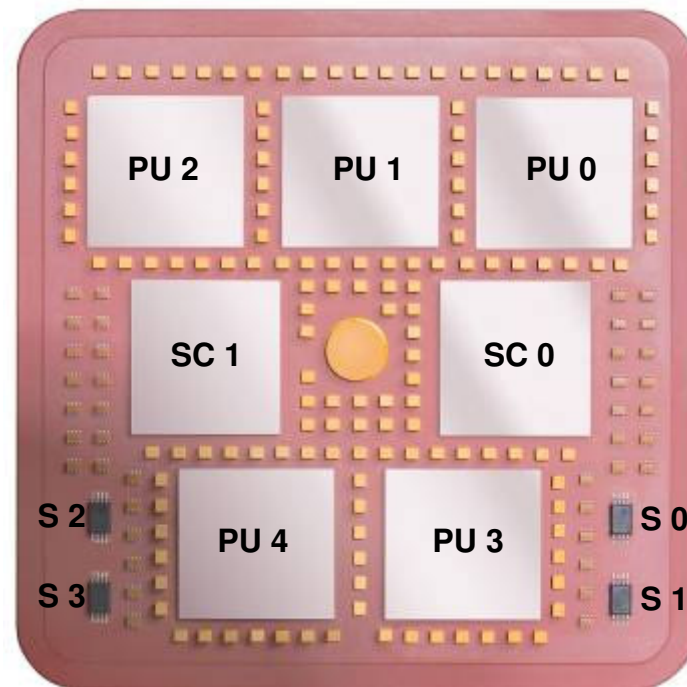
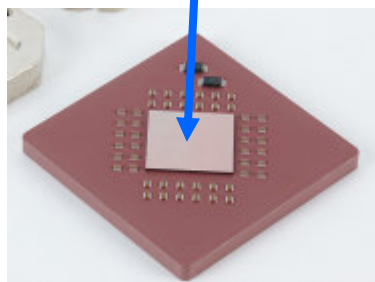
z10 EC MCM

- **MCM**
 - 96mm x 96mm in size
 - 5 PU chips per MCM
 - Quad core chips with 3 or 4 active cores
 - PU Chip size 21.97 mm x 21.17 mm
 - 2 SC chips per MCM
 - 24 MB L2 cache per chip
 - SC Chip size 21.11 mm x 21.71 mm
 - Up to 4 MCMs for System

**Single PU Chip
without heatsink**



**Single SC Chip
without heatsink**



z10 BC – Granularity and scalability

Z01	Z02	Z03	Z04	Z05
Y01	Y02	Y03	Y04	Y05
X01	X02	X03	X04	X05
W01	W02	W03	W04	W05
V01	V02	V03	V04	V05
U01	U02	U03	U04	U05
T01	T02	T03	T04	T05
S01	S02	S03	S04	S05
R01	R02	R03	R04	R05
Q01	Q02	Q03	Q04	Q05
P01	P02	P03	P04	P05
O01	O02	O03	O04	O05
N01	N02	N03	N04	N05
M01	M02	M03	M04	M05
L01	L02	L03	L04	L05
K01	K02	K03	K04	K05
J01	J02	J03	J04	J05
I01	I02	I03	I04	I05
H01	H02	H03	H04	H05
G01	G02	G03	G04	G05
F01	F02	F03	F04	F05
E01	E02	E03	E04	E05
D01	D02	D03	D04	D05
C01	C02	C03	C04	C05
B01	B02	B03	B04	B05
A01	A02	A03	A04	A05
1-way	2-way	3-way	4-way	5-way

z10 BC Model E10

- Granularity designed for flexibility and growth
 - Up to 130 Capacity Settings
- Any to any capacity upgradeability within the Hardware Model
- CBU capability from smallest to largest capacities
 - For CPs
 - All Specialty Engines and SAPs (always full capacity)
- Increased number of Specialty Engines
- Linux and CF only servers
- Capacity Indicator A00 is for systems with IFL(s) or ICF(s) only
 - Additional options for CBU i.e. CBU from A01 to Z05

Specialty Engine	Specialty Engine	Specialty Engine	Specialty Engine	Specialty Engine	Specialty Engine	Specialty Engine	Specialty Engine	Specialty Engine	Specialty Engine
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z10 BC Model Structure

- **Single Model E10, Machine Type – 2098**
- **Model number indicates PUs available for characterization**
 - Single serial number
 - PU characterization is identified by number of features ordered
- **Two System Assist Processors (SAPs) per System**
- **z10 BC Capacity Indicators**
 - nxx, where n = subcapacity engine size and xx = number of CPs
 - Total 130 Capacity Indicators
 - A00 for systems with IFL(s) or ICF(s) only. For z9 BC it was Z00.
- **Memory DIMM sizes: 2 GB, 4 GB and 8 GB**
 - Maximum physical memory: 128 GB per System (256 GB, June 30, 2006)
 - Minimum physical installed = 16 GB of which 8 GB is for Fixed HSA
 - For 8 to 32, 4GB increments, from 32 to 120, 8 GB increment, from 120-248, 32 GB increments

Models	PU SCMs	PUs for Customer	Max Available Subcapacity CPs	Standard SAPs	Standard Spares	CP/IFL/ICF/zAAP/zIIP**	Max Customer Memory	Max Channels
E10	4	10	5	2	0	5/10/10/5/5	248 GB***	480 *

Notes:

* Max is for ESCON channels.

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

*** Initially 120 GB. 248 GB available June 30, 2009

z10 BC Plan Ahead Memory

- **Provides the ability to plan for non-disruptive memory upgrades**
 - Memory cards are pre-installed based on planned target capacity
- **Pre-installed memory is activated by installing a new LICCC**
 - Orderable via Resource Link by the customer (CIU upgrade)
 - Orderable as an ordinary MES by IBM
 - **Memory upgrade orders use the pre-installed memory first**
- **Pre-planned memory install**
 - FC 1991 - Charged when physical memory is installed used to track the quantity of physical increments of plan ahead memory capacity
 - **Cost part pre-paid**
 - **Increment size of 4 GB (based on minimum memory purchase increment)**
- **Pre-planned memory activation**
 - **FC 1992 - Charged when Plan Ahead Memory is enabled based on the amount of Plan Ahead memory that is being activated**
 - **Remaining cost paid at time of activation**
 - Subsequent memory upgrade orders will use up the Plan Ahead memory first
- **Plan Ahead Memory is NOT temporary CoD or CBU memory (Removing memory is disruptive)**

IBM System z10 BC Capacity and Performance

z10 LSPR Measurements – what's changing?

LSPR update with z/OS 1.9

▪ **Multi-Image LSPR table**

- z/OS-1.9 Multi-Image table is new (includes all System z families)
- z/OS-1.8 Multi-Image table remains (does not include z10 BC)

▪ **Single-Image LSPR table**

- All System z families are included
- Capacity data for up to maximum of 64 CPs

Note: A new zPCR workload mix, **DI-Mix** (Data Intensive) has been added to complement the suggested workload mixes already carried in zPCR. This mix is intended to represent situations where the production workload qualifies for LoIO-Mix, but has data intensive characteristics resulting from significant exploitation of Data-in-Memory techniques.

