zEnterprise and z/VSE
Features, Functions, Software Pricing

zDG02

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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*
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Agenda

§ **zEnterprise**
- **z196, z114**
- **zBX**
- **zManager**

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

§ **z/VSE Exploitation of zEnterprise**
- **z/VSE V5.1**
- **z/VSE V4.3**

§ **Pricing Strategy on zEnterprise**
- **Hardware Pricing**
- **Solution Edition**
- **z/VSE Software Pricing**

§ **Wrap-up**

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 (z196)

§ 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

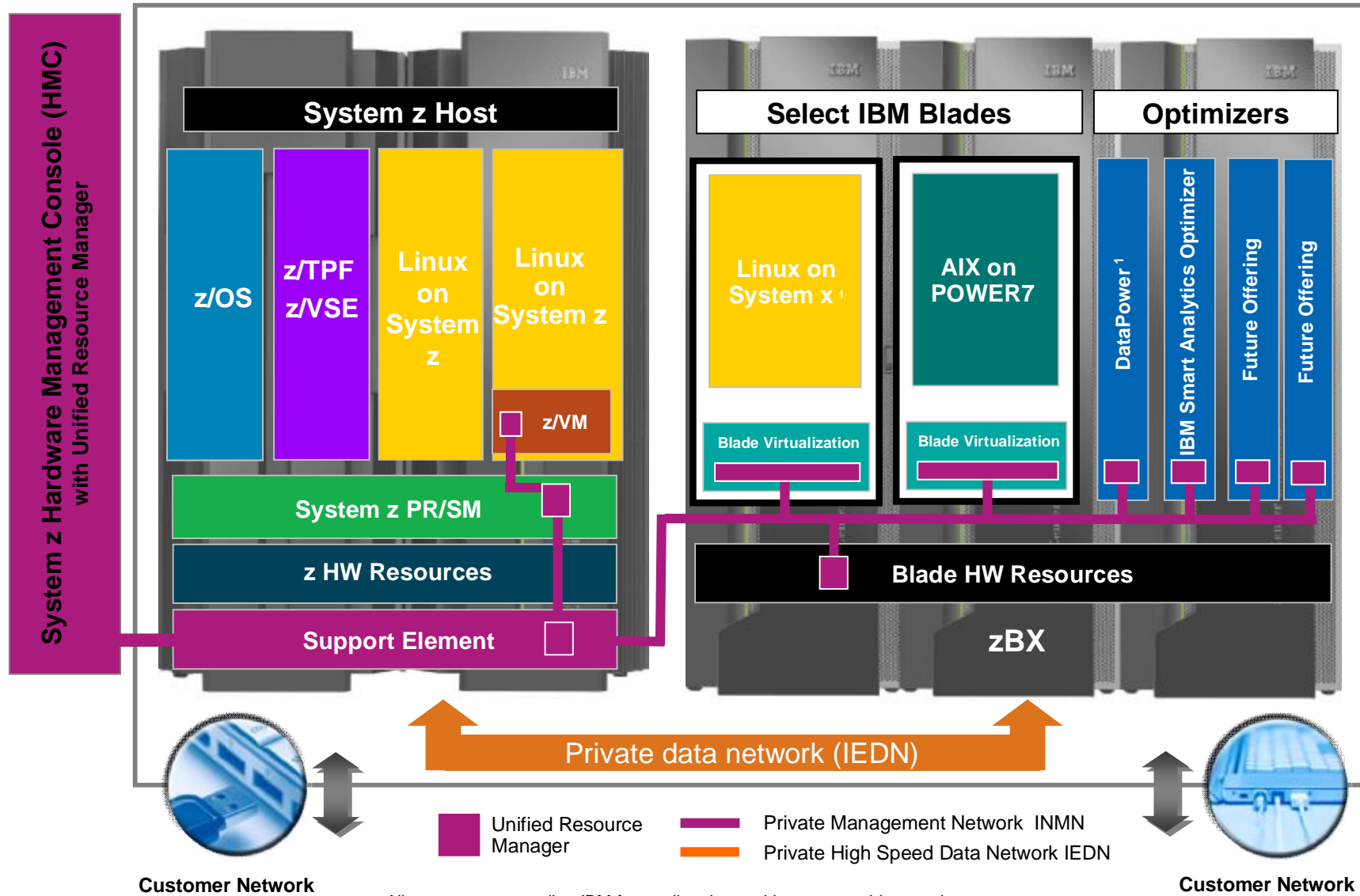§ Capable of massive scale up, over 50 Billion Instructions per Second (BIPS)

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

§ Selected IBM POWER7™ blades and IBM System x® Blades[1] for tens of thousands of AIX® and Linux 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

