IBM Enterprise2013
zOS036 – zBC12 and z/VSE V5
Features, Functions, and Software Pricing

Enterprise2013

Trademarks

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

APPN*	HiperSockets	OS/390*	VM/ESA*
CICS*	HyperSwap	Parallel Sysplex*	VSE/ESA
DB2*	IBM*	PR/SM	VTAM*
DB2 Connect	IBM eServer	Processor Resource/Systems Manager	WebSphere*
DirMaint	IBM e(logo)server*	RACF*	z/Architecture
e-business logo*	IBM logo*	Resource Link	z/OS*
ECKD	IMS	RMF	z/VM*
Enterprise Storage Server*	Language Environment*	S/390*	z/VSE
ESCON*	MQSeries*	Sysplex Timer*	zSeries*
FICON*	Multiprise*	System z9	
GDPS*	NetView*	TotalStorage*	
Geographically Dispersed Parallel Sysplex	On demand business logo	Virtualization Engine	

* Registered trademarks of IBM Corporation

The following are trademarks or registered trademarks of other companies.

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

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

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

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

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

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

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

Notes:

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

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

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

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

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

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

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

Enterprise2013

Notice regarding specialty engines (e.g., zIIPs, zAAPs and IFLs):

Any information contained in this document regarding Specialty Engines ("SEs") and SE eligible workloads provides only general descriptions of the types and portions of workloads that are eligible for execution on Specialty Engines (e.g., zIIPs, zAAPs, and IFLs). IBM authorizes customers to use IBM SE only to execute the processing of Eligible Workloads of specific Programs expressly authorized by IBM as specified in the "Authorized Use Table for IBM Machines" provided at
www.ibm.com/systems/support/machine_warranties/machine_code/aut.html ("AUT").

No other workload processing is authorized for execution on an SE.

IBM offers SEs at a lower price than General Processors/Central Processors because customers are authorized to use SEs only to process certain types and/or amounts of workloads as specified by IBM in the AUT.

Enterprise2013

Agenda

§ **IBM zEnterprise System**

§ **z/VSE Strategy and how it relates to zEnterprise**

§ **z/VSE Exploitation of zEnterprise**

§ **Pricing Strategy**

Enterprise2013

IBM zEnterprise System - Best in Class Systems and Software Technologies:
A system of systems that unifies IT for predictable service delivery

Unified management for a smarter system: zEnterprise Unified Resource Manager

§ Part of the IBM System Director family, provides platform, hardware and workload management

§ Unifies management of resources, extending IBM System z® qualities of service across the infrastructure

The world's fastest and most scalable system:
IBM zEnterprise™ 196
IBM zEnterprise™ 114
IBM zEnterprise™ EC12
IBM zEnterprise™ BC12

§ Ideal for large-scale data and transaction serving and mission critical applications

§ Most efficient platform for large-scale Linux® consolidation

§ Leveraging a large portfolio of z/OS®, z/VSE™, and Linux on System z applications

§ Capable of massive scale up, 26 MIPS to more than 70 BIPS

Scale out to a trillion instructions per second:
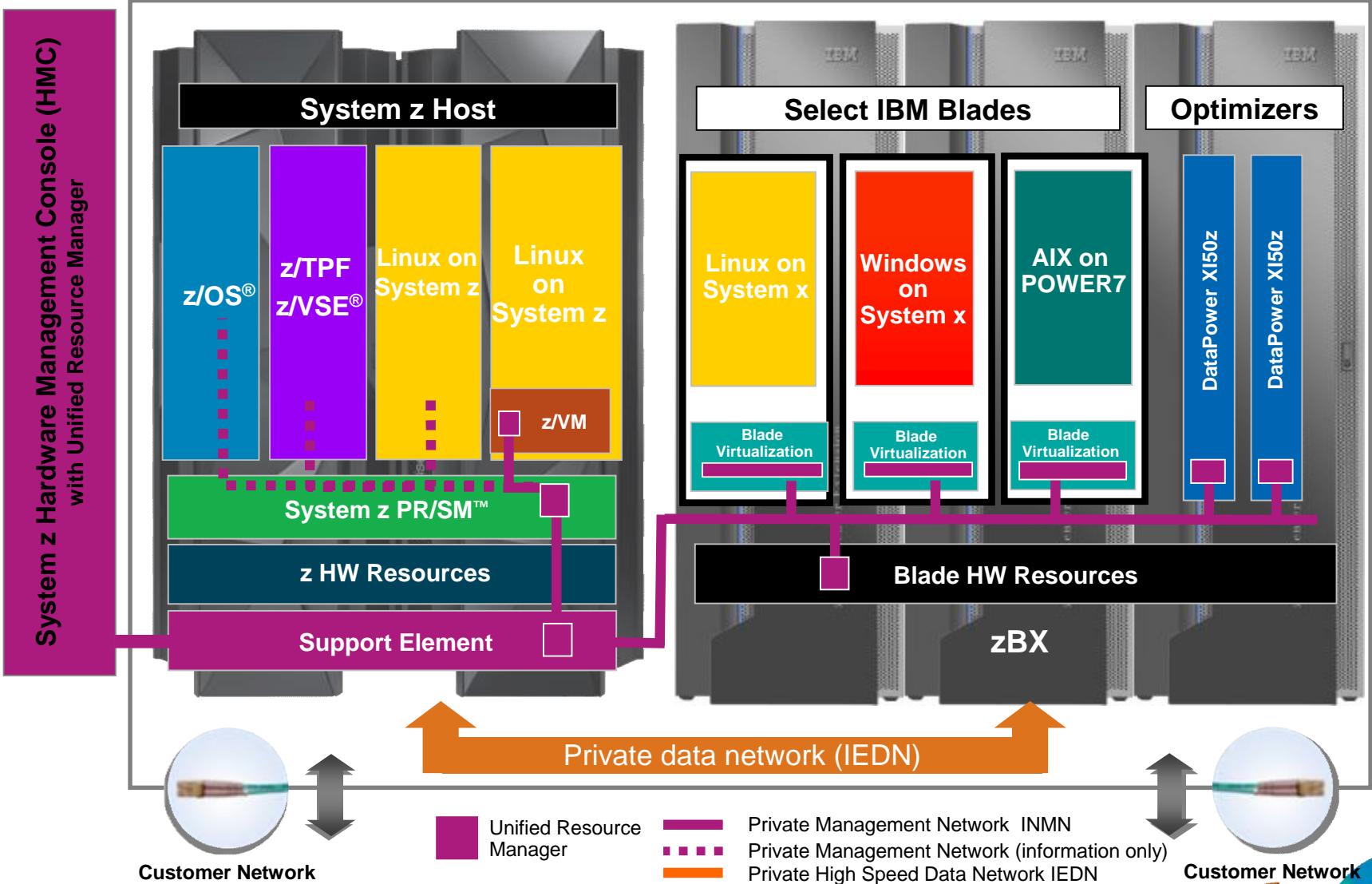**IBM zEnterprise BladeCenter® Extension (zBX)**

§ Selected IBM POWER7™ blades and IBM System x® Blades for tens of thousands of AIX®, Linux, and Windows applications

§ High performance optimizers and appliances to accelerate time to insight and reduce cost
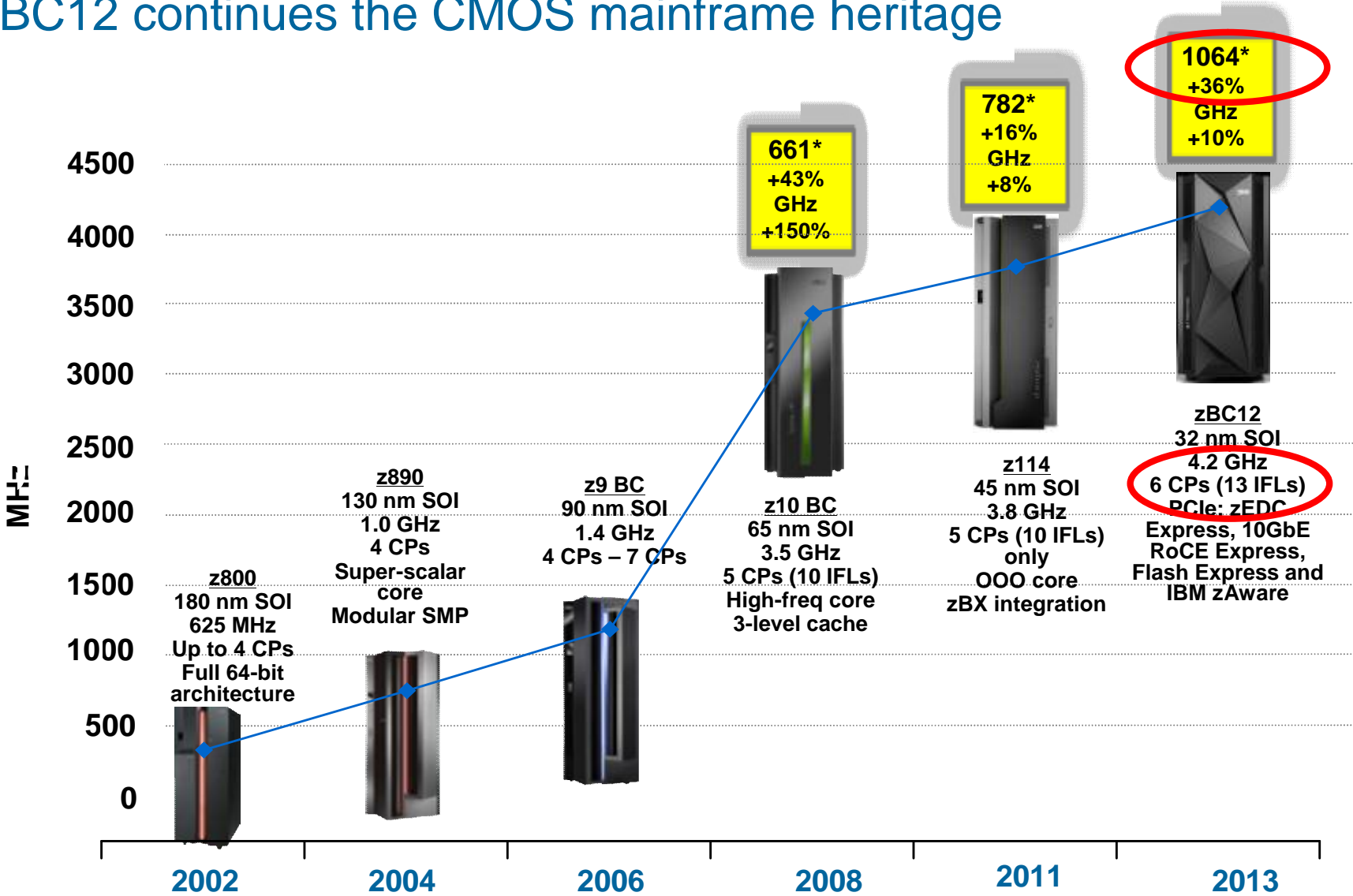
§ Dedicated high performance private network

z/OS

z/VM

z/VSE

z/TPF

Linux

HMC

AIX

Linux

Enterprise2013

IBM

Putting zEnterprise System to the task
Use the smarter solution to improve your application design

System z Hardware Management Console (HMC) with Unified Resource Manager

System z Host
- z/OS®
- z/TPF z/VSE®
- Linux on System z
- Linux on System z
  - z/VM

System z PR/SM™

z HW Resources

Support Element

Select IBM Blades
- Linux on System x
  - Blade Virtualization
- Windows on System x
  - Blade Virtualization
- AIX on POWER7
  - Blade Virtualization

Blade HW Resources

zBX

Optimizers
- DataPower XI50z
- DataPower XI50z

Private data network (IEDN)

Customer Network

Customer Network

Legend:
- ■ Unified Resource Manager
- ── Private Management Network INMN
- ▪▪▪ Private Management Network (information only)
- ── Private High Speed Data Network IEDN

© 2013 IBM Corporation

Enterprise2013

zBC12 continues the CMOS mainframe heritage

MHz

4500
4000
3500
3000
2500
2000
1500
1000
500
0

1064*
+36%
GHz
+10%

782*
+16%
GHz
+8%

661*
+43%
GHz
+150%

z800
180 nm SOI
625 MHz
Up to 4 CPs
Full 64-bit
architecture

z890
130 nm SOI
1.0 GHz
4 CPs
Super-scalar
core
Modular SMP

z9 BC
90 nm SOI
1.4 GHz
4 CPs – 7 CPs

z10 BC
65 nm SOI
3.5 GHz
5 CPs (10 IFLs)
High-freq core
3-level cache

z114
45 nm SOI
3.8 GHz
5 CPs (10 IFLs)
only
OOO core
zBX integration

zBC12
32 nm SOI
4.2 GHz
6 CPs (13 IFLs)
PCIe: zEDC
Express, 10GbE
RoCE Express,
Flash Express and
IBM zAware

2002   2004   2006   2008   2011   2013

* MIPS Tables are NOT adequate for making comparisons of System z processors.