▪ **Capacity planning tools affected**

- zPCR
- zCP3000
- BWATOOL
- zPSG
- zTPM

▪ **z10 processor capacity for z/OS is represented with HiperDispatch turned on**

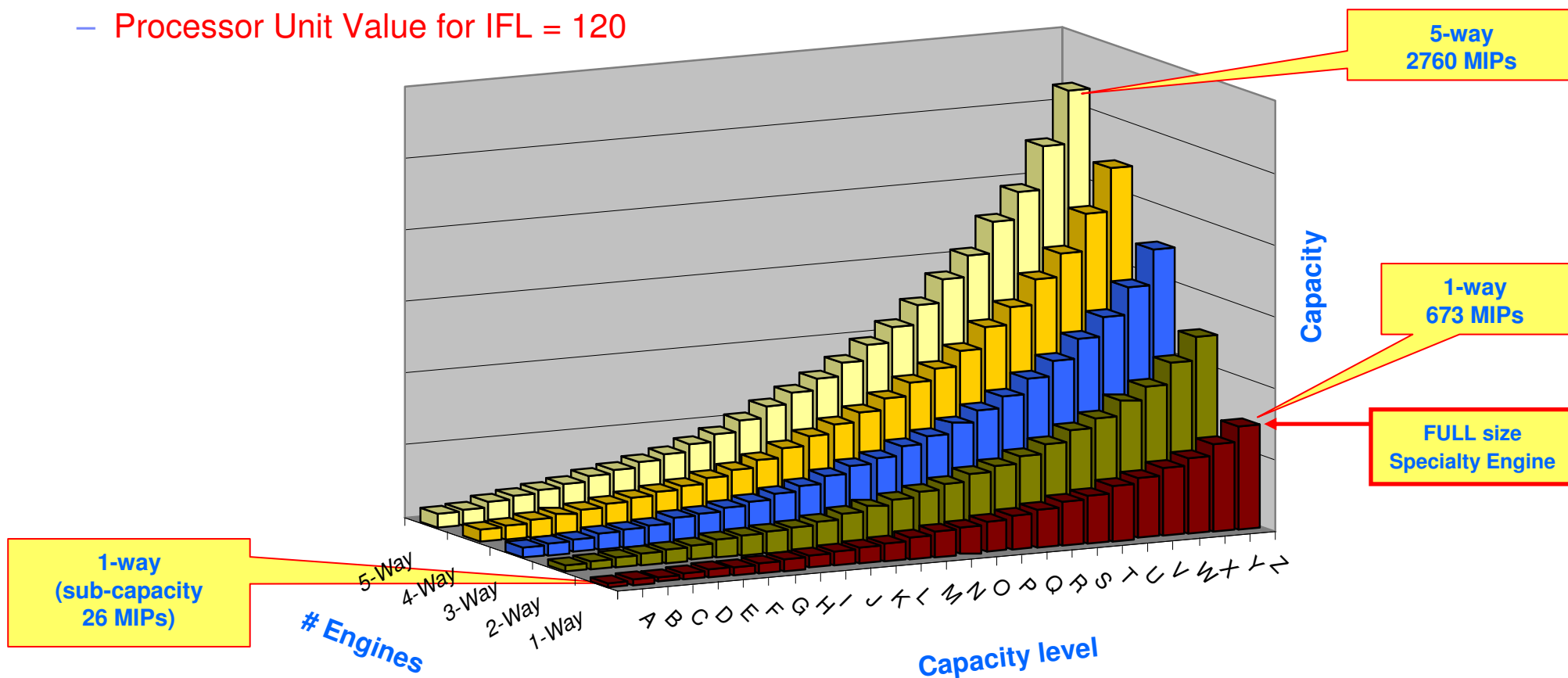
DI-Mix Workload: A Special Case

- **When workloads have low DASD I/O rates per consumed MSU (qualify for LoIO-Mix)**
 - Extensive use of various DIM (Data-in-Memory) techniques have been employed
 - Higher task switching rates and poorer HSB hit ratios are happening
- **Generally provides a more conservative capacity expectation for a z10 upgrade**
- **Currently, there is no scientific way to determine when DI-Mix should be used in lieu of LoIO-Mix or any other mix**
- **Model the current and planned scenarios both ways**
- **In cases where DI-Mix results for the planned processor show a lower capacity expectation relative to the current processor, that result must be considered as possibly the ultimate capacity that will be realized**
- **When planning for migration to IBM System z10 EC processor models, consideration of DI-Mix is particularly important (not necessarily limited to the z10)**

z10 BC Sub-capacity Processor Granularity

- The z10 BC has 26 CP capacity levels (26 x 5 = 130)
 - Up to 5 CPs at any capacity level
 - All CPs must be the same capacity level
- The one for one entitlement to purchase one zAAP and/or one zIIP for each CP purchased is the same for CPs of any speed.
 - All specialty engines run at full speed
 - Processor Unit Value for IFL = 120

Number of z10 BC CPs	Base Ratio	Ratio z9BC to z10BC
1 CP	z9 BC Z01	1.40
2 CPs	z9 BC Z02	1.36
3 CPs	z9 BC Z03	1.30
4 CPs	z9 BC Z04	1.28
5 CPs	Z9 BC Z04	1.54



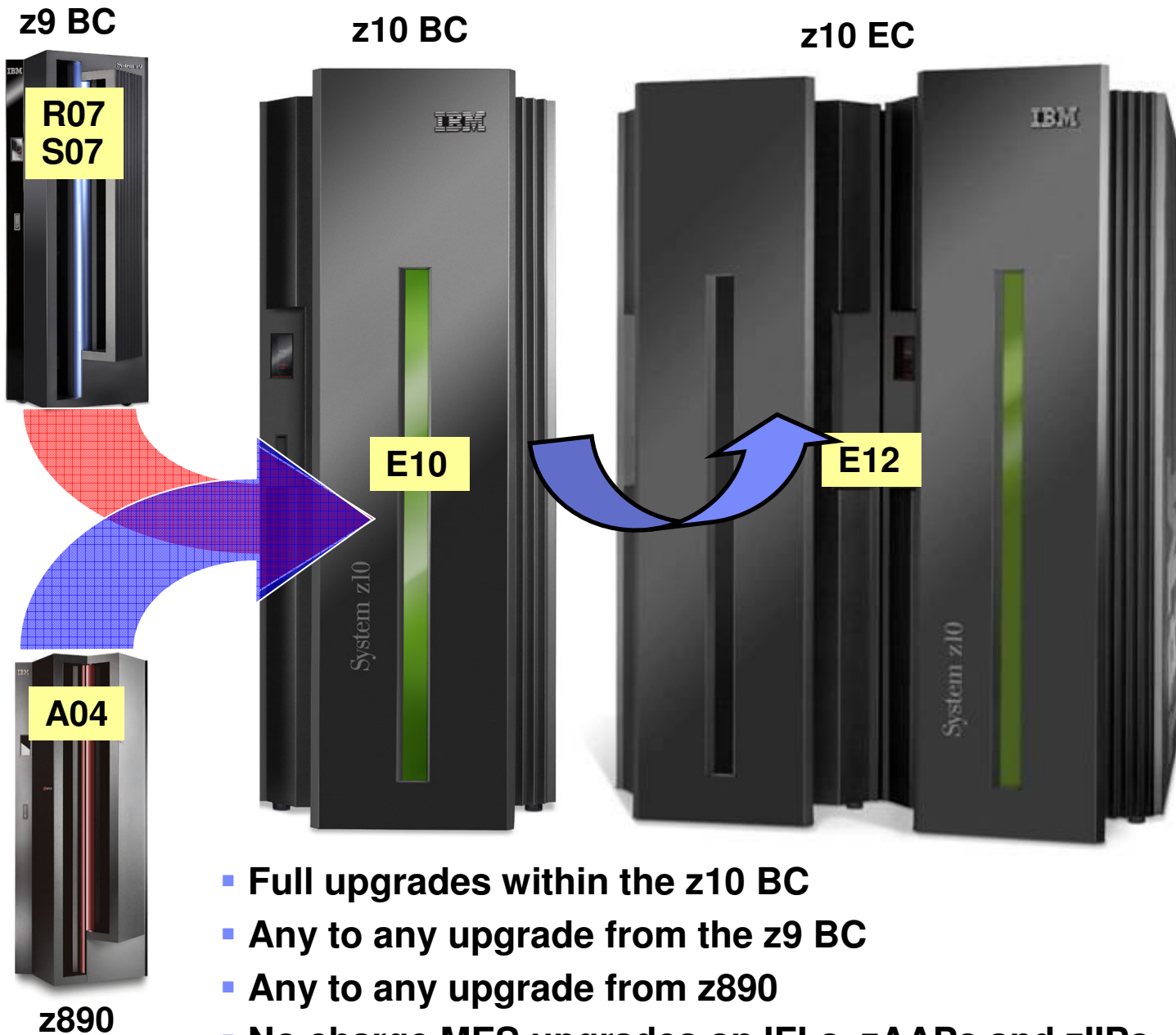
z10 BC Configuration Comparisons

	z9 BC R07	z9 BC S07	z10 BC E10	z10 EC E12
Uniprocessor Performance	470 MIPS		673 MIPS	920 MIPS
System Capacity	26-172 MIPS	193-1748 MIPS	26-2760 MIPS	218-8225 MIPS
System Memory (with HSA)	Up to 64 GB	Up to 64 GB	Up to 256 GB (06/09)	Up to 384 GB
Configurable Engines	7	7	10	12
Configurable CPs	1-3	0-4	0-5	0-12
LPARS/LCSS	15/1	30/2	30/2	60/4
HiperSockets	16		16	16
I/O Cages/Drawers	1	1	Up to 4	Up to 3
I/O slots per Cage/Drawers	16	28	8	28
FICON Channels	64	112	128	256
OSA Ports (10GbE/1GbE)	16/32	24/48	48/96	48/96
ESCON Channels	240	420	480	960
STI (z9), IFB (z10) Bandwidth	2.7 GB/sec		6.0 GB/sec	6.0 GB/sec
ICB-4/ISC-3/12x/1xPSIFB	16/48/12 for CF Only Model/0		12/48/12/12	16/48/16/16
zIIP/zAAP Maximum Qty	3	3	5	6
Capacity Settings	20	53	130	48
Upgradeable	Upgrade to z9 S07 and z10 BC	Upgrade to z9 EC & z10 BC	Upgrade to z10 EC, Model E12	Upgrade to z10 EC Models E26, E40, E56 and E64