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Putting zEnterprise System to the Task - Announced in July 2010

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 [1]	AIX on POWER7

Blade Virtualization

Blade Virtualization

Optimizers

DataPower [1]

IBM Smart Analytics Optimizer

Future Offering

Future Offering

Blade HW Resources

zBX

Private data network (IEDN)

	Unified Resource Manager		Private Management Network INMN
			Private High Speed Data Network IEDN

Customer Network

Customer Network

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zEnterprise and z/VSE

zEnterprise technology designed for mid-sized businesses
The value begins with a new size…

Up to
18% **Improvement for traditional z/OS workloads** [1]

Up to an ADDITIONAL
25% **Improvement in CPU intensive workloads via compiler enhancements** [2]

Up to
12% **Total capacity improvement** [1]

Scales From
26 - 3100 **MIPS**

Up to
130 **Available capacity settings**

From
1-10 **Configurable cores for client use includes CPs, IFL, zIIP, zAAP, and ICFs**

From
0-2 **IBM provided spare cores**

Up to
256 **GB RAIM fault tolerant memory**

Fully Upgradeable from the z10 BC & z9 BC; and to the z196 M15

zEnterprise 114 (z114)
Machine Type: 2818
2 Models: M05 & M10

§ **New technology in a new package**
– Modular 2 drawer design for lower cost of entry
– Granularity for right-sizing your system
– Additional Scale for consolidation and growth
– Improved data center efficiency
– Same Qualities of Service as the z196
– Hybrid enabled to drive workload expansion and integration

§ **Improved Platform Economics**
– New Software Curve
– Lower Hardware Maintenance
– Lower specialty engine and memory prices
– Upgradeability for investment protection

[1]Relative capacity and performance compares at equal software levels as measured by IBM Large System Performance Reference (LSPR) workloads using z/OS® 1.11, Results may vary
[2]The z114 will exhibit up to 25% increase for CPU intensive workload as provided by multiple C/C++ compiler level improvements when going from z/OS 1.09 to z/OS 1.12

zEnterprise and z/VSE

New Blades Provide Added Flexibility for Workload Deployment and Integration

§ **Introducing System x Blades in the zBX**

- IBM BladeCenter HX5 7873 dual-socket 16-core blades
- Complements existing portfolio of POWER7, DataPower XI50z
  and IBM Smart Analytic Optimizer blades.
- Ordered and fulfilled through System x providers
- Blades assume System x warranty and maintenance when installed in the zBX

§ **Unified Resource Manager will install an integrated hypervisor on blades in the zBX**

- KVM-based with IBM service and support

§ **Up to 112 Blades supported on zBX**

- Ability to mix and match DataPower XI50z, POWER7 and System x blades in the same chassis for better zBX utilization
- Number of blades supported varies by type

IBM zEnterprise
BladeCenter Extension (zBX)
Machine Type: 2458 Mod 002

Optimizers
- IBM Smart Analytics Optimizer
- IBM WebSphere DataPower Integration Appliance XI50z for zEnterprise

Select IBM Blades
- IBM BladeCenter PS701 Express
- IBM BladeCenter HX5 7873

One to four – 42u racks – capacity for up to 112 blades

- **Up to 112 PS701 Power blades**
- **Up to 28 HX5 System x blades**
- **Up to 28 DataPower XI50z blades (double-wide)**
- **Up to 56 IBM Smart Analytics Optimizer blades**

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zEnterprise and z/VSE

Extending support to New **Operating System Environments**

NEW § **Support for Linux and in the future Windows[1] environments on select System x blades**
- 64-bit version support only
- Linux: RHEL 5.5, SLES 11 SP1
- Additional versions to follow[1]
- In the future we are planning to support Microsoft® Windows® Server 2008 - Datacenter Edition[1]