Enterprise2013

# IBM System z Business Class configuration comparisons

	z10 BC™ E10	z114 M05	z114 M10	zBC12 H06	zBC12 H13
Uniprocessor Performance	673 MIPS	782 MIPS		1064 MIPS	
z/OS Capacity	26-2760 MIPS	26 - 3139 MIPS		50 – 4958 MIPS	
Total System Memory	248 GB	120 GB	248 GB	240 GB	496 GB
Configurable Engines	10	5	10	6	13
Configurable CPs	0-5	0-5		0 – 6	
LPARS/LCSS	30/2	30/2		30/2	
HiperSockets	16	32		32	
I/O drawers/ PCIe I/O drawers	Up to 4	Up to 4	Up to 3	Up to 3[1]	Up to 3[1]
I/O slots per I/O drawer/ PCIe I/O drawer	8	8/32		8/32[2]	
FICON® Channels	128	128		128[3]	
OSA Ports	96	96		96	
ESCON® Channels	480	240		0[4]	
IFB host bus Bandwidth PCIe Gen2 Bandwidth	6.0 GB/sec(IFB)	6.0 GB/sec (IFB) 8.0 GB/sec (PCIe)		6.0 GB/sec (IFB) 8.0 GB/sec (PCIe)	
ICB-4/ISC-3[8]/PSIFB	12/48/12	0/48/8 -16	0/48/16 - 32	0[5]/32/8 -16[6]	0[5]/32/16 - 32[7]
zIIP/zAAP Maximum Qty	5	2	5	4 (with Max of 2 CPs)	8 (with Max of 4/5 CPs)
IFL Maximum Qty	10	5 (3139 MIPS)	10 (5390 MIPS)	6 (4958 MIPS)	13 (8733 MIPS)
ICF Maximum Qty	10	5	10	6	13
Capacity Settings	130	130	130	156	156
Upgradeable	Upgrade to z114 or zBC12	Upgrade to zBC12 H06, H13	Upgrade to zBC12 H06, H13	Upgrade H06 to H13, H13 to zEC12 Model H20 (Radiator-based air cooled only)	

Enterprise2013

Optica PRIZM basics

§ A purpose-built appliance designed exclusively for IBM System z; enables ESCON devices to be connected to FICON channels or fabrics

§ Allows ESCON devices to connect to FICON channels and FICON fabrics/networks
– Prizm also supports attachment of parallel (bus/tag) devices to FICON channels via ESBT module

§ Converts FICON channels (CHPID type FC) into ESCON channels:
   § Available configurations: 1:2 (new), 1:4, and 2:8 [FICON : ESCON]
   § 1:2 configuration available for customers with 1-4 legacy device ports (in single or dual Prizm design)
   § Replace aging ESCON Directors with PRIZM (maintenance savings, and ESCD's announced as EOS)

§ Qualified by the IBM Vendor Solutions Lab in POK for all ESCON devices; qualified for connectivity to Brocade and Cisco FICON switching solutions
– Refer to: http://www.ibm.com/systems/z/hardware/connectivity/index.html
      • Products -- > FICON / FCP Connectivity -- > Other supported devices

§ PRIZM is available via IBM Global Technology Services: ESCON to FICON Migration offering (#6948-97D)

FICON Ports:
LC Duplex

ESCON Ports:
MT-RJ

2U

Front View

Rear View

Enterprise2013
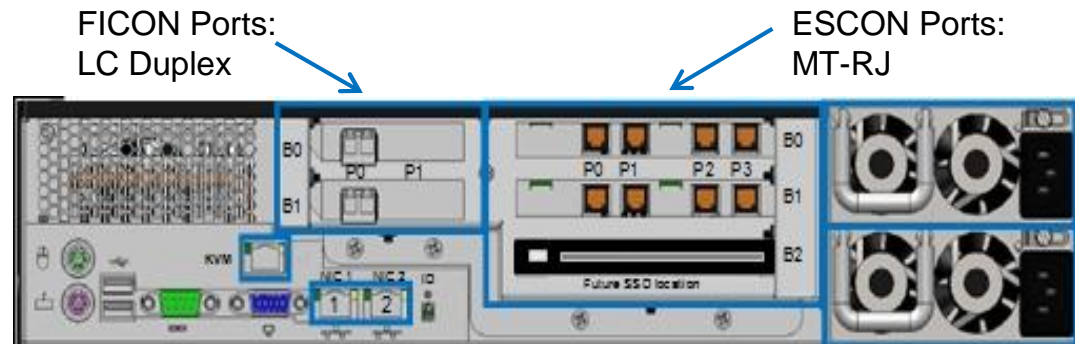
New innovations available on zBC12 (and zEC12)

SoD for z/VM, no support w/ z/VSE	**SoD for z/VM, no support w/ z/VSE**	**No support w/ z/VM, no support w/ z/VSE**	**z/OS only**	**Support w/ z/VM, support w/ z/VSE**
zEDC and zEDC Express	**SMC-R and 10GbE RoCE Express**	**Flash Express**	**IBM zAware**	**Hybrid Computing**
Compress your data *4X** *(efficient system data compression)* *Up to 118X reduction in CPU and up to 24X throughput improvement when zlib uses zEDC ***	*Network latency reduced up to 80% to improve service levels on web based claims and payment systems workloads**** *Up to 50% CPU savings for FTP file transfers across z/OS systems versus standard TCP/IP ***** *Up to 48% reduction in response time and 10% CPU savings for a sample CICS workload exploiting IPIC using SMC-R versus TCP/IP ****** *Up to 40% reduction in overall transaction response time for WAS workload accessing z/OS DB2 *******	*19% Reduction in total dump time for 36 GB standalone dump 10x Faster response time and 37% increase in throughput compared to disk for morning transition 28% Improvement in DB2™ throughput leveraging Flash Express with Pageable Large Pages (PLP)*	*Difficult or unusual problems can be found in 2 clicks not hours*	*240 Hybrid units shipped since inception 84% Lower TCA with fit for purpose cloud architectures 35% Lower infrastructure management costs*

* The amount of data sent to an SMF logstream can be reduced by up to 75% using zEDC compression – reducing logger overhead
** These results are based on projections and measurements completed in a controlled environment. Results may vary by customer based on individual workload, configuration and software levels
*** Based on internal IBM benchmarks of modeled z/OS TCP sockets-based workloads with request/response traffic patterns using SMC-R vs TCP/IP. The actual throughput that any user will experience will vary
**** Based on internal IBM benchmarks in a controlled environment using z/OS V2R1 Communications Server FTP client and FTP server, transferring a 1.2GB binary file using SMC-R (10GbE RoCE Express feature) vs standard TCP/IP (10GbE OSA Express4 feature). The actual CPU savings any user will experience may vary.
***** Based on internal IBM benchmarks using a modeled CICS workload driving a CICS transaction that performs 5 DPL (Distributed Program Link) calls to a CICS region on a remote z/OS system via CICS IP interconnectivity (IPIC), using 32K input/output containers. Response times and CPU savings measured on z/OS system initiating the DPL calls. The actual response times and CPU savings any user will experience will vary.
****** Based on projections and measurements completed in a controlled environment. Results may vary by customer based on individual workload, configuration and software levels.

Enterprise2013

Agenda

§ **IBM zEnterprise System**

§ **z/VSE Strategy and how it relates to zEnterprise**

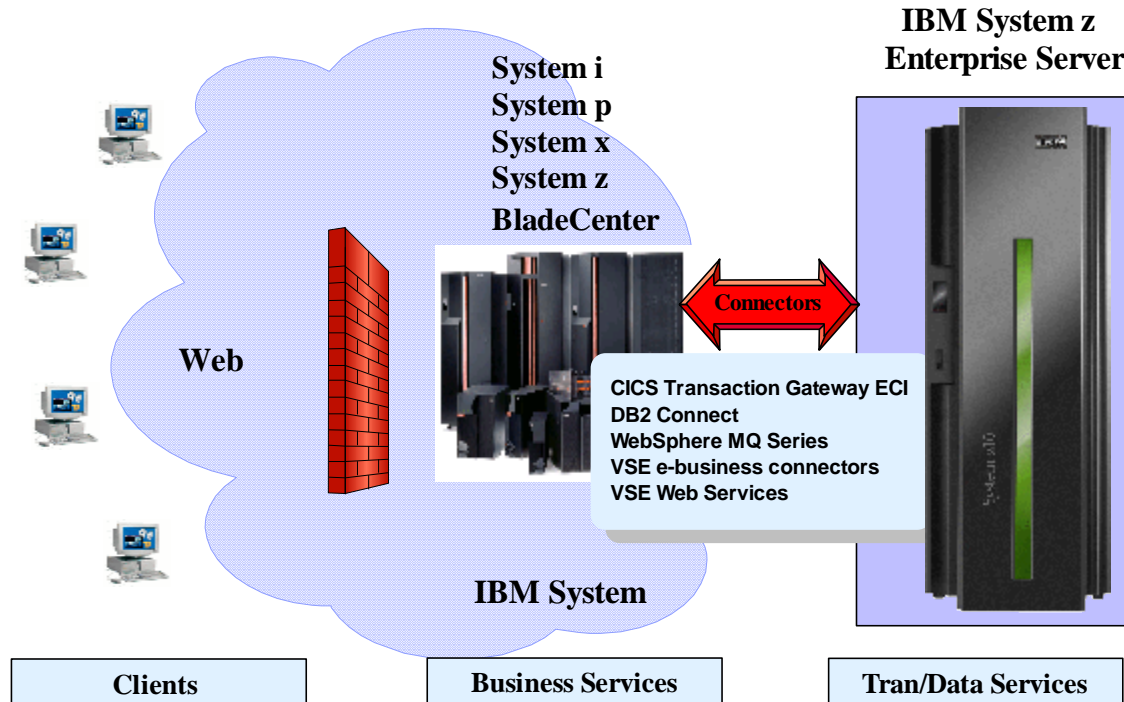§ **z/VSE Exploitation of zEnterprise**
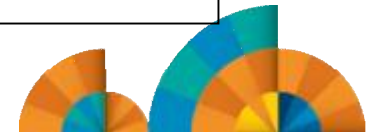
§ **Pricing Strategy**

© 2013 IBM Corporation

IBM

z/VSE strategy - invented in year 2000

alias

§ 3-tier Strategy

§ **Hybrid Strategy**

§ Connector Strategy

§ Migration Strategy

§ Coexistence Strategy

§ Linux Surround Strategy

§ **PIE Strategy**

IBM System z Enterprise Server

System i
System p
System x
System z
BladeCenter

Web

Connectors

CICS Transaction Gateway ECI
DB2 Connect
WebSphere MQ Series
VSE e-business connectors
VSE Web Services