IBM System z10 BC Upgrades

z10 BC Upgrade Paths

- Can enable dynamic and flexible capacity growth for mainframe servers
- Temporary capacity upgrade available through On/Off Capacity on Demand
- Temporary, nondisruptive addition of CP processors, IFLs, ICFs, zAAPs or zIIPs
- New options for reconfiguring specialty engines if the business demands it
- New options for changing On/Off CoD configurations
- Subcapacity CBU engines



- Full upgrades within the z10 BC
- Any to any upgrade from the z9 BC
- Any to any upgrade from z890
- No charge MES upgrades on IFLs, zAAPs and zIIPs

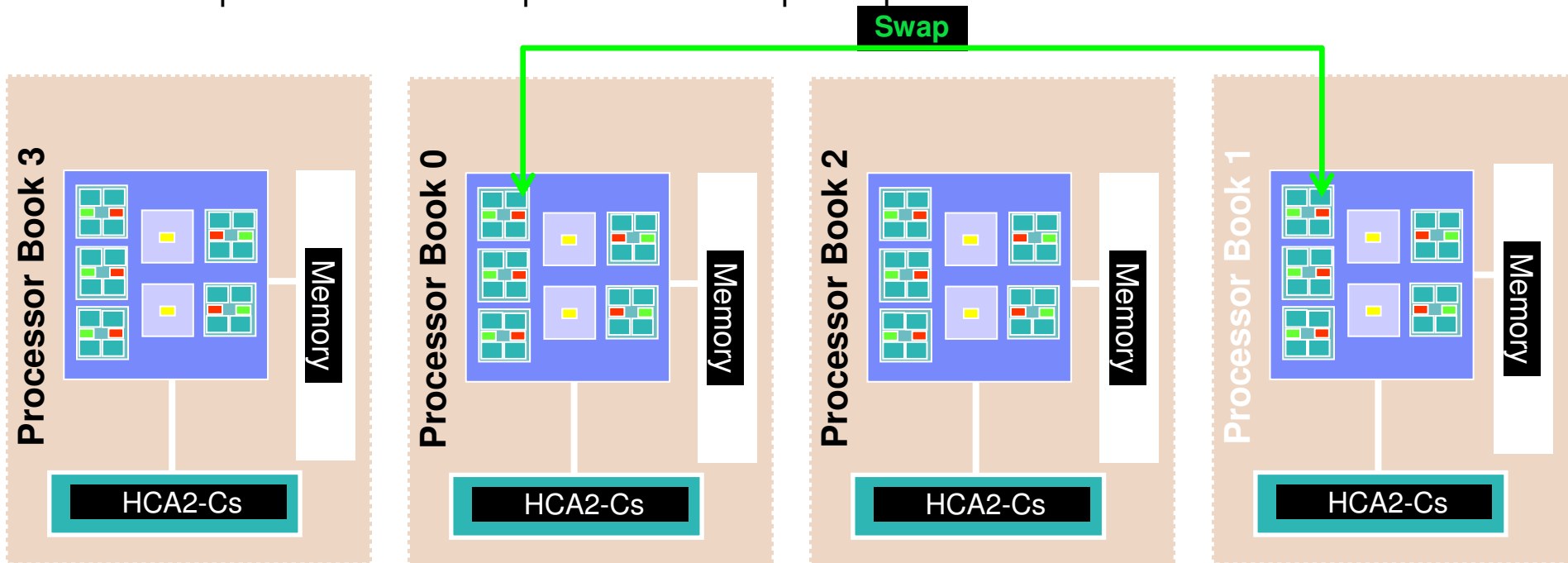
IBM System z10 HiperDispatch and LPAR Dynamic PU reassignment

z10 HiperDispatch

- **HiperDispatch – z10 unique function**
 - Dispatcher Affinity (DA) - New z/OS Dispatcher
 - Vertical CPU Management (VCM) - New PR/SM™ Support
- **Mitigate impact of scaling differences between processor and memory**
 - Access to memory and remote caches not scaling with processor speed
 - Increased performance sensitivity to cache misses in multi-processor system
- **Optimize performance by redispersing units of work to same processor group**
 - Keep processes running near their cached instructions and data
 - Minimize transfers of data ownership among processors / books
- **Tight collaboration across entire z10 hardware/firmware/OS stack**
 - Concentrate logical processors around shared L2 caches
 - The z10 BC with its single drawer and L2 will get minimal benefit, if any, from HiperDispatch
 - Communicate effective cache topology for partition to OS
 - Dynamically optimize allocation of logical processors and units of work