§ **Certifications inherited from System x**

§ **Operating Systems are customer acquired and installed**

§ **Delivering APIs to enable management of Unified Resource Manager from external tools[1]**
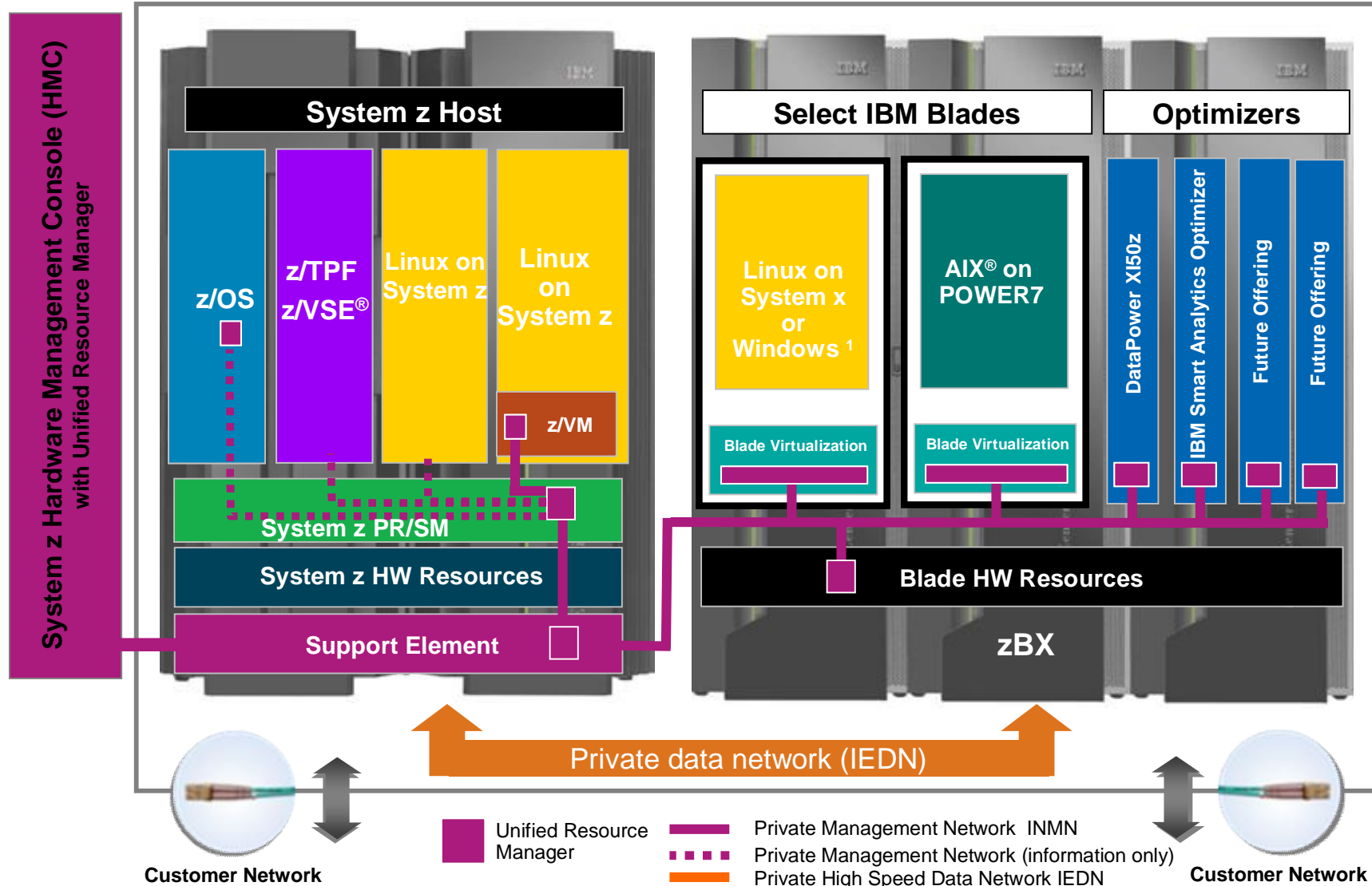- Providing API access to Unified Resource Manager functions

Manage your mainframe and distributed environment with the same tools, same techniques, same practices

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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

System z HW Resources

Support Element

Select IBM Blades

Linux on System x or Windows [1]

AIX® on POWER7

Blade Virtualization

Blade Virtualization

Optimizers

DataPower XI50z

IBM Smart Analytics Optimizer

Future Offering

Future Offering

Blade HW Resources

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

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zEnterprise and z/VSE

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§ **z/VSE Exploitation of zEnterprise**
- **z/VSE V5.1**
- **z/VSE V4.3**

§ **Pricing Strategy on zEnterprise**
- **Hardware Pricing**
- **Solution Edition**
- **z/VSE Software Pricing**