IBM System

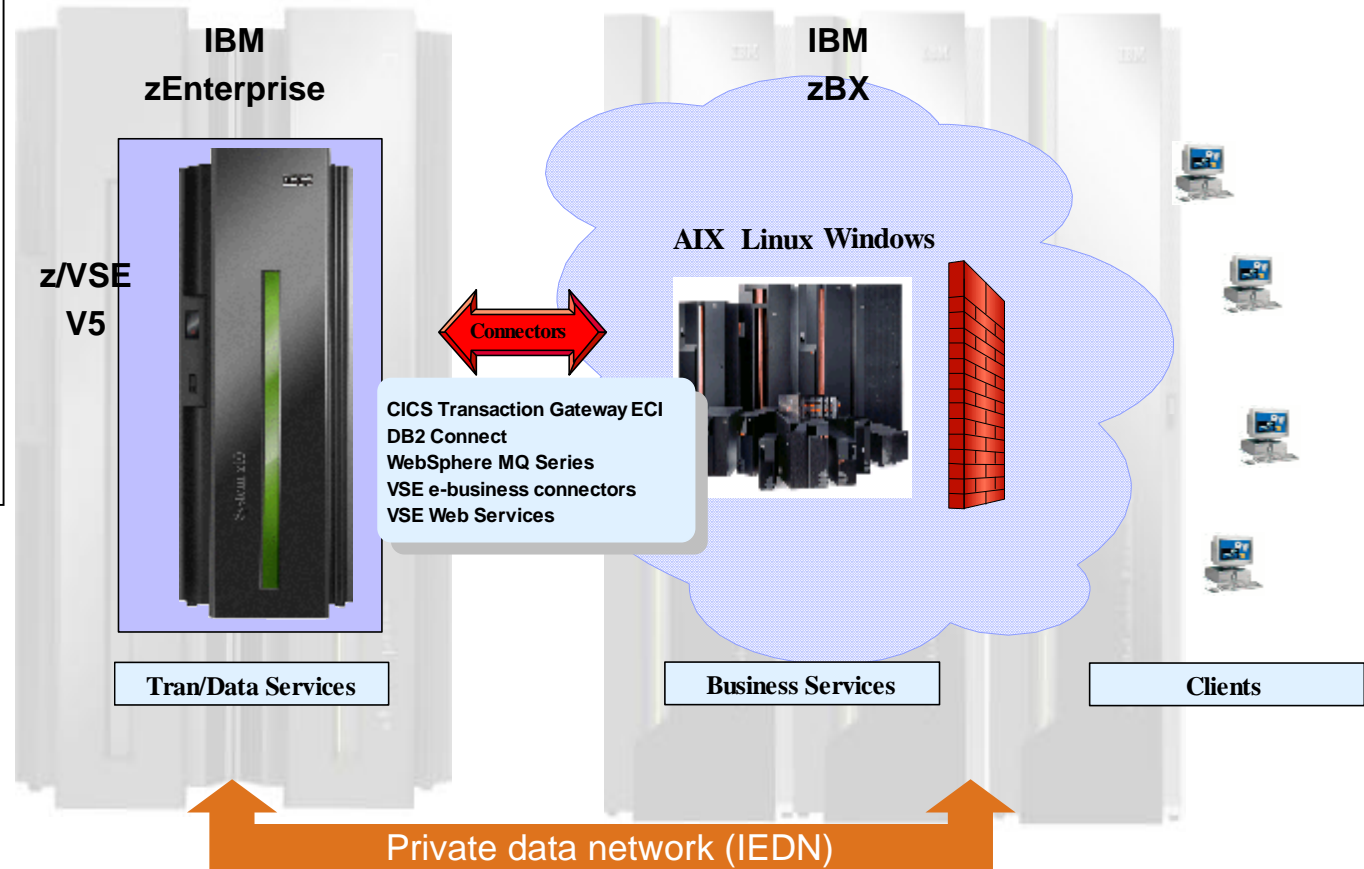| Clients	Business Services	Tran/Data Services

Protect existing z/VSE investments

Integrate using middleware and z/VSE connectors

Extend with another platform to access new applications & solutions

Enterprise2013

z/VSE V5 strategy with zEnterprise - more options, highly integrated

alias

§ 3-tier Strategy

§ **Hybrid Strategy**

§ Connector Strategy

§ Migration Strategy

§ Coexistence Strategy

§ Linux Surround Strategy

§ **PIE Strategy**

IBM zEnterprise

z/VSE V5

Connectors

CICS Transaction Gateway ECI
DB2 Connect
WebSphere MQ Series
VSE e-business connectors
VSE Web Services

Tran/Data Services

IBM zBX

AIX   Linux   Windows

Business Services

Clients

Private data network (IEDN)

Protect existing z/VSE investments

Integrate using middleware and z/VSE connectors

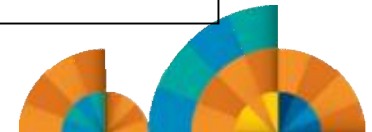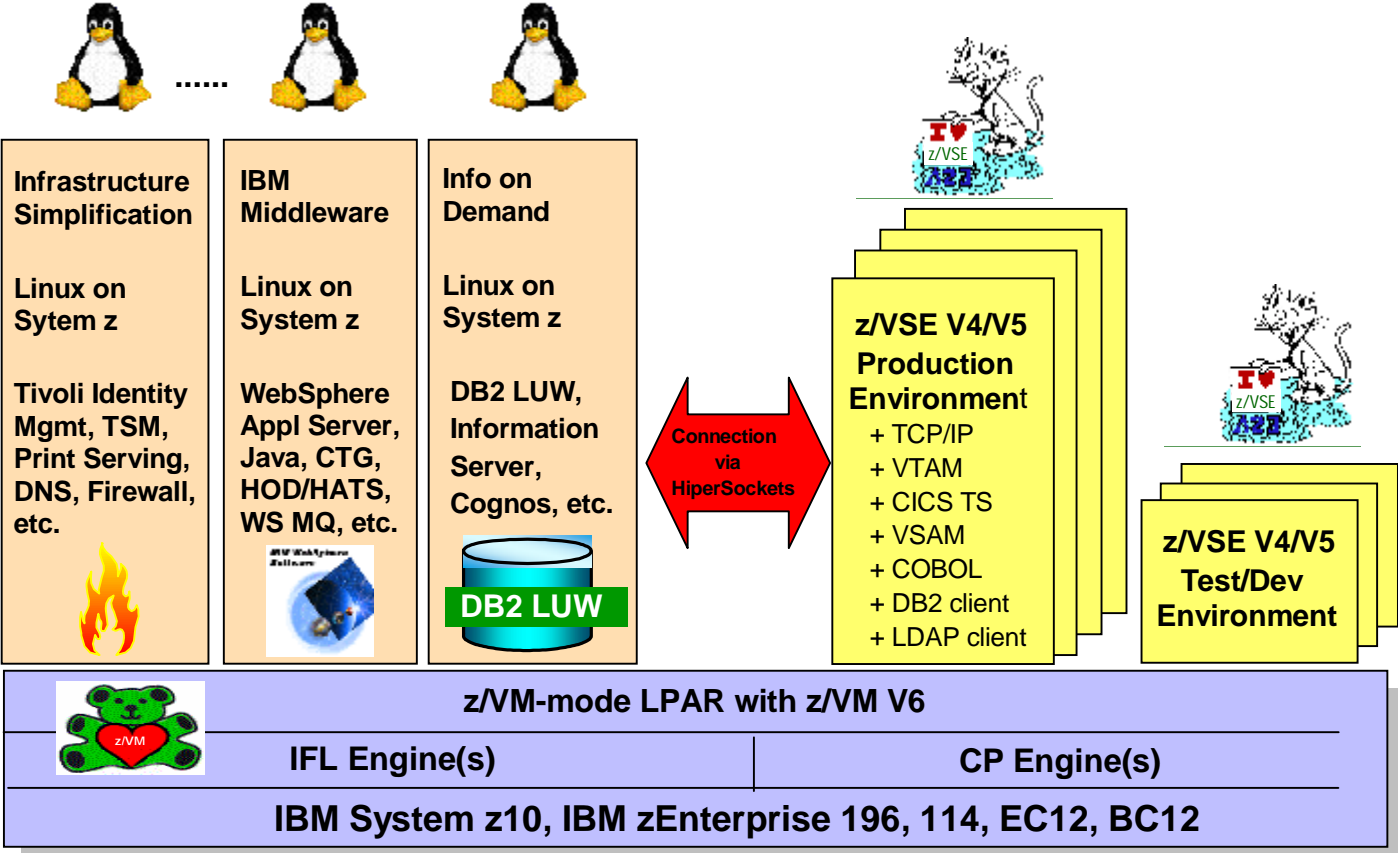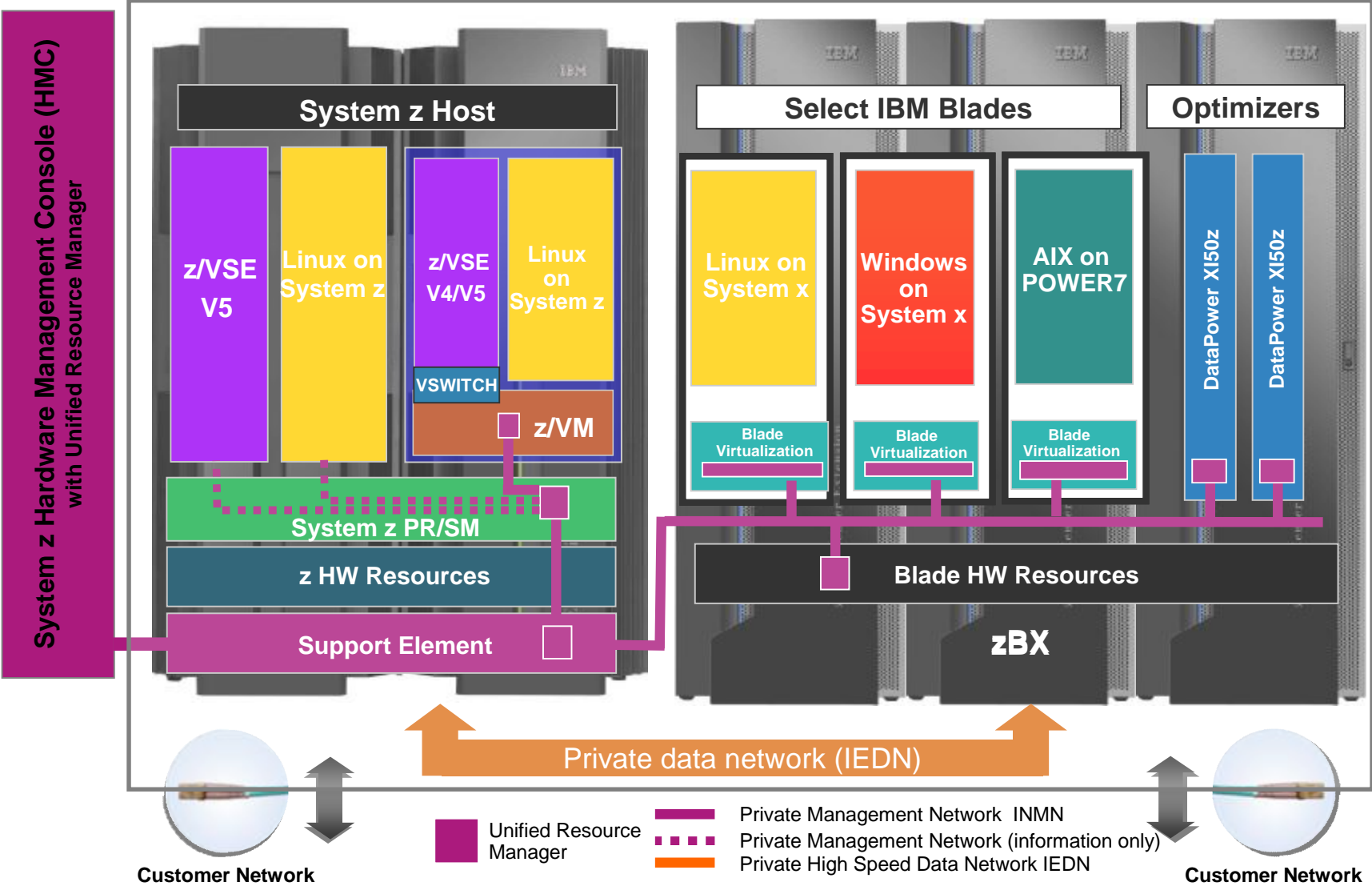**E**xtend with zBX or with Linux on z to access new applications & solutions

Enterprise2013

z/VSE strategy with Linux on System z

Hybrid Environment leveraging z/VSE, z/VM, and Linux on System z

Protect existing VSE investments
Integrate using middleware and VSE connectors
Extend with Linux on IBM System z technology & solutions

......