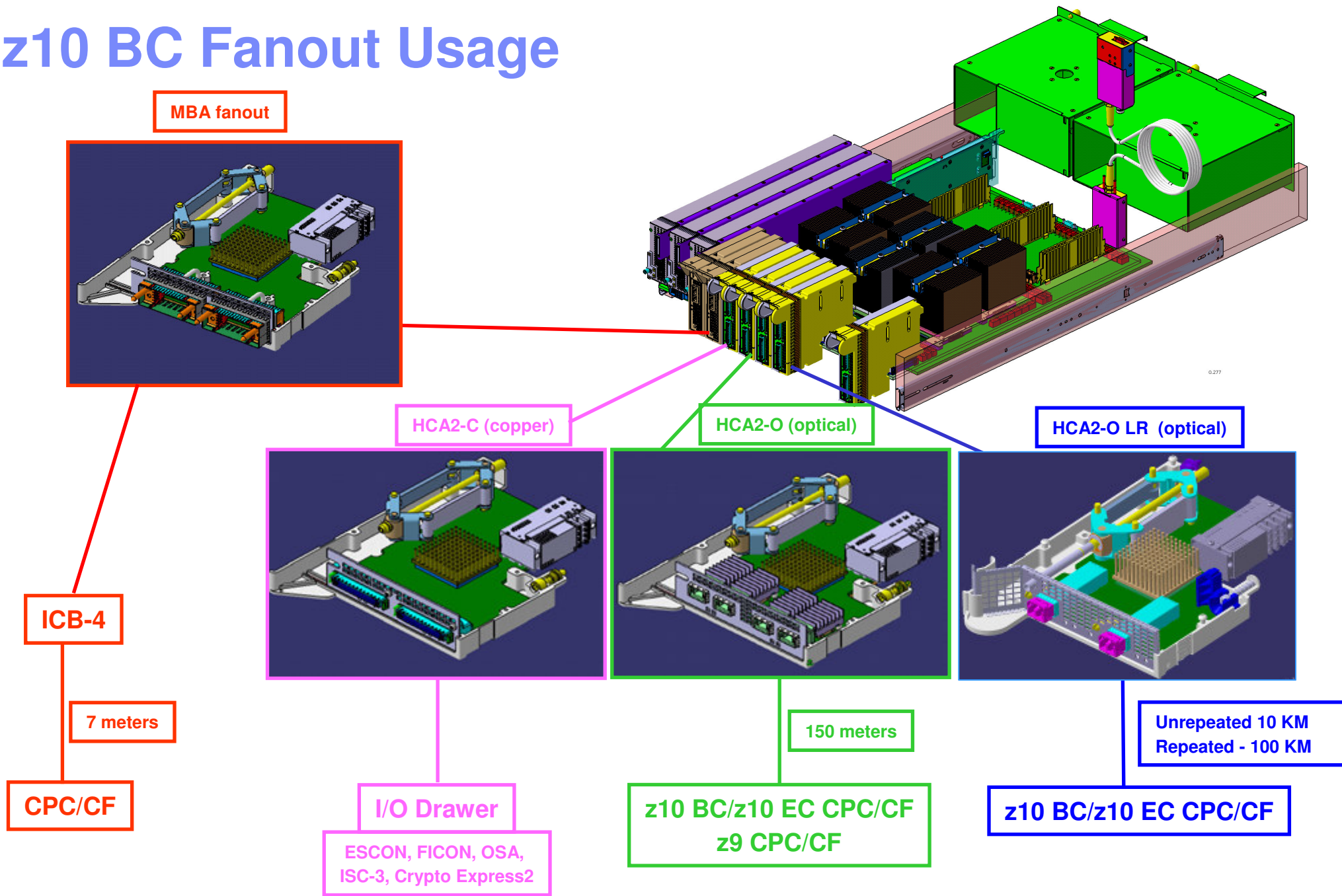
z10 EC LPAR Dynamic PU Reassignment

- PR/SM dynamic relocation of running processors to different processor cores
- Designed to optimize physical processor location for the current LPAR logical processor configuration
- Swap an active PU with a different active PU in a different book
 - Designed Benefit: Better L2 cache reuse
 - CP, zAAP, zIIP, IFL and ICF supported
 - Triggers: Partition activation/deactivation, machine upgrades/downgrades, logical processors on/off
- Designed to provide the most benefit for:
 - Multiple book machines
 - Dedicated partitions and wide partitions with HiperDispatch active



IBM System z10 BC I/O Structure

z10 BC Fanout Usage



IBM System z10 BC I/O Connectivity FICON, OSA, ESCON and Coupling Links

z10 BC Channel Type and Crypto Overview

▪ FICON/FCP

- FICON Express4
- FICON Express2 (carry forward on upgrade)
- FICON Express (carry forward on upgrade for FCV)

▪ Networking

- OSA-Express3
 - 10 Gigabit Ethernet LR and SR
 - Gigabit Ethernet LX and SX
 - 1000BASE-T Ethernet
- OSA-Express2
 - 10 Gigabit Ethernet LR (carry forward on upgrade)
 - Gigabit Ethernet LX and SX (limited availability or carry forward on upgrade)
 - 1000BASE-T Ethernet (limited availability or carry forward on upgrade)
- HiperSockets (Define only)

▪ ESCON

▪ STP

Note: ICB-4 cables are available as features. All other cables are sourced separately

▪ Coupling Links

- InfiniBand Coupling Links
 - 12x IB-SDR, 12x IB-DDR
 - 1x IB-SDR, 1x IB-DDR
- ISC-3 (Peer mode only)
- ICB-4 (except z10 EC E64 and z10 BC E10 with non-raised floor feature)
- IC (Define only)

▪ Crypto

- Crypto Express2
 - Configurable Coprocessor or Accelerator

▪ Channel types not supported:

- FICON (pre-FICON Express)
- OSA-Express
- ICB-2
- ICB-3
- ISC-3 Links in Compatibility Mode
- PCIXCC and PCICA
- Parallel (use ESCON Converter)

z10 BC FICON Express4-2C

■ FICON Enhancements

- High Performance FICON for System z (zHPF) for FICON Express4
- Improved performance at extended distance for FICON Express4 (and FICON Express2) features

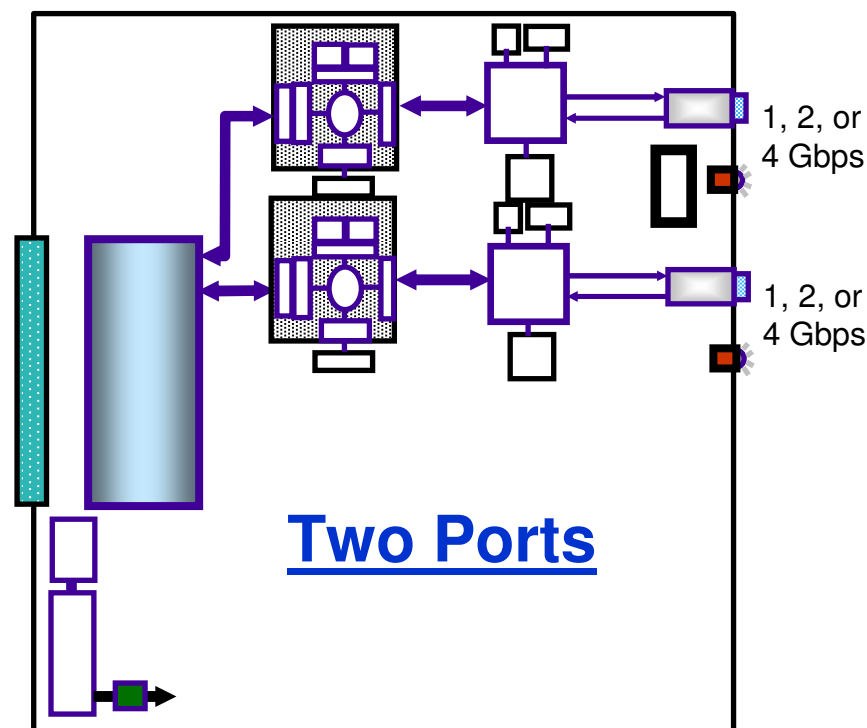
■ FICON Express4 2 Channels supports:

- 4 Gbps with Auto-negotiate capability (1, 2, or 4 Gbps)
- Can be shared among LPARs, and defined as spanned
- Small Form Factor Pluggable (SFP) optics for Service / Repair
 - Concurrent repair/replace action for each SFP
- CHPID types FC and FCP

■ Ordering

- One feature = two port increment
- Intermix is not supported on a single card
- Both ports must be SX or LX
- 2 port card can not be 'upgraded' to a 4 port card
 - it's a physical card replacement

- **z10 BC FC 3318 and FC 3323 (2 ports) is NOT available on z10 EC and cannot be carried forward from z10 BC to z10 EC**