§ **Wrap-up**

Hybrid Computing with the zEnterprise - Announced in July 2010

Freedom to innovate your business with a multi-platform that's both mainframe and distributed
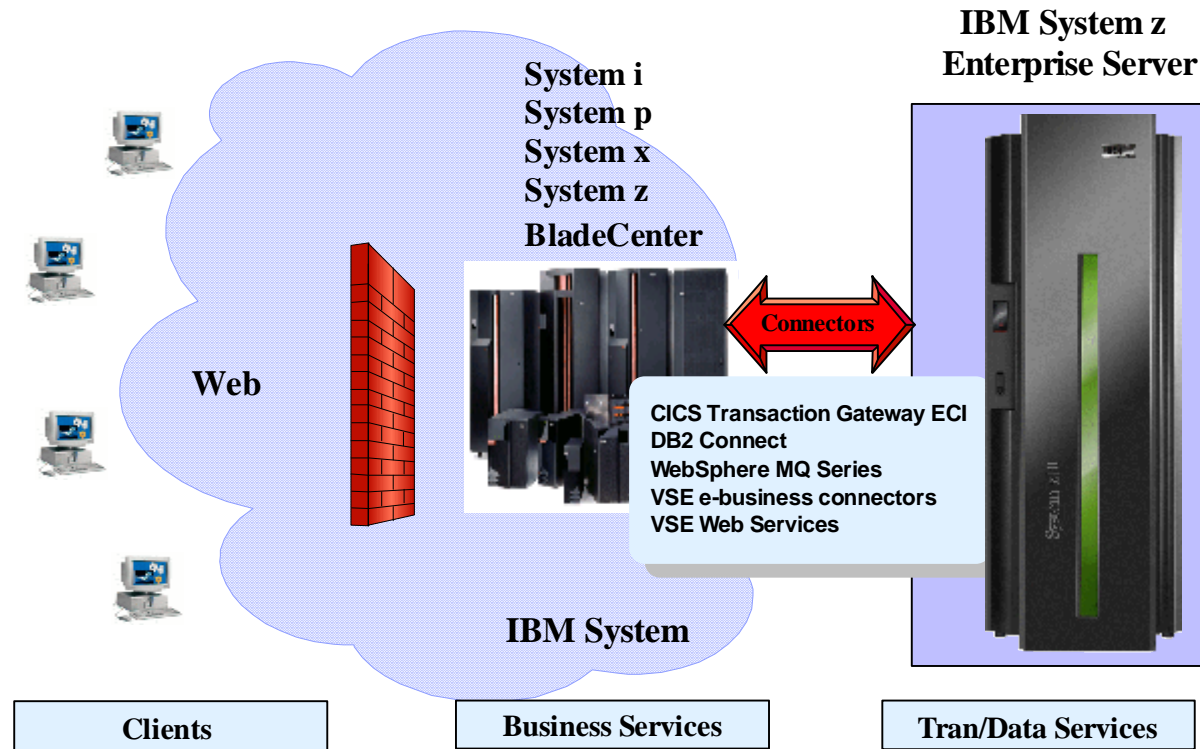
§ Redefining IT frameworks to bring change to operational silos and extend System z governance to POWER7 and IBM System x blades

§ Fast and flexible application integration

§ Improving agility to compete with consolidation and simplification

§ Delivering consistent business controls across applications and platforms

§ Focused on integration and collaboration to fuel business growth

§ zEnterprise is the industry's only heterogeneous cloud platform
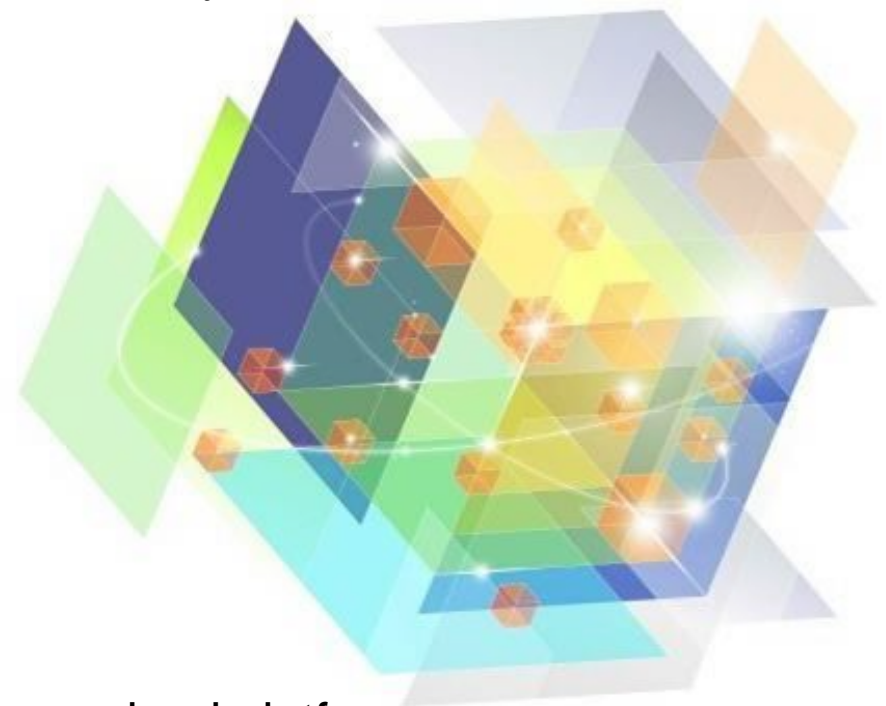
z/VSE Strategy - Invented in Year 2000