Infrastructure Simplification

Linux on Sytem z

Tivoli Identity Mgmt, TSM, Print Serving, DNS, Firewall, etc.

IBM Middleware

Linux on System z

WebSphere Appl Server, Java, CTG, HOD/HATS, WS MQ, etc.

Info on Demand

Linux on System z

DB2 LUW, Information Server, Cognos, etc.

DB2 LUW

Connection via HiperSockets

z/VSE

z/VSE V4/V5 Production Environment
+ TCP/IP
+ VTAM
+ CICS TS
+ VSAM
+ COBOL
+ DB2 client
+ LDAP client

z/VSE

z/VSE V4/V5 Test/Dev Environment

z/VM-mode LPAR with z/VM V6

z/VM

| **IFL Engine(s)** | **CP Engine(s)** |

IBM System z10, IBM zEnterprise 196, 114, EC12, BC12

Enterprise2013

IBM

z/VSE support of Intra Ensemble Data Network (IEDN) to zBX

System z Hardware Management Console (HMC)
with Unified Resource Manager

System z Host
- z/VSE V5
- Linux on System z
- z/VSE V4/V5
- Linux on System z
- VSWITCH
- z/VM
- System z PR/SM
- z HW Resources
- Support Element

Select IBM Blades
- Linux on System x
- Windows on System x
- AIX on POWER7
- Blade Virtualization
- Blade HW Resources

Optimizers
- DataPower XI50z
- DataPower XI50z

zBX

Private data network (IEDN)

Customer Network

Customer Network

- Unified Resource Manager
- Private Management Network INMN
- Private Management Network (information only)
- Private High Speed Data Network IEDN

Enterprise2013

Example: Oracle e-business suite

Supported as native port

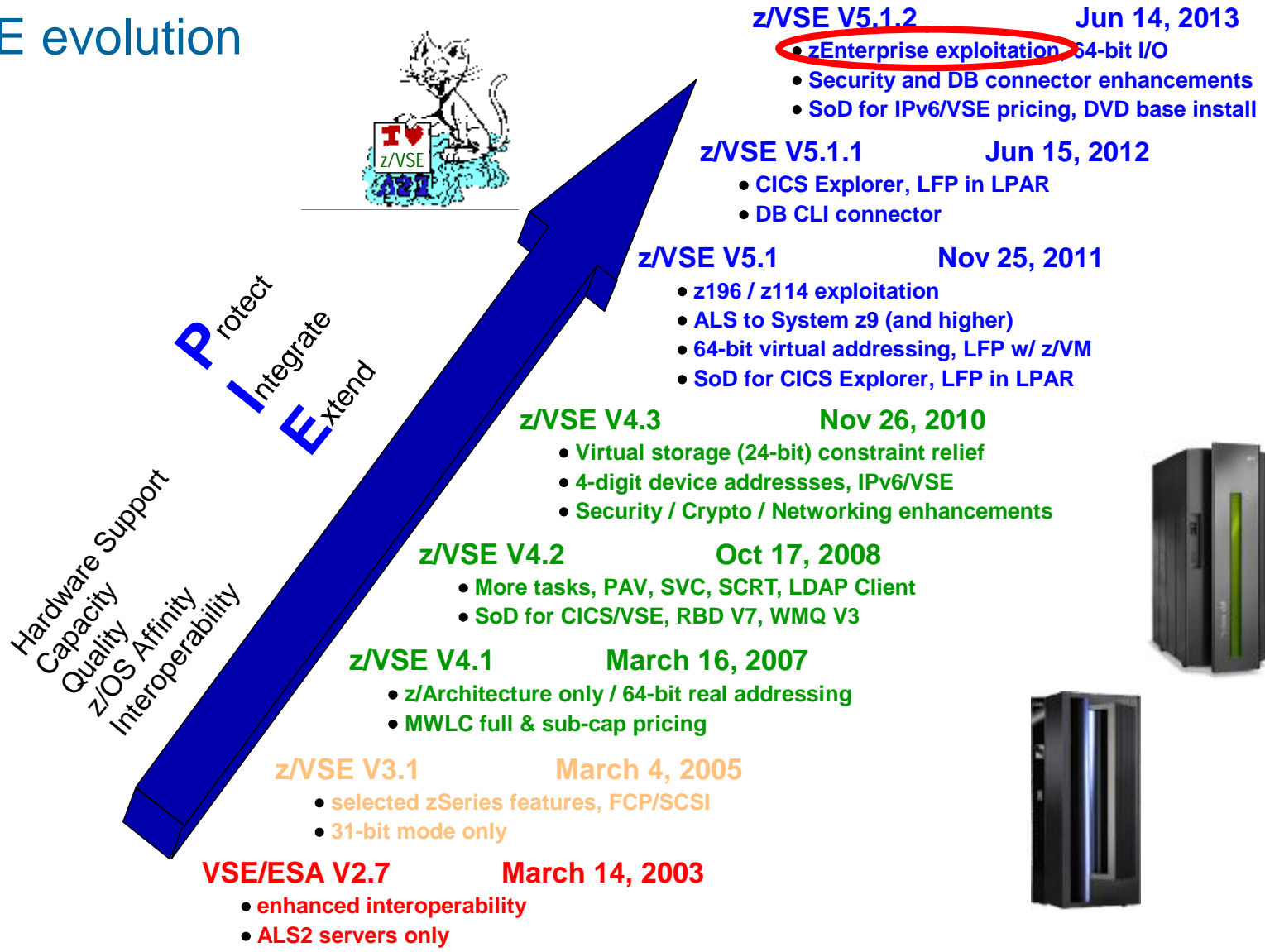Applications not certified on LoZ can be run on AIX blades

System z Hardware Management Console z(HMC) with Unified Resource Manager

System z Host

Oracle DB and FMW

Oracle EBS Mid-Tier

Oracle DB and FMW

z/OS z/TPF z/VSE

Linux

Linux

Linux

z/VM

System z PR/SM

z HW Resources

Support Element

IBM Power7 Blades

Oracle Enterprise Manager

Oracle supported app

Oracle supported app

Oracle supported app

AIX

AIX

AIX

AIX

Power

Power

PowerVM

PowerVM

Blade HW Resources

zBX - **Optional Factory-Packaged Blades and Accelerators**

Private Data Network

Customer Network

Ensemble Management Firmware

Private Management Network

Private High Speed Data Network

Customer Network

© 2013 IBM Corporation

Enterprise2013

Agenda

§ **IBM zEnterprise System**

§ **z/VSE Strategy and how it relates to zEnterprise**

→ § **z/VSE Exploitation of zEnterprise**

§ **Pricing Strategy**

© 2013 IBM Corporation

Enterprise2013

z/VSE evolution

z/VSE V5.1.2 **Jun 14, 2013**
- zEnterprise exploitation, 64-bit I/O
- Security and DB connector enhancements
- SoD for IPv6/VSE pricing, DVD base install

z/VSE V5.1.1 **Jun 15, 2012**
- CICS Explorer, LFP in LPAR
- DB CLI connector

z/VSE V5.1 **Nov 25, 2011**
- z196 / z114 exploitation
- ALS to System z9 (and higher)
- 64-bit virtual addressing, LFP w/ z/VM
- SoD for CICS Explorer, LFP in LPAR

z/VSE V4.3 **Nov 26, 2010**
- Virtual storage (24-bit) constraint relief
- 4-digit device addressses, IPv6/VSE
- Security / Crypto / Networking enhancements

z/VSE V4.2 **Oct 17, 2008**
- More tasks, PAV, SVC, SCRT, LDAP Client
- SoD for CICS/VSE, RBD V7, WMQ V3

z/VSE V4.1 **March 16, 2007**
- z/Architecture only / 64-bit real addressing
- MWLC full & sub-cap pricing

z/VSE V3.1 **March 4, 2005**
- selected zSeries features, FCP/SCSI
- 31-bit mode only

VSE/ESA V2.7 **March 14, 2003**
- enhanced interoperability
- ALS2 servers only

Protect
Integrate
Extend

Hardware Support
Capacity
Quality
z/OS Affinity
Interoperability

I ♥ z/VSE

¹) z/VSE V3 is 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.
²) z/VSE V4 is designed to exploit 64-bit real memory addressing, but will not support 64-bit virtual memory addressing

* IPv6/VSE is a registered trademark of Barnard Software, Inc.

© 2013 IBM Corporation

Enterprise2013

z/VSE support of IBM zEnterprise EC12 and zBC12

§ z/VSE Release Support

- z/VSE supports the zEC12 and zBC12 with z/VSE V4.3 and V5.1
  - No PTFs are required
  - For IOCP, EREP and HLASM PTFs, see PSP (subset 2827/ZVSE of 2827DEVICE, or subset 2828/ZVSE of 2828DEVICE, respectively)

§ OSA-Express5s 1000BASE-T – new with zBC12

- No z/VSE PTF required
  - 1000BASE-T supported with existing z/VSE functionality
  - Allow to configure OSA-Express5S with OSA/SF in HMC

§ Configurable Crypto Express4s – new with zEC12

- z/VSE toleration PTF required to use Crypto Express4s
  - Toleration PTF (DY47414) provided for z/VSE V5.1 only
- Crypto Express4s supported with existing z/VSE cryptographic functionality
  - Supported modes: (CCA) coprocessor and accelerator
  - PKCS #11 (EP11) coprocessor not supported

Enterprise2013

z/VSE support of IBM zEnterprise z196, z114, zEC12, zBC12

§ **Features / Functions**

- **Fast Path to Linux on System z in a z/VM-mode LPAR**
  - also available on z10 BC/EC
- **Fast Path to Linux on System z in an LPAR environment**
  - exclusively on zEnterprise
- **z/VSE z/VM IP Assist (VIA)**
  - exclusively on zEnterprise
- **Dynamic add of logical CPs**
  - also available on z10 BC/EC
- **Large page (1 MB frames) support for data spaces**
  - also available on z10 BC/EC
- **Dynamic add / remove of cryptographic processors**
  - also available on z10 BC/EC
- **Crypto Adjunct Processor (AP) Queue interrupt facility**
  - also available on z10 BC/EC
- **4096-bit RSA key support with configurable Crypto Express3**
  - also available on z10 BC/EC

§ **zBX environment**

- **z/VSE V5 provides native Intra Ensemble Data Network (IEDN) support**
  - z/VSE V4 can participate in an IEDN data network using z/VM's V6 VSWITCH support

© 2013 IBM Corporation

Linux Fast Path in a z/VM environment - Supported by z/VSE 4.3
Faster communication between z/VSE and Linux applications