FC 3318 FICON Express4-2C SX
FC 3323 FICON Express4-2C LX

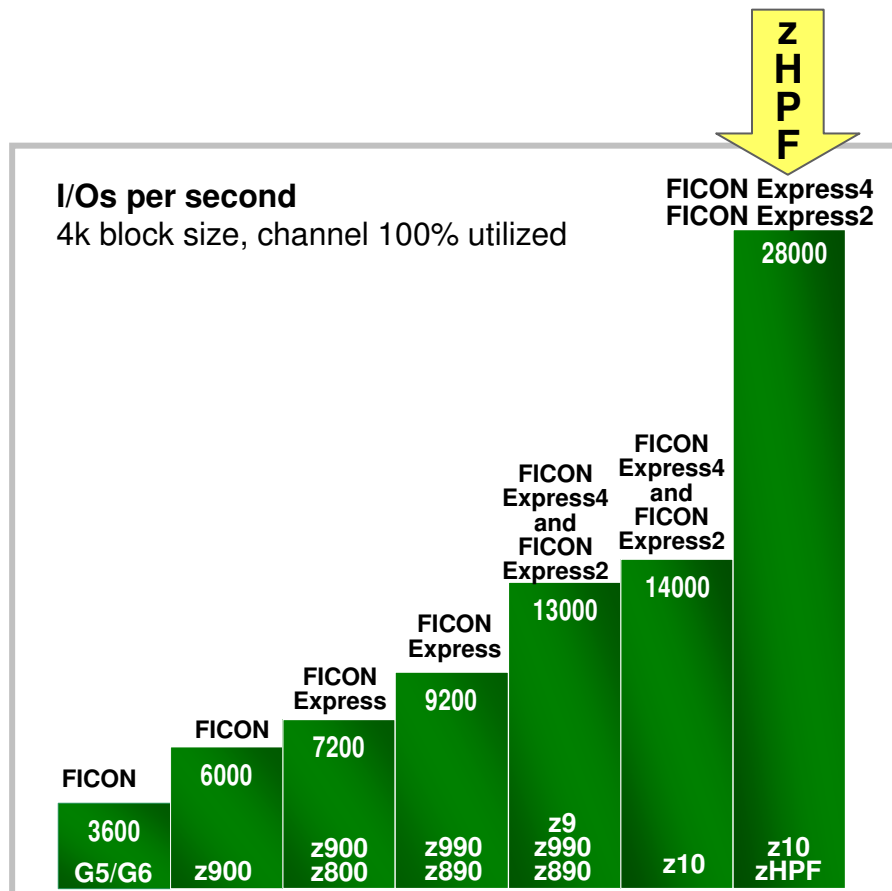
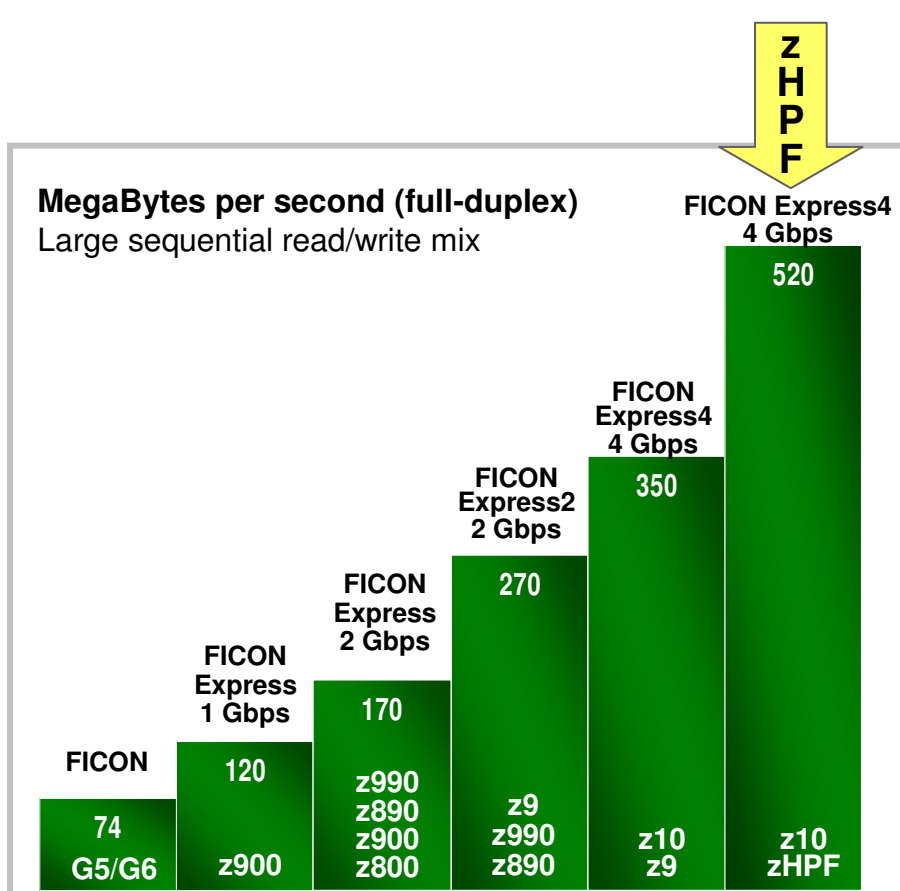
z10 High Performance FICON for System z (zHPF)

- **FICON architecture for protocol simplification and efficiency, reducing the number of Information Units (IUs) processed. When exploited by the FICON channel, the z/OS operating system, and the control unit, FICON channel overhead is reduced and performance improved**
 - Packages a series of commands in a single packet that looks like an SCSI CDB
 - Allows streaming of data for multiple commands in a single data transfer
- **The maximum number of I/Os per second is designed to be improved up to 100%* for small block sizes data transfers that can exploit the zHPF protocol**
- **Requires control unit feature code for exploitation**
 - Feature is 'High Performance FICON'
 - Requires a priced license feature and a monthly maintenance charge
 - IBM System Storage DS8000 family – Release 4.1 (LMC level 5.4.1.xx (bundle version 64.1.x.x), or later.)
- **Applicable to all FICON Express4 and Express2 features CHPID type FC**
 - Implemented in System z10 Licensed Internal Code
 - An FC channel can support multiple CUs using both older FICON protocol and zHPF protocol at the same time. Control unit capability is determined automatically
 - zHPF protocols will not be used unless all the CHPIDs and control unit ports for the device support the new protocols
- **Exclusive to System z10**
- **Supported by z/OS 1.8 and higher releases with PTF**

***Note: Some complex channel programs can not be converted to zHPF protocol**

z10 High Performance FICON for System z (zHPF)

- **Optimization of storage area network (SAN) traffic using zHPF to improve performance**
 - Maximum number of I/Os per second can be increased by up to 100%*
 - For OLTP workloads (DB2, VSAM, PDSE, and zFS) that transfer small blocks of fixed size data (4K blocks)
- **Exclusive to System z10 – FICON Express4 and FICON Express2**
- **Requires**
 - Control unit exploitation – IBM DS8000 Release 4.1
 - z/OS V1.7 with the IBM Lifecycle Extension for z/OS V1.7 (5637-A01), V1.8, V1.9, or V1.10 with PTFs



* Some complex channel programs can not be converted to zHPF protocol

z10 FICON – Name Server Registration

- **The FICON channel now provides the same information to the fabric as is commonly provided by open systems, registering with the name server in the attached FICON directors**
 - Enables quick and efficient management of storage area network (SAN) and perform problem determination and analysis.
- **Platform registration is a standard service defined in the Fibre Channel - Generic Services 3 (FC-GS-3) standard (INCITS (ANSI) T11.3 group)**
 - It allows a platform (storage subsystem, host, etc.) to register information about itself with the fabric (directors).
- **Applicable to all FICON Express4, FICON Express2, and FICON Express features - CHPID type FC**
- **Exclusive to System z10**
- **Transparent to operating systems**

z10 OSA-Express3

- **Double density of ports compared to OSA-Express2**
 - Reduced CHPIDs to manage
 - Reduced I/O slots
 - Reduced I/O cages or I/O drawers
 - Up to 96 LAN ports versus 48
- **Designed to reduce the minimum round-trip networking time between z10 BC & z10 EC systems (reduced latency)**
 - Designed to improve round trip at the TCP/IP application layer
 - OSA-Express3 10 GbE
 - **45%** improvement compared to the OSA-Express2 10 GbE
 - OSA-Express3 GbE
 - **45%** improvement compared to the OSA-Express2 GbE
 - Designed to improve throughput (mixed inbound/outbound)
 - OSA-Express3 10 GbE
 - 1.0 GBytes/ps @ 1492 MTU
 - 1.1 GBytes/ps @ 8992 MTU
 - 3-4 times the throughput of OSA-Express2 10 GbE
 - 0.90 of Ethernet line speed sending outbound 1506-byte frames
 - 1.25 of Ethernet line speed sending outbound 4048-byte frames

The above statements are based on OSA-Express3 performance measurements performed in a test environment on a System z10 EC and do not represent actual field measurements. Results may vary.

z10 Coupling Link Options

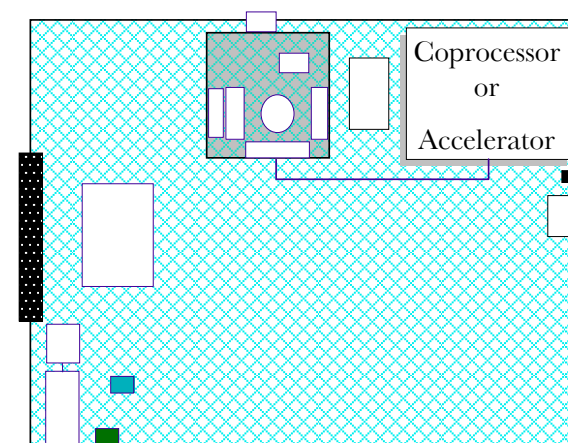
- **PSIFB - 12x IB-DDR for high speed communication at medium distance**
 - New CHPID – CIB (Coupling using InfiniBand)
 - New 50 micron OM3 (2000 MHz-km) multimode fiber with MPO connectors
 - Up to 150m
- **PSIFB – 1x IB-SDR or 1x IB-DDR**
 - Unrepeated distanced up to 10 km
 - Repeated distances at up to 100 km when attached to a Dense Wavelength Division Multiplexer (DWDM) qualified by System z10
 - Speed may be auto-negotiated if the attached DWDM is capable of operating at SDR or DDR
 - Supports SDR at 2.5 Gbps when connected to a DWDM capable of SDR speed
 - Supports DDR at 5 Gbps when connected to a DWDM capable of DDR speed
 - 9 micron single mode fiber optic cables with LC Duplex connectors.
- **ICB-4 for short distances over copper cabling**
 - New ICB-4 cables are required
 - z10 to z10 and z10 to System z9/z990/z890
 - 10 meter distance remains
 - ICB-4 for non-raised floor z10 BC not supported (non-raised z9 BC with ICB-4 will not connect to z10 BC)
 - ICB-4s not supported on z10 EC Model E64 or on a non-raised floor z10 BC
- **ISC-3 for extended distance over fiber optic cabling**
 - No change to current cabling
- **Internal Coupling channels (IC)**

Note: The InfiniBand link data rates of 6 GBps, 3 GBps, 2.5 Gbps, or 5 Gbps do not represent the performance of the link. The actual performance is dependent upon many factors including latency through the adapters, cable lengths, and the type of workload. With InfiniBand coupling links, while the link data rate may be higher than that of ICB (12x IB-SDR or 12x IB-DDR) or ISC-3 (1x IB-SDR or 1x IB-DDR), the service times of coupling operations are greater, and the actual throughput may be less than with ICB links or ISC-3 links.