alias

§ 3-tier Strategy

§ **Hybrid Strategy**

§ Connector Strategy

§ Migration Strategy

§ Coexistence Strategy

§ Linux Surround Strategy

§ **PIE Strategy**
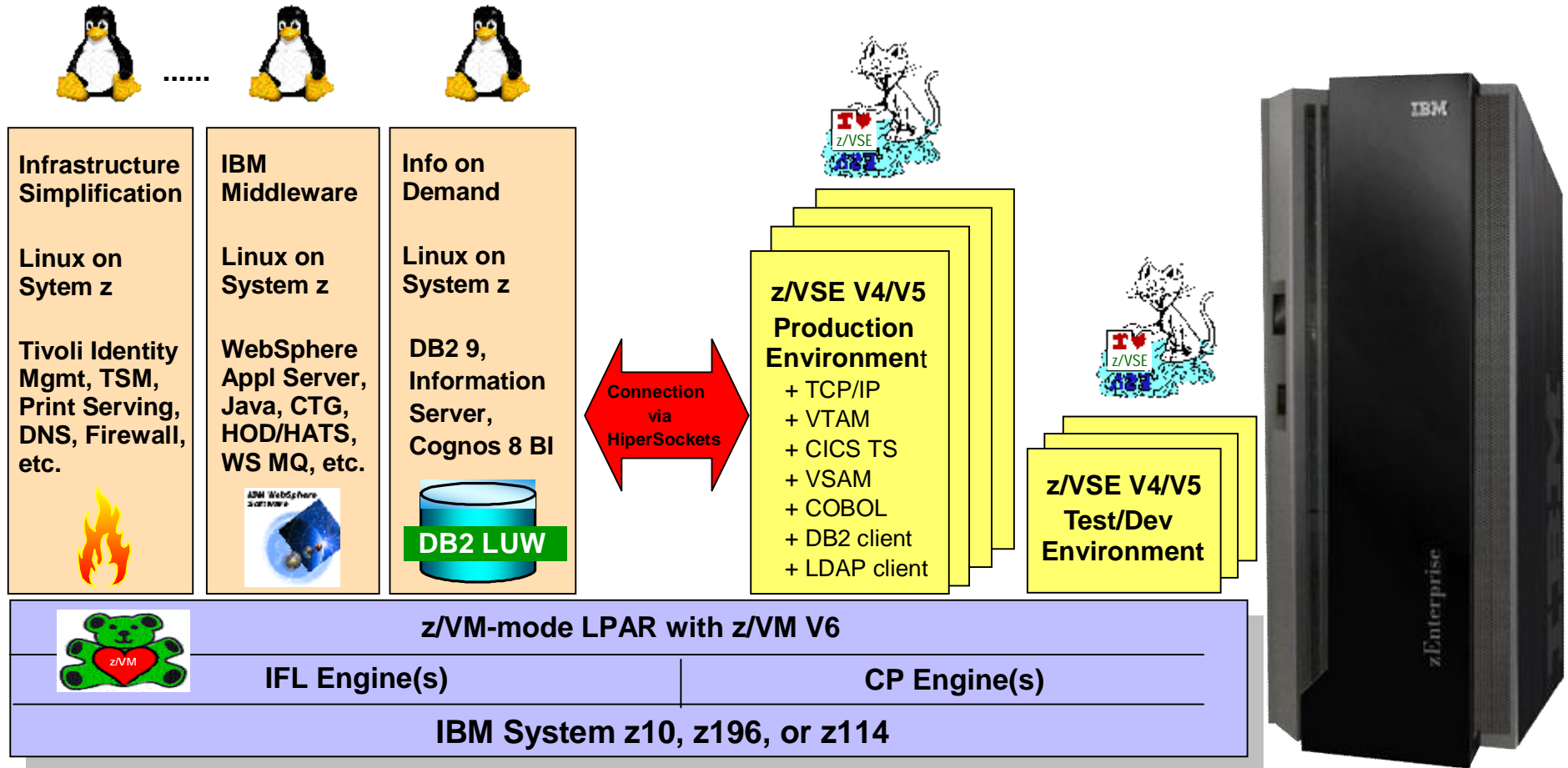
IBM System z Enterprise Server