Application

TCP/IP Stack

z/VSE Supervisor

z/VM

Application

TCP/IP Stack

Kernel

z/VM

HiperSockets, OSA, VSWITCH

network

Without LFP

Application

z/VSE Supervisor

Application

LFP Daemon

TCP/IP Stack

Kernel

IUCV

z/VM

z10, z196, z114, zEC12, zBC12

network

With LFP under z/VM

network

Enterprise2013
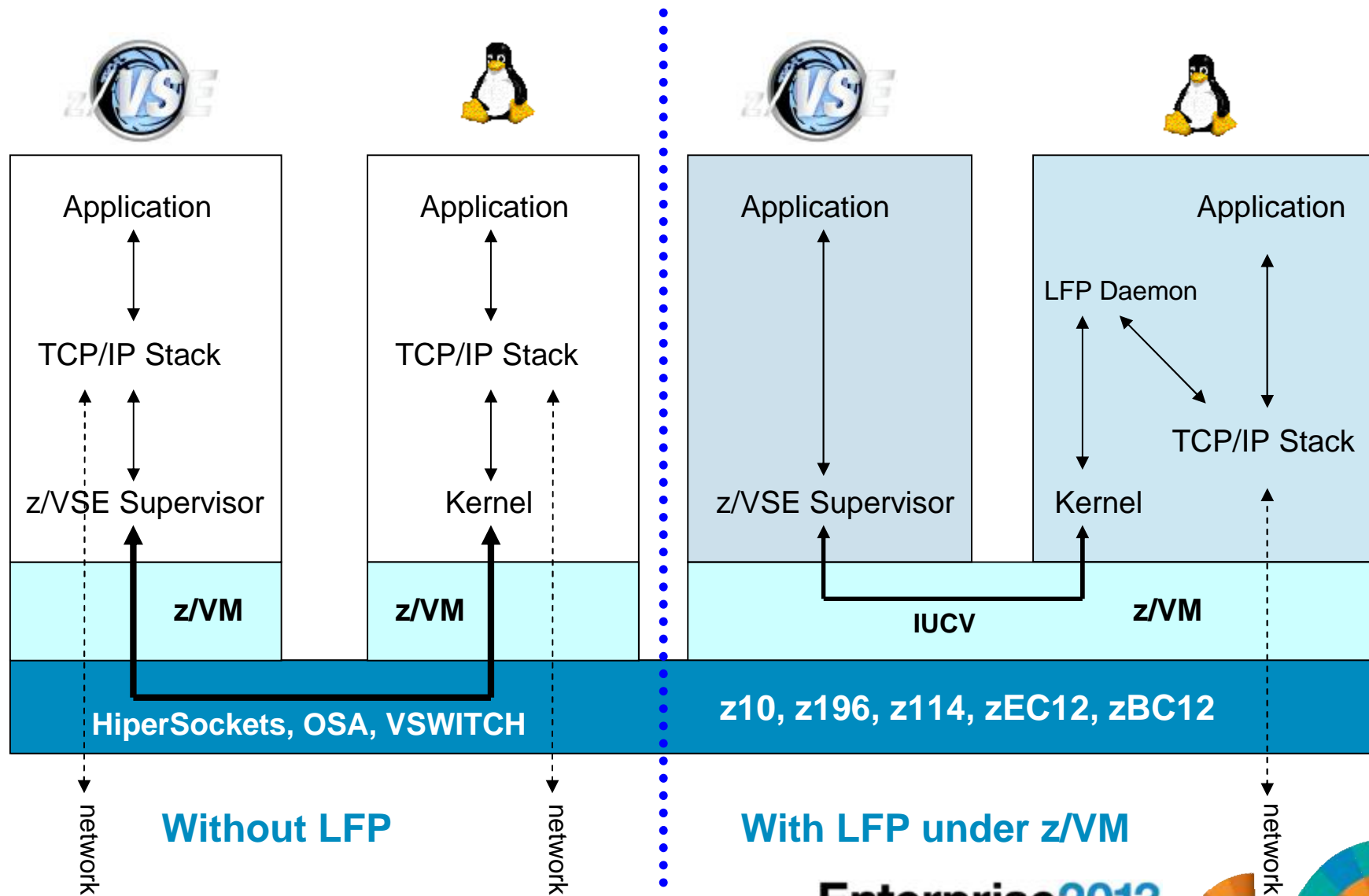
z/VSE z/VM IP Assist (VIA) - Supported by z/VM 6.x with z/VSE 5.1

With VIA, no Linux on System z is needed to utilize the LFP advantage

Application	Application	Application
↕	↕	↕
TCP/IP Stack	TCP/IP Stack	z/VSE Supervisor
↕	↕	
z/VSE Supervisor	Kernel	

z/VM   **z/VM**   IUCV → **VIA**   **z/VM 6.x**

HiperSockets, OSA, VSWITCH   **z196, z114, zEC12, zBC12**

network   **Without LFP**   network   **With LFP + VIA**   network
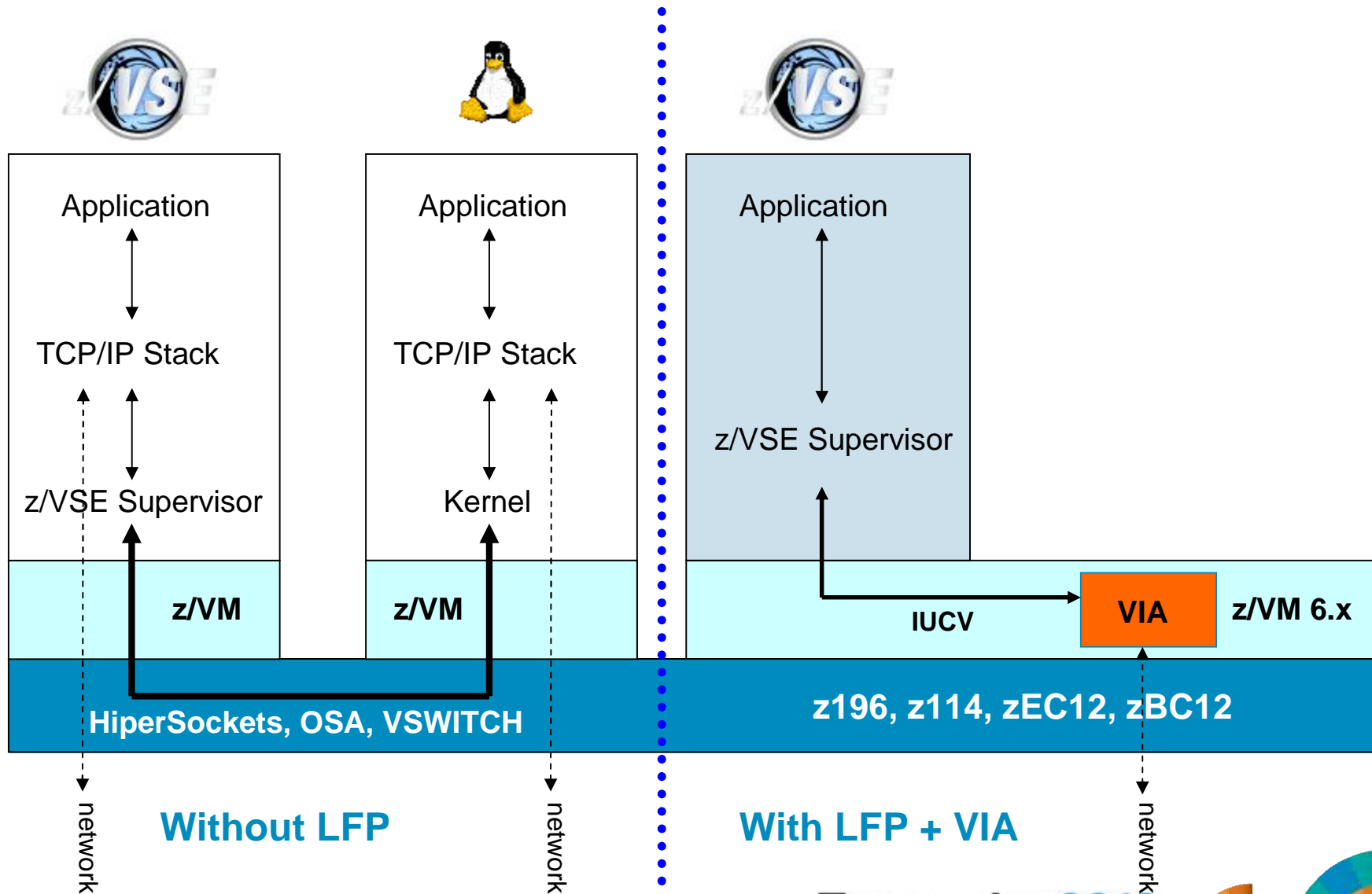
Enterprise2013

Linux Fast Path in an LPAR environment - Supported by z/VSE 5.1.1

Faster communication between z/VSE and Linux applications

à Exploits the HiperSockets Completion Queue support of IBM zEnterprise

Application

TCP/IP Stack

z/VSE Supervisor

Application

TCP/IP Stack

Kernel

HiperSockets, OSA, VSWITCH

Application

z/VSE Supervisor

Application

LFP Daemon

TCP/IP Stack

Kernel

Hipersockets CQ

z196, z114, zEC12, zBC12

network

Without LFP

network

With LFP in LPAR

network

© 2013 IBM Corporation

Enterprise2013
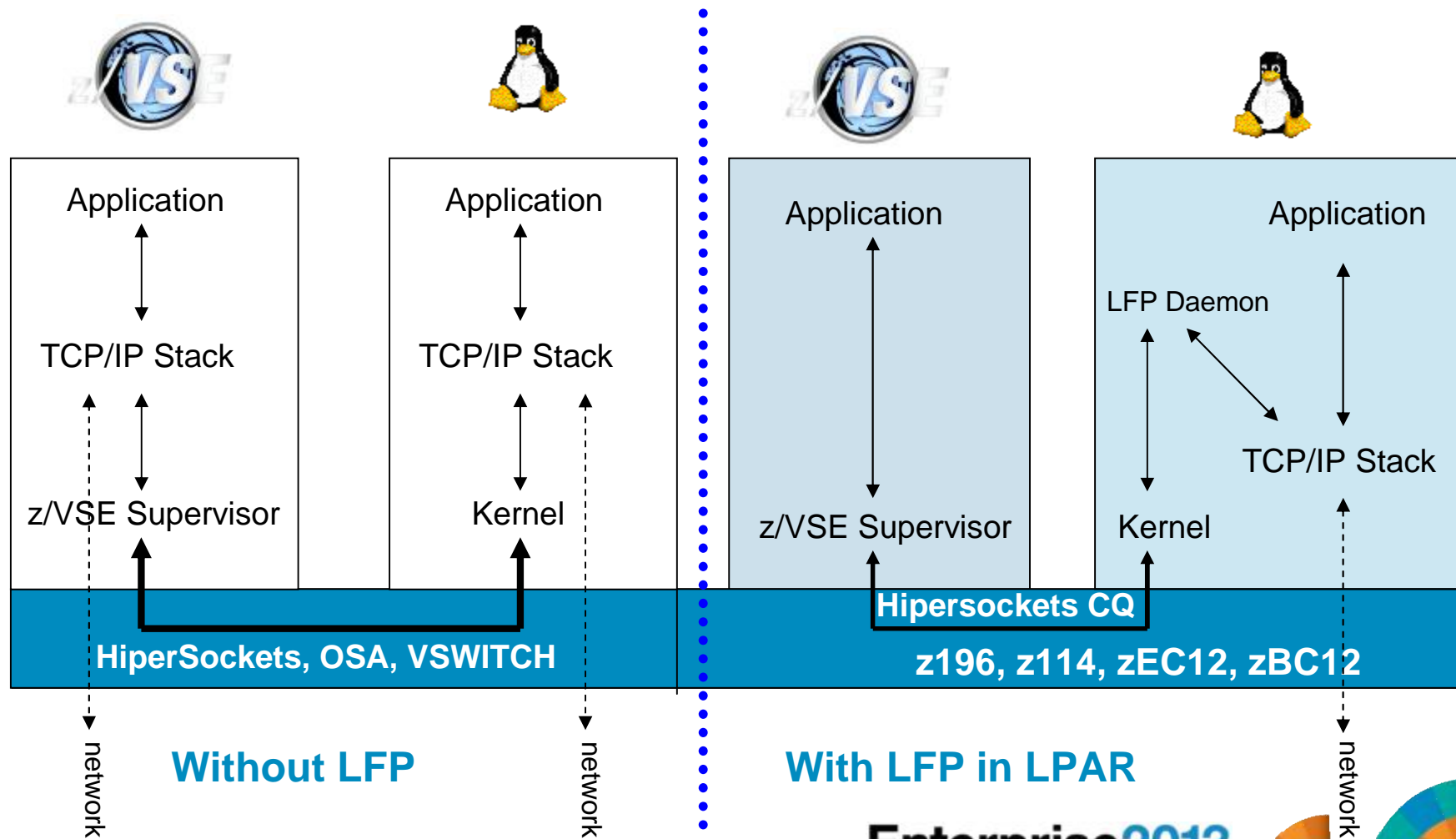
Dynamic add of CPs and large pages - Supported by z/VSE 4.3