IBM System z10 Cryptography

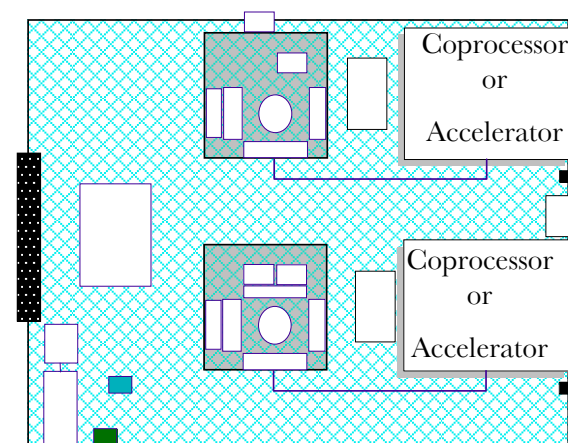
z10 Cryptographic Support

- **CP Assist for Cryptographic Function (CPACF)**
 - Standard on every CP and IFL
 - **Supports the following algorithms:**
 - DES, TDES, AES-128, AES-192, AES-256
 - SHA-1, SHA-224, SHA-256, SHA 384 & SHA 512
 - Pseudo random Number Generation (PRNG)
 - SHA-1, SHA-256, and SHA-512 are shipped enabled
 - UP to 4096-bit RSA keys
 - Random Number Generation Long (8 bytes to 8096 bits)
- **Crypto Express2**
 - Two features – 1 (z10 BC only) and 2 Coprocessor option (minimum of 2 features)
 - Two configuration modes
 - Coprocessor (default)
 - Federal Information Processing Standard (FIPS) 140-2 Level 4 certified
 - Accelerator (configured from the HMC)
 - Three configuration options (Two for 1 Coprocessor option)
 - Default set to Coprocessor
 - Concurrent Patch
 - Secure Key AES (128, 192 and 256 bit) support
 - Support for 13 through 19 Personal Account Numbers
- **Dynamic Add Crypto to LPAR**
 - No recycling of LPAR
 - No POR required
- **TKE LIC 5.3 and optional Smart Card Readers**



Crypto Express2-1P

z10 BC only



Crypto Express2

z10 BC and z10 EC

IBM System z10 BC Availability

z10 BC Enhancements designed to avoid Outages

- **Continued Focus on Firmware Quality**
- **Memory Subsystem Improvements**

- **DIMM FRU indicators**
- **Single Processor Core Checkstop**
- **Single Processor Core Sparing**
- **Redundant 100Mb Ethernet service network w/ VLAN**

NEW for z10 BC

- **Concurrent add/replaceable I/O drawer**

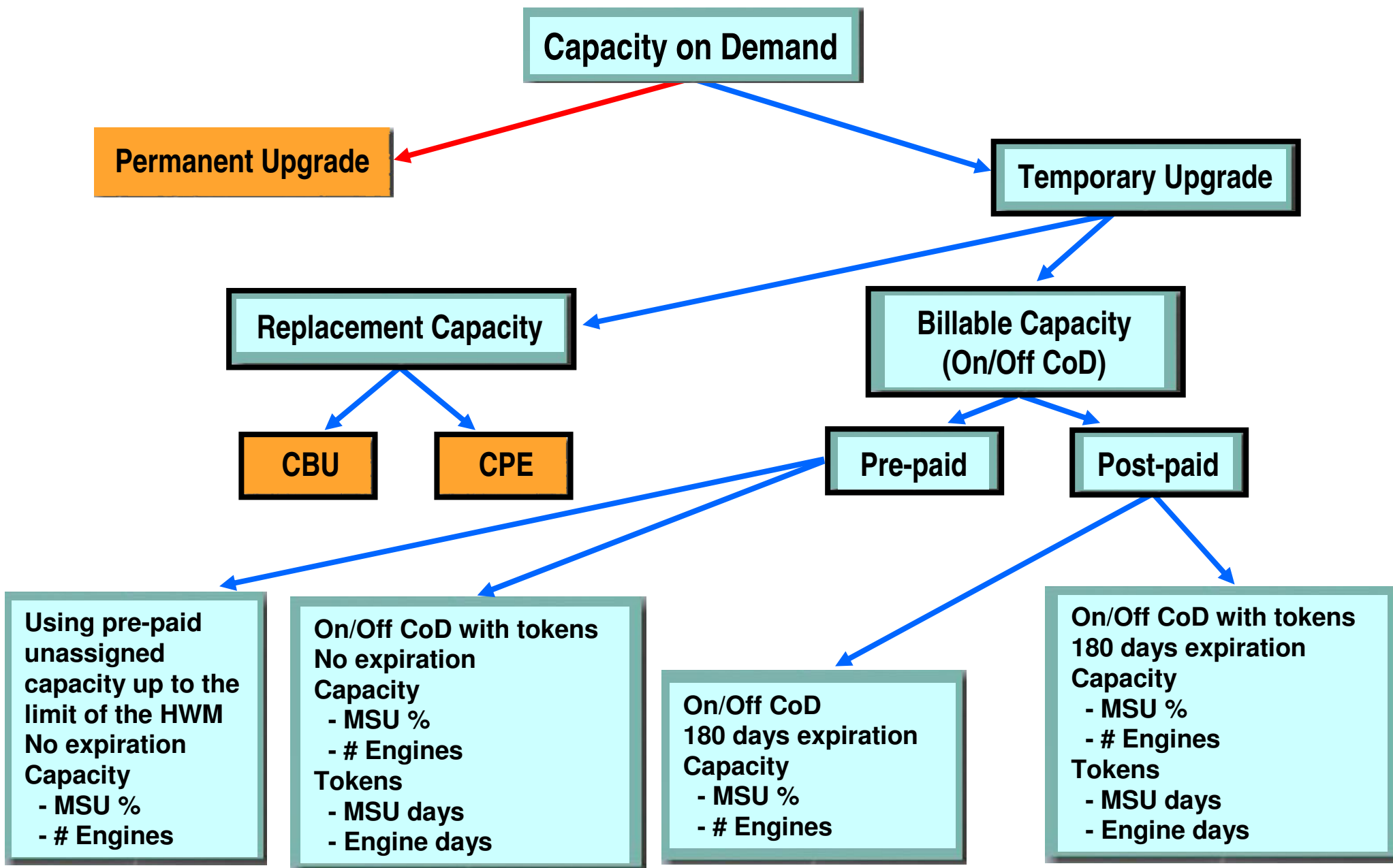
New for z10 EC and BC

- **Plan ahead memory**
- **Serviceability enhancements of SAN for both FICON and FCP**

- **Elimination of unnecessary CBU passwords**
- **Enhanced Driver Maintenance (EDM) Upgrades**
 - Multiple “from” sync point support
 - Improved control of channel LIC levels
- **Reduce Pre-planning to Avoid POR**
 - 8 GB for HSA
 - Dynamic I/O Enabled by Default
 - Add Logical Channel Subsystem (LCSS)
 - Change LCSS Subchannel Sets
 - Add/Delete Logical Partitions
- **Reduce Pre-Planning to Avoid LPAR Deactivate**
 - Change Partition Logical Processor Config
 - Change Partition Crypto Coprocessor Config
- **CoD – Flexible Activation/Deactivation**