**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

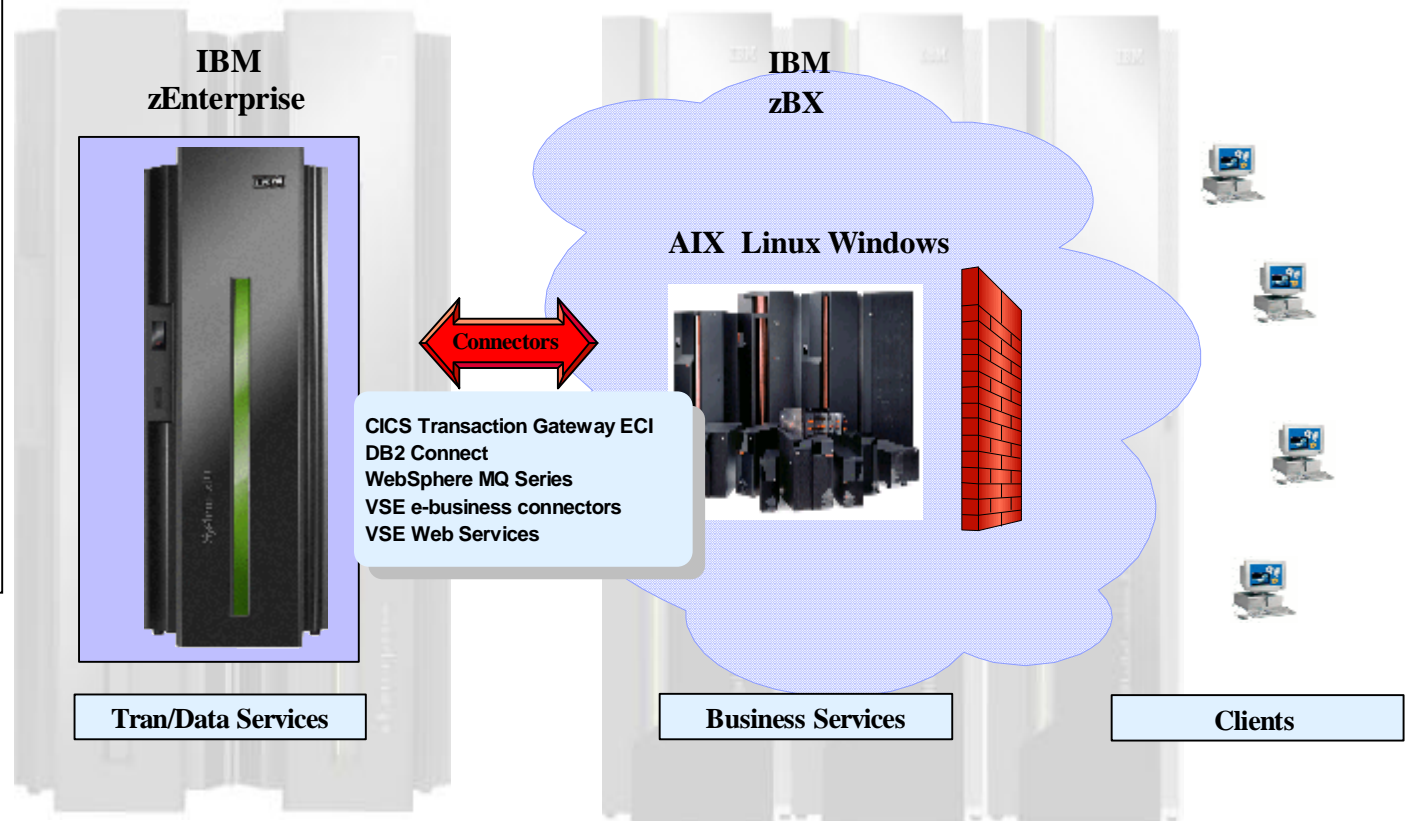**Clients**

Business Services

Tran/Data Services

Protect existing VSE investments

Integrate using middleware and VSE connectors

Extend with another platform to access new applications & solutions

z/VSE Strategy w/ 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 9, Information Server, Cognos 8 BI

DB2 LUW

Connection via HiperSockets

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

z/VSE V4/V5 Test/Dev Environment

z/VM-mode LPAR with z/VM V6

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

IBM System z10, z196, or z114

z/VSE Strategy - Invented in Year 2000 - Recognize what changed?