§ **Dynamic add of logical CPs***

- Ability to dynamically add logical CPs without preplanning
- Allows adding central processors (CPs) to LPAR without re-IPL of the z/VSE system
- Clients can increase (and decrease) the capacity of their z/VSE system dependent on workload needs

§ **Large page (1 megabyte page) support for data spaces***

- Better exploitation of large processor storage
- Might result in better performance for long-running applications
- Transparent to applications

*) Not available in a z/VM guest environment

© 2013 IBM Corporation

Enterprise2013

Dynamic add / remove of crypto engines - Supported by z/VSE 4.3

§ **System z10, z196, z114, zEC12**

- **Add / Remove of an AP (Crypto card) <u>without</u> having to reactivate the LPAR**
- Dynamically adding an AP to an LPAR for the first time
- Dynamically adding an AP to an existing LPAR already using crypto
- Dynamically removing an AP from an LPAR when it is no longer needed
- Dynamically changing the AP queue number

```
msg FB,data=apadd ap=1
AR 0015 1I40I READY
FB 0011 1J025I AP 1 ENABLED SUCCESSFULLY.
```

© 2013 IBM Corporation

Enterprise2013

Crypto AP-Queue interrupt facility - Supported by z/VSE 4.3

§ **Crypto Adjunct Processor (AP) Queue Interrupt Facility**

- Exploitation of the z10 and zEnterprise functionality
- **Reduced CPU consumption and elapsed job time** dependent on workload
- New AP Interrupt commands provided by the z/VSE crypto device driver
- AP-Queue status displayed via the crypto STATUS command:

```
msg FB,data=status=cr
AR 0015 1I40I   READY
FB 0011 BST223I CURRENT STATUS OF THE SECURITY TRANSACTION SERVER:
FB 0011 ADJUNCT PROCESSOR CRYPTO SUBTASK STATUS:
FB 0011   AP CRYPTO SUBTASK STARTED .......... : YES
FB 0011   MAX REQUEST QUEUE SIZE ............. : 1
FB 0011   MAX PENDING QUEUE SIZE ............. : 1
FB 0011   TOTAL NO. OF AP REQUESTS ........... : 40065
FB 0011   NO. OF POSTED CALLERS .............. : 40065
FB 0011   AP-QUEUE INTERRUPTS AVAILABLE ...... : YES
FB 0011   AP-QUEUE INTERRUPTS STATUS ......... : DISABLED
FB 0011   AP CRYPTO POLLING TIME (1/300 SEC).. : 0
FB 0011   AP CRYPTO WAIT ON BUSY (1/300 SEC).. : 75
FB 0011   AP CRYPTO RETRY COUNT .............. : 5
FB 0011   AP CRYPTO TRACE LEVEL .............. : 3
FB 0011   TOTAL NO. OF WAITS ON BUSY ......... : 0
...
```

4096-bit RSA key support with Crypto Express3 - Supported by z/VSE 5.1

§ **4096-bit RSA Key Support (previously up to 2048-bit)**

– **Enhanced SSL network security** for AES-128 encryption

– **Enhanced data security** for DISK and TAPE with Encryption Facility support

Encryption strength equivalent	
Asymmetric key size (bits)	Symmetric key size (bits)
1024-bit RSA	80
2048-bit RSA	Triple DES (112)
3072-bit RSA	AES-128
4096-bit RSA	n/a

§ **z/VSE Crypto Express3 exploitation in coprocessor mode (CEX3C)**

– New z/VSE crypto device driver allows to generate RSA keys directly on the mainframe

– Higher Security by generation of "**true random numbers**"

Enterprise2013

z/VSE exploitation of IBM System Storage options

§ IBM System Storage **TS7700** Virtualization Engine Release 3.0
  – Copy Export function can be used for disaster recovery purposes
  – Multi-Cluster Grid Support enables disaster recovery or high availability solutions

§ **FCP-attached SCSI disks** can be used with:
  – IBM Storwize® V7000 Midrange Disk System
  – IBM XIV® Storage System
  – IBM San Volume Controller
  – IBM FlashSystem™

§ IBM System Storage **DS8870**
  – Newest member of the IBM System Storage DS8000 series
  – Supports FICON-attached ECKD and FCP-attached SCSI

§ IBM System Storage **TS1140**
  – Tape Drive Model E07 – fourth generation
  – Designed to provide higher levels of performance, reliability and capacity

TS7700

TS1140

FlashSystem 720 / 820

Midrange size system with great high-end features

XIV

High-end system with grid architecture

Storwize V7000

Enterprise2013

© 2013 IBM Corporation

Agenda

- § **IBM zEnterprise System**

- § **z/VSE Strategy and how it relates to zEnterprise**

- § **z/VSE Exploitation of zEnterprise**

- § **Pricing Strategy**

Enterprise2013

z114 pricing strategy

Our customers are focused on ...	*IBM taking action ...*
Price performance on the stack, pricing linked to increased capability and performance	§ **Deliver price performance on Hardware, Software, and Maintenance** § Introduce **$75k z114 Hardware Entry Price** (down 25% from z10 BC) § z114 Unified Resource Manager priced per connection
TCA and short term ROI and cost savings	§ Memory - **Cutting prices by 75%** versus z10 BC, and **instituting upgrade charge** § Specialty Engines - **Cutting IFL prices by 27%** (zIIP's/zAAP's by 16%) versus z10 BC, and **instituting upgrade charge**
MLC software savings and unit cost improvement	§ Announcing new metric **"Advanced Entry Workload License Charges" (AEWLC)** § Providing price performance of up to 18% versus z10 BC for z/OS workloads, and **up to 5% versus z10 BC for z/VSE workloads**
Competitive pricing for new workloads versus off-platform alternatives	§ Continue **Solution Edition** strategy to aggressively compete for new workloads & applications
Financial benefit when growing capacity on the platform	§ Providing incremental **stack savings for stack capacity growth**

<u>Note</u>: Items marked in 'blue' are of relevance to z/VSE, z/VM, and/or Linux on System z. All prices are US prices, will vary by GEO.

© 2013 IBM Corporation

Enterprise2013

z114 pricing strategy – changes with zBC12

Our customers are focused on ...	IBM taking action ...
Price performance on the stack, pricing linked to increased capability and performance	§ **Deliver price performance on Hardware, Software, and Maintenance** § Introduce **$75k z114 Hardware Entry Price** (down 25% from z10 BC) – flat w/ zBC12, up from 26 to 50 MIPS § z114 Unified Resource Manager priced per connection
TCA and short term ROI and cost savings	§ Memory - **Cutting prices by 75%** versus z10 BC, and **instituting upgrade charge** – flat w/ zBC12 § Specialty Engines - **Cutting IFL prices by 27%** (zIIP's/zAAP's by 16%) versus z10 BC, and **instituting upgrade charge** – flat w/ zBC12, 36% more capacity
MLC software savings and unit cost improvement	§ Announcing new metric **"Advanced Entry Workload License Charges" (AEWLC)** – same metric w/ zBC12 § Providing price performance of up to 18% versus z10 BC for z/OS workloads, and **up to 5% versus z10 BC for z/VSE workloads** – add'l up to 5% versus z114
Competitive pricing for new workloads versus off-platform alternatives	§ Continue **Solution Edition** strategy to aggressively compete for new workloads & applications – new VSE/Linux growth offering with zBC12
Financial benefit when growing capacity on the platform	§ Providing incremental **stack savings for stack capacity growth** – flat w/ zBC12

<u>Note</u>: Items marked in 'blue' are of relevance to z/VSE, z/VM, and/or Linux on System z. All prices are US prices, will vary by GEO.
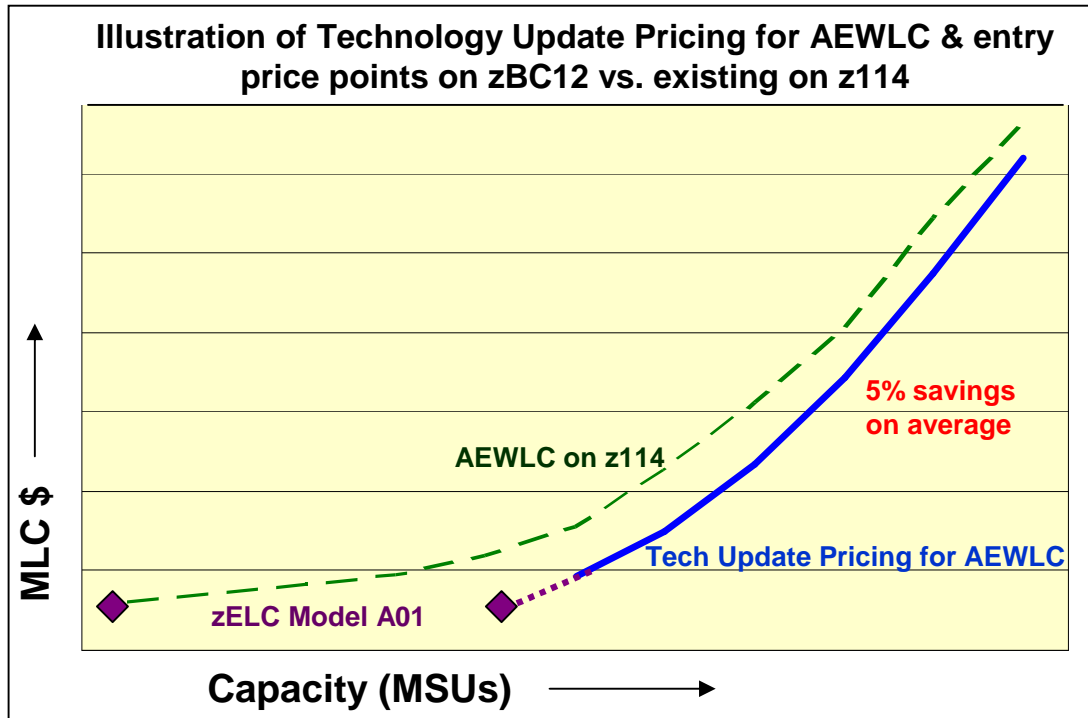
Enterprise2013

zBC12 pricing strategy

§ **Gain MLC price performance (p/p) for zBC12 via enhanced AEWLC pricing**
  – *"Technology Update Pricing for AEWLC"*
  – Maintain existing AEWLC software metric, prices and existing AEWLC contract

§ **Deliver 4% - 5% MLC p/p on average** coupled with targeted GPA (General Price Action) on EWLC metric
  – Price performance compared to AEWLC on z114 (flat capacity assumed)
  – Targeted price performance tied to capacity

§ **EWLC GPA +3% increase effective January 1, 2014**
  – GPA will impact z10 BC and older machines only

§ **Increased p/p at very low-end aligned with new HW entry point of 50 MIPS**
  – Historical mainframe entry point was 26 MIPS, is now 50 MIPS with zBC12
  – Maintain zELC model A01 pricing for zBC12 entry machine

§ **Hold Linux engine (IFL) PVU rating flat at 100 PVUs**
  – Projected engine performance improvement approximately 36%

Note: Items marked in 'blue' are of relevance to z/VSE, z/VM, and/or Linux on System z. All prices are US prices, will vary by GEO.