IBM System z10 Capacity on Demand (CoD)

z10 – Basics of CoD



Capacity Tokens Overview

- **Pre-paid Offering**
 - Non-expiring
- **Post-paid Offering**
 - To set spending limits on the offering record expires after 180 days

Types of Tokens:

- **Specialty engines: IFL/ICF/zIIP/zAAP/SAP Day tokens**
 - The specialty engine tokens to be billed per day equal the highest activation level for this resource during the current 24 hour billing window period
 - Example: if five zAAPs were the max activation level during this window, at the end of the window five zAAP tokens will be subtracted
- **CP MSU Tokens**
 - CP 1 MSU Token is used per MSU day per 24 hour period
 - Example: 86 additional MSUs for 300 days (86x300=25,800 MSU tokens)
- **CBU Tokens**
 - Length of the CBU contact one to five years
 - Number of CBU tests remaining within the CBU record (MAX 15)

z10 – Running Production workload with CBU Test

- **Customers may now execute production workload during a CBU test provided:**
 - An amount of System z production workload Capacity equivalent to the CBU Upgrade is shut down or otherwise made unusable by the Customer for the duration test
 - The appropriate contracts are in place. All new CBU contract documents contain these new CBU Test terms
 - Existing CBU customers will need to execute IBM Customer Agreement Amendment for IBM System z Capacity Backup Upgrade Tests

IBM System z10 Sysplex

z10 CFCC Level 16

- **Designed to improve CF Duplexing performance**
 - System z10 exclusive
 - Requires two CFCC level 16 CFs
 - Ready to Commit (RTC) signal is now asynchronous to the transaction
 - CF to CF exchange without z/OS waiting for acknowledgement
 - Designed to enhance performance, especially in the GDPS environment
- **New command for list notifications**
 - WebSphere MW Shared Queue environment
 - CF notification improvements to avoid false schedules in IMS
 - Parallelize cleaning up the lock table.
- **Structure and CF Storage Sizing with CFCC level 16**
 - May increase storage requirements when moving from:
 - CF Level 15 (or below) to CF Level 16
- **CF Sizer Tool recommended**
 - <http://www.ibm.com/systems/z/cfsizer/>
- **OS requirements for z10 Servers with CFLEVEL 16**
 - z/OS 1.8 or higher plus PTF
(z/OS 1.7 with Lifecycle Extension, 5637-A01, plus PTF)
 - z/VM 5.2 or higher for guest virtual **coupling**
- **Migrating to new level of CFCC requires one to recycle the CF LPAR**

IBM System z NTP Client Support for Server Time Protocol Enhancements

Server Time Protocol (STP) Enhancements

- **Enhanced Accuracy to an External Time Source (ETS)**
 - Designed for 10 microseconds accuracy vs 100 milliseconds accuracy with dial out from HMC or NTP Client support
 - Utilizes highly stable, accurate pulse per second (PPS) output from NTP servers available from some vendors
 - Available on z10, and z9
 - Fulfills Statement of Direction made in October 2006
- **Continuous Availability of External Time Source (ETS)**
 - ETS configured for Backup Time Server (BTS) can be used for time adjustments to maintain ETS accuracy, if ETS configured for Preferred Time Server (PTS) not accessible
 - Applies to NTP server support with or without PPS
- **Enhanced STP recovery when Internal Battery Feature is in use**
 - Designed to enable PTS/CTS to reconfigure the BTS as the CTS if
 - Power outage of PTS/CTS
 - Power outage of site where PTS/CTS and Arbiter are located
- **STP configuration and time information saved across Power on Resets or power outages**
 - Does not require Initializing the time or reassigning PTS/CTS roles
 - “One server” configuration enhancement
 - Available on z10, z9, z990 and z890
- **NTP Server on Hardware Management Console**
 - NTP Client on Support Element (SE) can access NTP server using a secure LAN connection
- **API to automate STP CTN Reconfiguration**
 - Allows automation to reconfigure special roles of servers (PTS, BTS, Arbiter) after a recovery action
 - Maintains recovery capability in the event of a second failure

IBM System z10 HMC and SE Enhancements

What's new with the SE and HMC LIC Version 2.10.1

- **Capacity On Demand Updates**
- **Selective Channel Path Enhancements**
- **EDM - related Changes**
- **HMC Console Messenger**
- **Context-sensitive Helps**
- **STP Updates**
- **NTP Client/Server support on HMC**
- **CIM Management API Enhancements**
- **System I/O Configuration Analyzer (SIOA) on the SE/HMC**
- **Screen Capture**
- **Scheduled Operations for Change LPAR Weights**
- **Disruptive Actions Confirmation Enhancements**
- **TKE 5.3 Security Logging**
- **Network Analysis Tool for SE Communication (“Test Communications”)**
- **Managing Call Home Servers**
- **HMC z/VM Tower Systems Management Support for Defining Virtual Resources**
- **Support for installing zLinux from the HMC**

IBM System z10 Energy Management and Environmentals

z10 BC Physical planning

- **IMPP – GC28-6875**
- **One frame system**
 - Non-raised floor systems (available)
- **Height reduction (FC 9975) to 72”**
 - Accommodates door height restrictions
 - IBF batteries will come unplugged if height reduction is ordered
- **Air Cooled – No MRU**
- **Internal Battery Feature – IBF (FC 3210)**
 - Installed in pairs (top - front and back - one pair only)
 - No width reductions are required
 - Can be added later via MES
- **Power – Dual power cables – 3 phase or optional 1 phase**
 - 30Amp, 250V or 450V, Hubbell
 - Balanced Power feature required for > 3 I/O drawers
- **Power Sequence Control (PSC) – Optional FC 6501 installed as a pair**



z10 BC System Power

- **z10 BC maximum configuration calculated AC input power (Statistical Maximum)**
 - All systems should draw less power than this
 - Typical systems will draw less power than this

	1 I/O Drawer	2 I/O Drawers	3 I/O Drawers	4 I/O Drawers
normal room (<28 degC)	3.686 kW	4.542 kW	5.308 kW	6.253 kW
warm room (>=28 degC)	4.339 kW	5.315 kW	6.291 kW	7.266 kW

- **30 Amp plug capacity (208 VAC)**
 - 5.5 kW single phase or unbalanced 3 phase
 - Supports up to 2 I/O drawers
 - 8.9 kW balanced 3 phase
 - Supports all system configurations – have balanced 3 phase feature
 - Plug 2 additional BPR's per side

Always refer to the z10 BC IMPP (GC28-6875) for detailed planning information

IBM System z10 Operating System Support

System z10 BC Operating System Support

Operating System	ESA/390 (31-bit)	z/Architecture (64-bit)
z/OS Version 1 Releases 8, 9 and 10	No	Yes
z/OS Version 1 Releases 7 ⁽¹⁾⁽²⁾ with IBM Lifecycle Extension for z/OS V1.7	No	Yes
Linux on System z ⁽²⁾ , Red Hat RHEL 4, & Novell SUSE SLES 9	Yes	Yes
Linux on System z ⁽²⁾ , Red Hat RHEL 5, & Novell SUSE SLES 10	No	Yes
z/VM Version 5 Release 2 ⁽³⁾ and 3 ⁽³⁾ and 4	No*	Yes
z/VSE Version 3 Release 1 ⁽²⁾⁽⁴⁾	Yes	No
z/VSE Version 4 Release 1 ⁽²⁾⁽⁵⁾ and 2 ⁽⁵⁾	No	Yes
z/TPF Version 1 Release 1	No	Yes
TPF Version 4 Release 1 (ESA mode only)	Yes	No

- z/OS V1.7 support on the z10 BC requires the Lifecycle Extension for z/OS V1.7, 5637-A01. The Lifecycle Extension for z/OS R1.7 + zIIP Web Deliverable required for z10 to enable HiperDispatch on z10 (does not require a zIIP). z/OS V1.7 support was withdrawn September 30, 2008. The Lifecycle Extension for z/OS V1.7 (5637-A01) makes fee-based corrective service for z/OS V1.7 available through September 2009. With this Lifecycle Extension, z/OS V1.7 supports the z10 BC server. Certain functions and features of the z10 BC server require later releases of z/OS. For a complete list of software support, see the PSP buckets and the Software Requirements section of the System z10 BC announcement letter, dated October 21, 2008.
- Compatibility Support for listed releases. Compatibility support allows OS to IPL and operate on z10 BC
- Requires Compatibility Support which allows z/VM to IPL and operate on the z10 providing System z9 functionality for the base OS and Guests. *z/VM supports 31-bit and 64-bit guests
- z/VSE v3. 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 System z10, System z9, and zSeries hardware.
- z/VSE V4 is designed to exploit 64-bit real memory addressing, but will not support 64-bit virtual memory addressing

Note: Refer to the z/OS, z/VM, z/VSE subsets of the 2098DEVICE Preventive Planning (PSP) bucket prior to installing a z10 BC

IBM Lifecycle Extension for z/OS V1.7

- **For customers that have not completed their migration from z/OS V1.7 to z/OS V1.8 or z/OS V1.9, IBM provides fee-based corrective service for z/OS V1.7 after its end of support date of Sept. 30, 2008**
 - For z/OS V1.7 only
 - Only provides defect support
 - Up to two years of support starting October 1, 2008
 - Six month minimum duration required
- **This Lifecycle Extension for z/OS V1.7 does not change coexistence, migration, and fallback policies for z/OS.**
 - z/OS V1.7 coexists, migrates, and falls back between z/OS V1.8 and z/OS V1.9.
- **Additional information**
 - Lifecycle Extension for z/OS V1.7 Announcement letter
<http://www.ibm.com/systems/z/os/zos/> (Announcement section)
 - Lifecycle Extension for z/OS V1.7 FAQ
<ftp://ftp.software.ibm.com/common/ssi/sa/st/n/zsq03023usen/ZSQ03023USEN.PDF>
 - z/OS Installation and Migration
<http://www.ibm.com/systems/z/os/zos/installation/>
 - Pricing
<http://ibm.com/zseries/swprice/other/>

IBM System z10 Statements of Direction and WDFM News

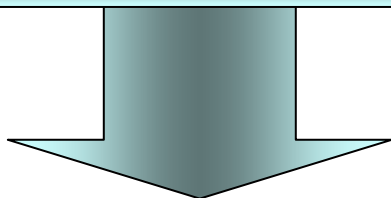
All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice. Any reliance on these Statements of General Direction is at the relying party's sole risk and will not create liability or obligation for IBM.

Statement of Direction

- **System z9 to support 12x IB-SDR on z9 EC and z9 BC general purpose servers:**
 - IBM intends to expand the support for connecting a System z10 with 12x IB-SDR to z9 EC and z9 BC beyond dedicated Coupling Facilities (ICFs only), to include support for System z9 general purpose servers. A System z10 will then be able to connect with 12x InfiniBand coupling links to a System z9 server whether the System z9 has Processor Units (PUs) that are defined as Central Processors (CPs), Integrated Facilities for Linux (IFLs), System z9 Application Assist Processors (zAAPs), System z9 Integrated Information Processors (zIIPs), or System Assist Processors (SAPs)
- **Note: Support of 12x InfiniBand coupling links on System z9 for attachment to System z10 are for migration purposes only. IBM does not intend to support 12x InfiniBand coupling links to connect two System z9 servers. The new Long Reach 1x InfiniBand coupling links are exclusive to System z10 and will not be offered on System z9**

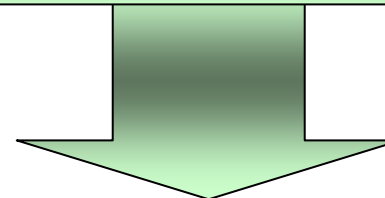
IBM System z Announcement & Withdrawal Dates

2066 (z800)	2064 (z900)	2086 (z890)	2084 (z990)	2094 (z9 EC)	2096 (z9 BC)	2097 (z10 EC)	2098 (z10 BC)
Withdrawn December 31, 2005	Withdrawn June 30, 2006	Withdrawn September 30, 2008	Withdrawn June 30, 2008	Available July 27, 2005	Available April 27, 2006	Available February, 26, 2008	Available October, 28, 2008



Withdrawal Letters

- 2066 - IBM United States Withdrawal Announcement 905-220
- 2064 - IBM United States Withdrawal Announcement 906-060
- 2086 - IBM United States Withdrawal Announcement 907-134
 - IBM United States Hardware Announcement 108-328
- 2084 - IBM United States Withdrawal Announcement 908-057



Announcement Letters

- 2094 - IBM United States Announcement 105-241
- 2096 - IBM United States Announcement 106-287
- 2097 - IBM United States Announcement 108-154
- 2098 - IBM United States Announcement Pending

Note: Even though machines have been withdrawn from marketing, valid upgrade paths from these models to current models are still supported.

Withdrawn from Marketing – z990

- **Effective June 30, 2008, IBM withdrew from marketing all models of the IBM eServer zSeries 990 (z990), and all upgrades from IBM eServer zSeries 900 (z900), or IBM eServer zSeries 890 (z890) to z990**
 - Model conversions requiring hardware within the z990 and MES features requiring hardware on the z990 will continue to be available until December 31, 2008. After December 31, 2008, model conversions and MES features requiring hardware within the z990 will be withdrawn.
 - Field install features and conversions which are delivered solely through a modification to the machines Licensed Internal Code (LIC) will continue to be available until June 30, 2009. After June 30, 2009, features and conversions which are delivered solely through a modification to the LIC will be withdrawn.
 - After June 30, 2009, IBM will not accept any new Capacity BackUp (CBU) contracts or on-demand upgrade orders (Customer Initiated Upgrade (CIU) or On/Off Capacity on Demand (On/Off CoD)) for z990 machines. However, IBM will continue to honor requests for a) modification to the CBU upgrade configuration, and b) additional CBU tests, for existing z990 CBU machines until expiration or termination of the machine's CBU contract.
- **On or after the effective dates for the withdrawal of these offerings, you can no longer order this product directly from IBM.**

Withdrawn from Marketing – z890

- **Effective December 31, 2007, IBM withdrew from marketing all models of the IBM eServer® zSeries® 890 (z890), and all upgrades from IBM eServer zSeries 800 (z800) to z890. Model conversions within the z890 and MES features on the z890 will continue to be available until June 30, 2008**
 - After June 30, 2008, model conversions and MES features within the z890 were withdrawn. Also included in the June 30, 2008, withdrawal were all field-install features and conversions which are delivered solely through a modification to the machine's Licensed Internal Code (LIC)
 - As of July 1, 2008, IBM is not accepting any new Capacity BackUp (CBU) contracts or on-demand upgrade orders (Customer Initiated Upgrade [CIU] or On/Off Capacity on Demand [On/Off CoD]) for z890 machines. However, IBM will continue to honor requests for a) modification to the CBU upgrade configuration, and b) additional CBU tests, for existing z890 CBU machines until expiration or termination of the machine's CBU contract
- **On or after the effective dates for the withdrawal of these offerings, you can no longer order this product directly from IBM.**

Withdrawn from Marketing – z890 date extended

- **IBM extended the withdrawal from marketing effective date for the MES features on the eServer® zSeries® 890 (z890) from June 30, 2008, as originally announced in Hardware Announcement 907-134, dated June 26, 2007, to September 30, 2008**
 - This extension also applied to the effective withdrawal from marketing date for the z890 field-install features and conversions which are delivered solely through a modification to the machine's Licensed Internal Code (LIC)
 - The date which IBM will no longer accept any new Capacity BackUp (CBU) contracts or on-demand upgrade orders (Customer Initiated Upgrade (CIU) or On/Off Capacity on Demand (On/Off CoD)) for z890 machines was also extended from July 1, 2008 to October 1, 2008
- **For additional information, refer to Hardware Announcement 907-134, dated June 26, 2007, to September 30, 2008.**

Summary

IBM System z10 Business Class

Cornerstone of your New Enterprise Data Center

- **Cost Reduced packaging for midrange customers**
- **More engines for customers growing new workloads IFL, ICF, zAAP, zIIP**
- **Lower capacity and cost I/O cards and lower entry memory size**
- **Upgrades**
 - Investment protection with upgrades from two previous families
 - z9 BC
 - z890 (A04)
 - Upgradeability to z10 EC (E12)
- **I/O Improvements – InfiniBand, FICON, OSA and Crypto**
- **Increased flexibility - a single model and increased granularity and enhanced temporary upgrade capability (On/Off CoD, CBU, CPE)**
 - Prepaid On/Off CoD
- **RAS improvements to help elimination planned outages**





The Future Runs on System z

End of Presentation