Enterprise2013

Technology Update Pricing for AEWLC leverages the existing AEWLC pricing metric while offering price performance for zBC12

Illustration of Technology Update Pricing for AEWLC & entry price points on zBC12 vs. existing on z114

MLC $

5% savings
on average

AEWLC on z114

Tech Update Pricing for AEWLC

zELC Model A01

Capacity (MSUs)

Technology Update Pricing for AEWLC
zBC12 Pricing

Machine Rated MSU Range	Reduction to AEWLC
1-7 MSU	5.0%
8-17 MSU	5.0%
18- 30 MSU	5.0%
31-45 MSU	5.0%
46-87 MSU	4.0%
88-175 MSU	4.0%
176-260 MSU	4.0%
261 - 315 MSU	4.0%
316 - 390 MSU	4.0%
390 + MSU	4.0%

* Reductions to AEWLC calculated using the Full Capacity MSUs of zBC12 machines. Sample stack includes z/OS, DB2, CICS and WMQ.

Benefits of the Technology Update Pricing for AEWLC:

§ Technology Update Pricing for AEWLC provides <u>visible customer savings</u>

§ Enables very <u>targeted price performance</u> aligned to capacity

§ Applies to <u>MLC pricing only</u> with no impact to OTC price points

§ Delivers with <u>reduced complexity</u> – no new pricing metric to learn

§ <u>Same AEWLC agreement</u> as already used for z114

§ Extending <u>zELC A01 pricing to</u> zBC12 entry also provides increased p/p at zBC12 entry model

Enterprise2013

MWLC on z9/z10/z196 and zEC12, AEWLC on z114 and zBC12

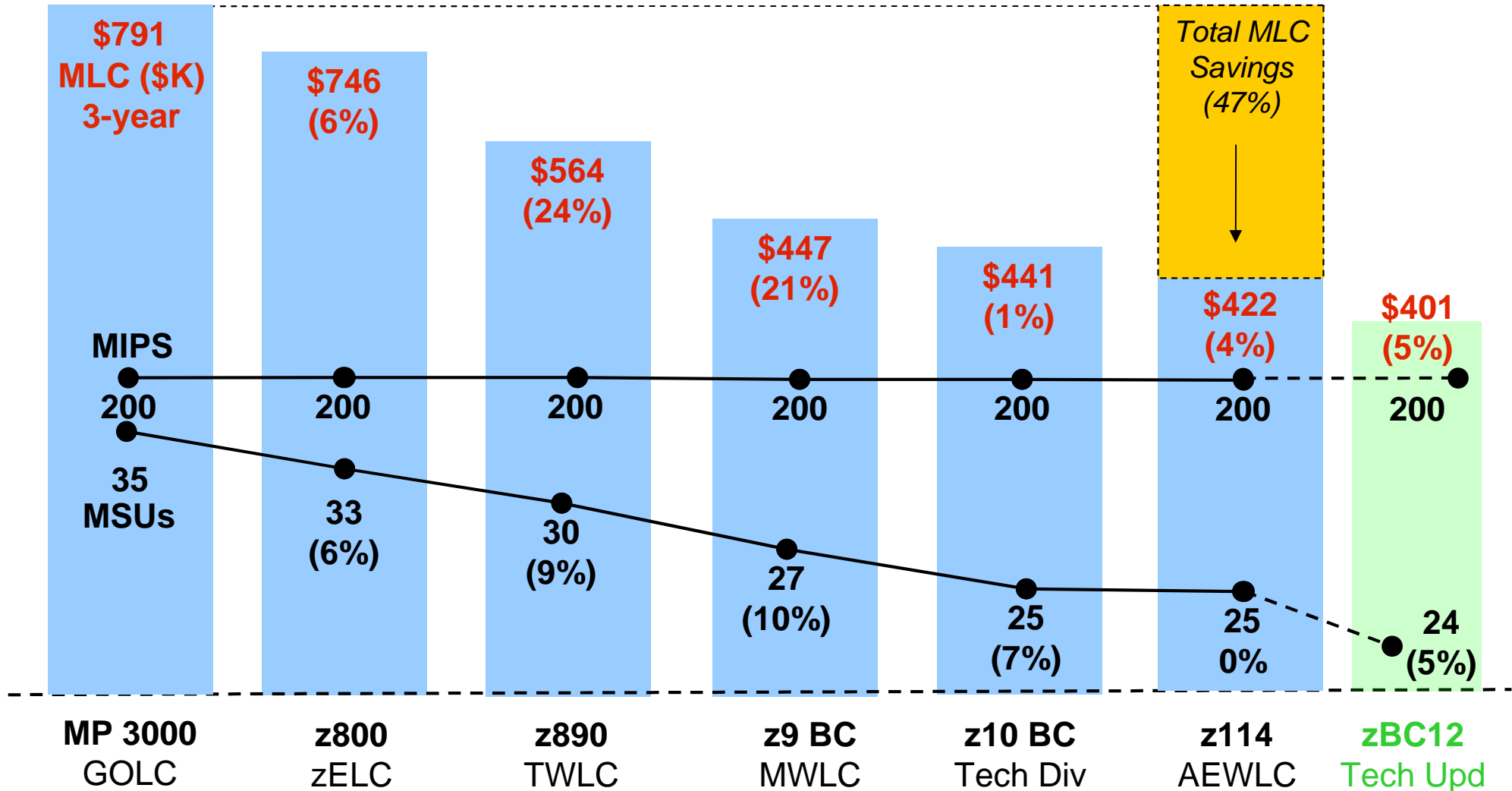## Price for typical z/VSE stack
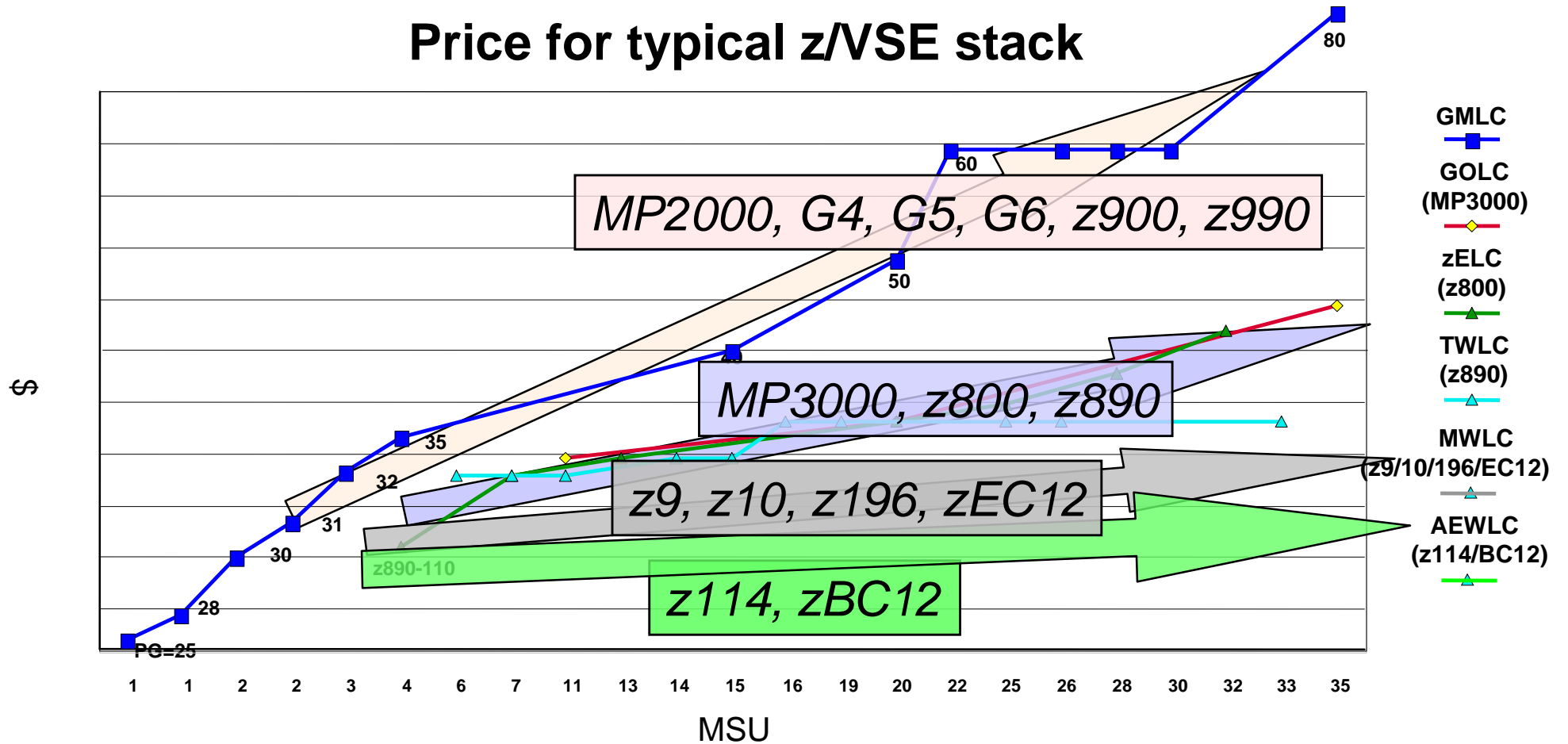
Typical z/VSE stack consists of z/VSE Operating System, LE, CICS TS, VTAM, TCP/IP, DB2

IBM

MLC price performance across HW generations for z/VSE
200 MIPS example for a typical z/VSE stack

* All prices are US prices, will vary by GEO.

$791
MLC ($K)
3-year

$746
(6%)

$564
(24%)

$447
(21%)

$441
(1%)

Total MLC Savings (47%)

$422
(4%)

$401
(5%)

MIPS

200   **200**   **200**   **200**   **200**   **200**   **200**

35
MSUs

33
(6%)

30
(9%)

27
(10%)

25
(7%)

25
0%

24
(5%)

MP 3000	z800	z890	z9 BC	z10 BC	z114	zBC12
GOLC	zELC	TWLC	MWLC	Tech Div	AEWLC	Tech Upd

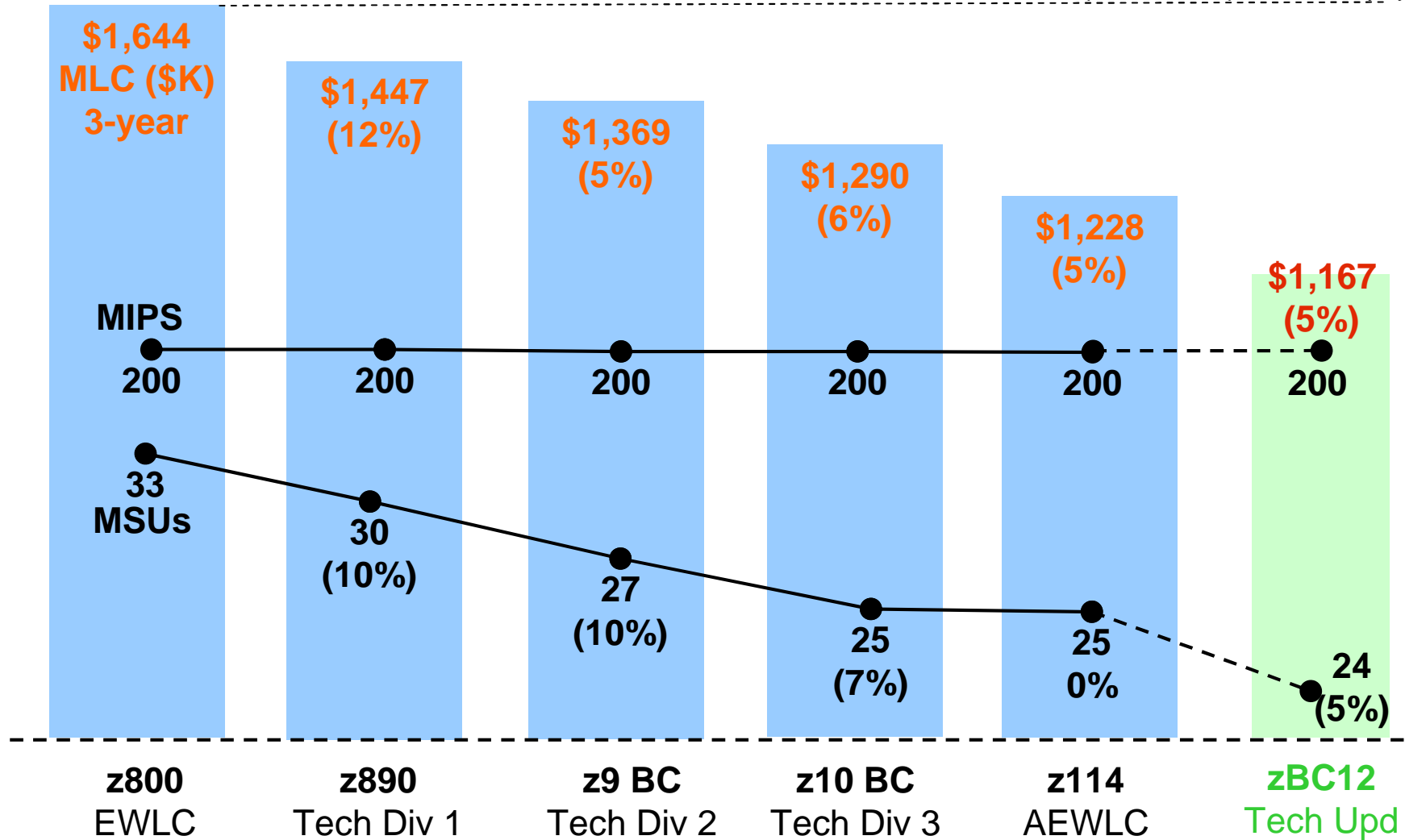* MLC savings will vary significantly by customer - actual customer configuration must be priced out to be accurate.
* A typical z/VSE stack includes z/VSE CF, CICS TS, VTAM, TCP/IP, DB2, Ditto, Cobol, HLASM

© 2013 IBM Corporation

Enterprise2013

IBM

MLC price performance across HW generations for z/OS
200 MIPS example for a typical z/OS stack

* All prices are US prices, will vary by GEO.

$1,644
MLC ($K)
3-year

$1,447
(12%)

$1,369
(5%)

$1,290
(6%)

$1,228
(5%)

$1,167
(5%)

MIPS

200   200   200   200   200   200

33
MSUs

30
(10%)

27
(10%)

25
(7%)

25
0%

24
(5%)

| z800 | z890 | z9 BC | z10 BC | z114 | zBC12 |
| EWLC | Tech Div 1 | Tech Div 2 | Tech Div 3 | AEWLC | Tech Upd |

* MLC savings will vary significantly by customer - actual customer configuration must be priced out to be accurate.

Enterprise2013

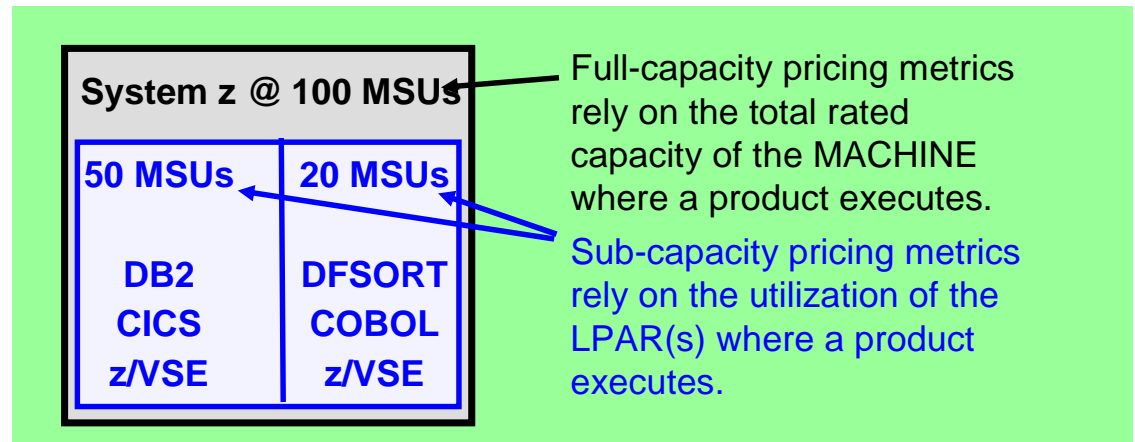# Additional MLC savings are possible through sub-capacity pricing

§ **z/VSE price/performance through new pricing metric**

  – Advanced Entry Workload License Charge (**AEWLC**)

  – AEWLC requires z114 or zBC12 <u>and</u> current z/VSE software (i.e. z/VSE V4 or V5)
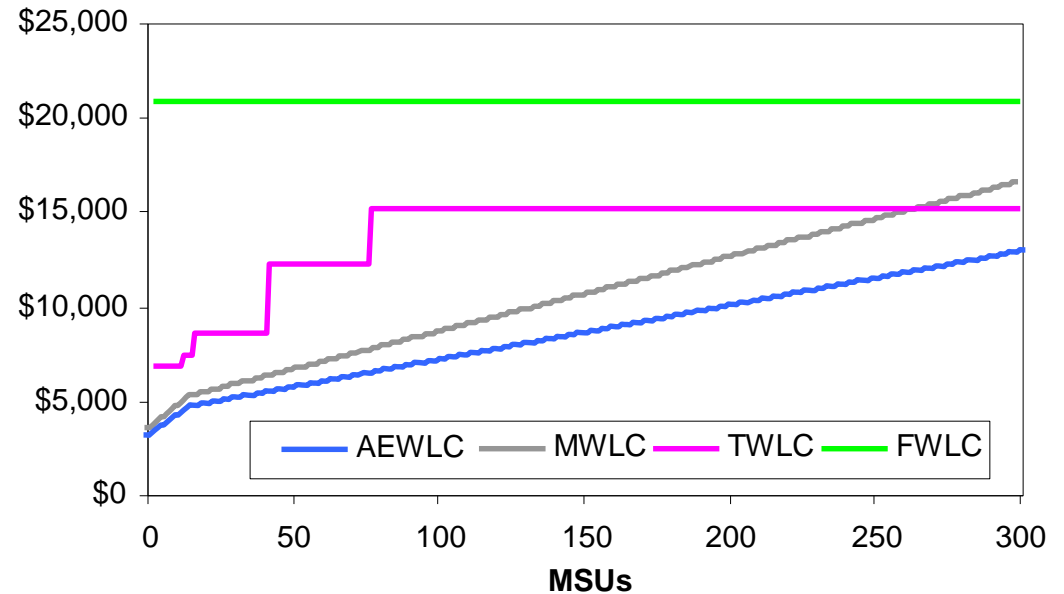
§ **Additional price/performance through sub-capacity option**

  – Some hardware footprint **consolidations** more attractive now

  – Presence of z/VSE V3 or VSE/ESA™ forces full-capacity pricing

System z @ 100 MSUs

50 MSUs	20 MSUs
DB2 CICS z/VSE	DFSORT COBOL z/VSE

Full-capacity pricing metrics rely on the total rated capacity of the MACHINE where a product executes.

Sub-capacity pricing metrics rely on the utilization of the LPAR(s) where a product executes.

(*) z9 BC A01, z10 BC A01, z114-A01, zBC12 entry model are priced zELC.

Enterprise2013

IBM

PVU Table – RISC + System z
Processor Value Units

PVU Website Link:
[click here](#)

http://ibm.com/software/lotus/
passportadvantage/pvu_licen
sing_for_customers.html

Notes:
1) Each Integrated Facility for Linux (IFL) or Central Processor (CP) engine is equivalent to 1 processor core.

2) Refers to System z9, eServer zSeries, or System/390 servers.

3) Entitlements required for Power Processor Element (PPE) cores only.

4) The PVU requirement for the POWER7/7+ processor technology is dependent on the maximum possible number of sockets on the server.

5) z196 refers to IBM zEnterprise 196, zEC12 refers to IBM zEnterprise EC12.

6) z114 refers to IBM zEnterprise 114

PVU Table per Core (section 1 of 2 - RISC and System z)

Processor Technologies												
	Processor Brand				Processor Type							
Processor Vendor	Processor Name	Server model numbers	Maximum number of sockets per server	Cores per socket						IFL Engine	Proc. Model Number	PVUs per Core
				(1)	(2)	(4)	(6)	(8)	(16)			
IBM	POWER7 [4]	770, 780, 795	> 4			■	■	■			All	120
		750, 755, 760, 775 PS704, p460	4			■	■	■			All	100
		PS700-703, 710-740, p260, p270, 7R1, 7R2, p24L	2			■	■	■			All	70
	POWER6	550, 560, 570, 575, 595	All		■						All	120
		520, JS12, JS22, JS23, JS43	All		■						All	80
	POWER5, POWER4	All	All		■						All	100
	POWER5 QCM	All	All			■					All	50
	zEC12, z196, System z10 [1,5]	All	All							■	All	120
	zBC12, z114, System z9, z990, S/390 [1,2,6]	All	All							■	All	100
	PowerPC 970	All	All		■						All	50
	PowerXCell[TM], Cell/B.E.[TM] 8i[3]	All	All	■							All	30

© 2013 IBM Corporation

Benefit from the security, performance and scalability of both technologies and save 50% on Red Hat Enterprise Linux on IBM System z Business Class servers

§ Consolidate workloads and save on software license costs

§ Bring Data closer to the Application

§ Explore Big Data and Analytics under Linux on System z

§ Extra security with SELinux and platform independent Management with RHN Satellite

Rules:
- Discount of 50% on MSRP
- Applicable for Business Class (BC) machines only
- New workloads* (Net New Customers)
- Limited to 28th February 2014

For more information - contact Red Hat's local Alliance Manager or:
WW   Filipe Miranda   fmiranda@redhat.com
US   Jennifer Miller   jmiller@redhat.com
EMEA   Sebastian Siegert   ssiegert@redhat.com
APAC   Norman Deery   ndeery@redhat.com
LATAM   Mariano Fernandez   mfernanfez@redhat.com
BRAZIL   Samuel Masini   samuca@redhat.com

*Not valid for renewals of regular Subscriptions   www.redhat.com/products/enterprise-linux/for-ibm-system-z/promotions/

z114

zBC12

SLES for System z Business Class Multi-IFL Promotion (USD)

NEW

Basic Subscription Pricing*	1 IFL	2-5 IFLs	6-11 IFLs	12+ IFLs
1 year	$6,000	$5,700	$5,600	$5,500
3 year	$16,200	$15,400	$15,100	$14,800
5 year	$24,000	$22,800	$22,400	$21,900

Basic Subscription:
includes Code Maintenance, such as patches, fixes and security updates.
Can be combined with IBM GTS services

Standard Subscription Pricing*	1 IFL	2-5 IFLs	6-11 IFLs	12+ IFLs
1 year	$7,500	$7,200	$7,000	$6,900
3 year	$20,300	$19,300	$18,900	$18,500
5 year	$30,000	$28,500	$27,900	$27,300

Standard Subscription:
includes Basic Subscription deliveries plus 12x5 Support services delivered by SUSE Technical Services

Priority Subscription Pricing*	1 IFL	2-5 IFLs	6-11 IFLs	12+ IFLs
1 year	$9,000	$8,600	$8,400	$8,200
3 year	$24,300	$23,100	$22,600	$22,200
5 year	$36,000	$34,200	$33,500	$32,800

Priority Subscription:
includes Basic Subscription deliveries plus 24x7 Support services delivered by SUSE Technical Services

* Per IFL. Get more details on subscription and support service levels here !

ATTENTION:
ı **Offer is restricted to new System z Business Class purchases only**
ı **Promotion Period: September 2013 (with availability of zBC12) through December 31st, 2014**
ı **Get a 50% discount compared to regular Multi-IFL pricing – plus volume discount!**

Thank You

Enterprise2013