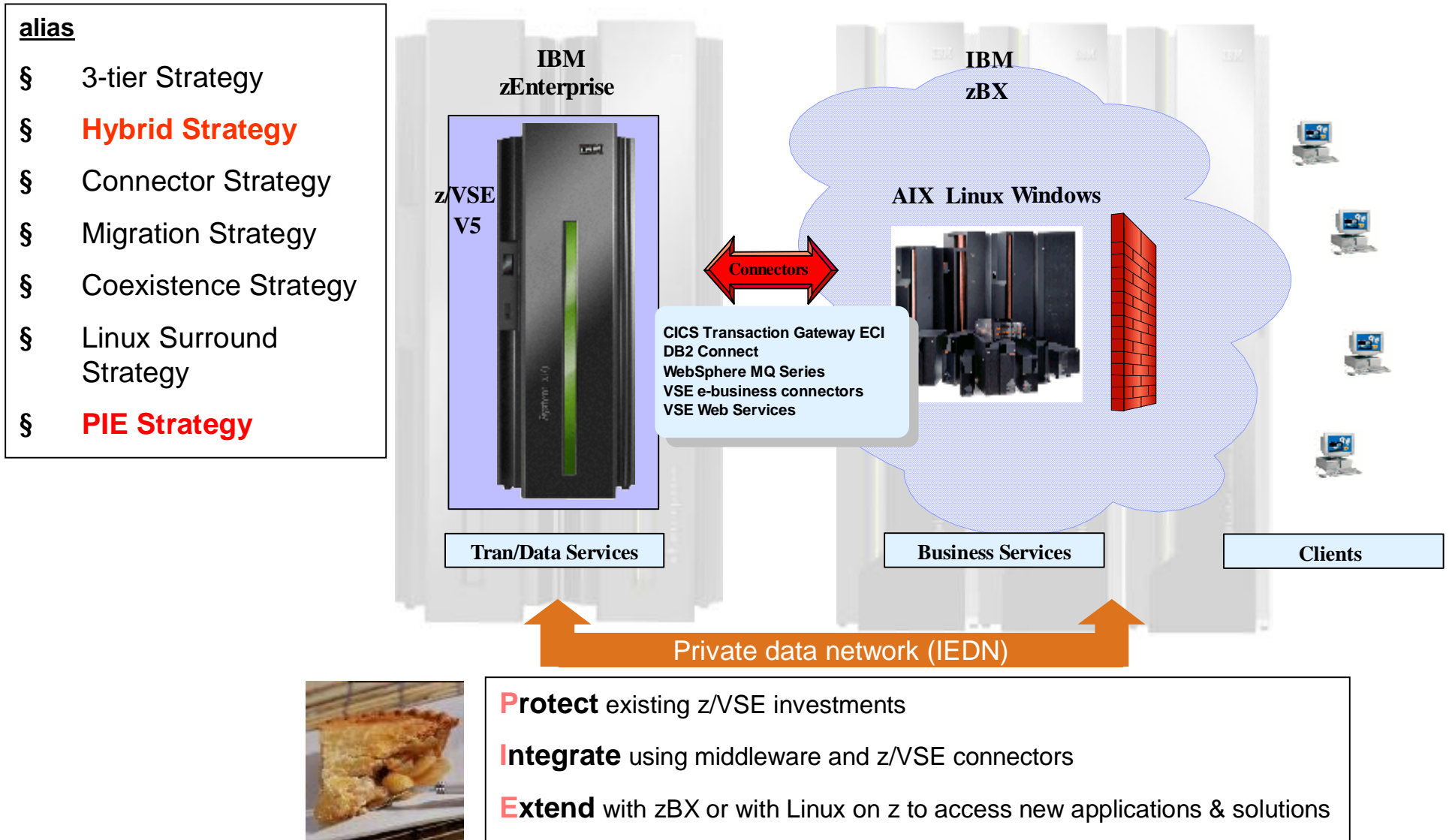**alias**

§ 3-tier Strategy

§ **Hybrid Strategy**

§ Connector Strategy

§ Migration Strategy

§ Coexistence Strategy

§ Linux Surround Strategy

§ **PIE Strategy**

IBM System z Enterprise Server

Connectors

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

System i
System p
System x
System z

BladeCenter

Web

IBM System

Tran/Data Services

Business Services

Clients

Protect existing VSE investments

Integrate using middleware and VSE connectors

Extend with another platform to access new applications & solutions

zEnterprise and z/VSE

z/VSE Strategy - Natural Evolvement into zEnterprise

alias

§   3-tier Strategy

§   **Hybrid Strategy**

§   Connector Strategy

§   Migration Strategy

§   Coexistence Strategy

§   Linux Surround Strategy

§   **PIE Strategy**

IBM zEnterprise

IBM zBX

AIX Linux Windows

Connectors

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

Tran/Data Services

Business Services

Clients

Protect existing z/VSE investments

Integrate using middleware and z/VSE connectors

Extend with zBX or with Linux on z to access new applications & solutions

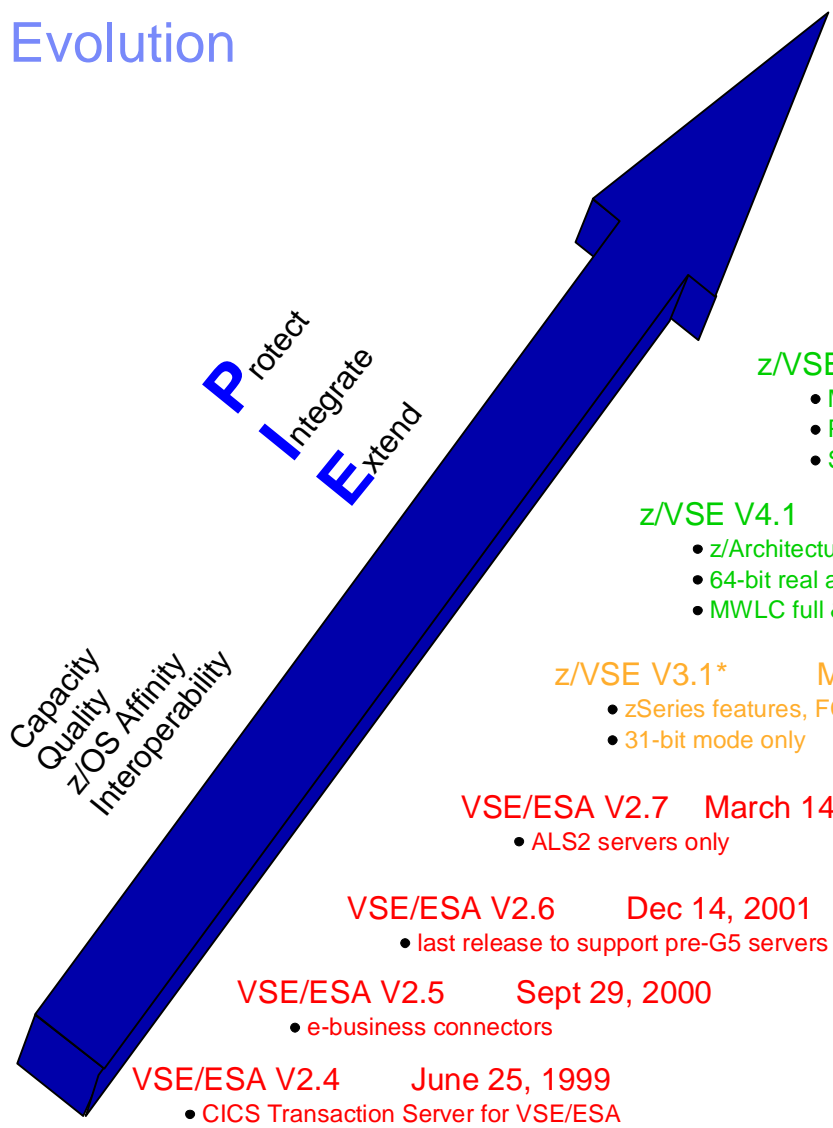# z/VSE V5 Strategy with zEnterprise - More options, highly integrated

alias

§ 3-tier Strategy

§ **Hybrid Strategy**

§ Connector Strategy

§ Migration Strategy

§ Coexistence Strategy

§ Linux Surround Strategy

§ **PIE Strategy**

IBM zEnterprise

z/VSE V5

IBM zBX

AIX Linux Windows

Connectors

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

Tran/Data Services

Business Services

Clients

Private data network (IEDN)

Protect existing z/VSE investments

Integrate using middleware and z/VSE connectors

Extend with zBX or with Linux on z to access new applications & solutions

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§ **z/VSE Strategy and how it relates to zEnterprise**
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⟶ § **z/VSE Exploitation of zEnterprise**
- **z/VSE V5.1**
- **z/VSE V4.3**

§ **Pricing Strategy on zEnterprise**
- **Hardware Pricing**
- **Solution Edition**
- **z/VSE Software Pricing**

§ **Wrap-up**

zEnterprise and z/VSE

z/VSE Evolution

Protect Integrate Extend

Capacity
Quality
z/OS Affinity
Interoperability

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

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, more memory, LDAP client
- PAV, SVC, EF, SCRT on z/VSE
- SoD** for CICS/VSE, RBD V7 extension, WMQ V3

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

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

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

VSE/ESA V2.6   Dec 14, 2001
- last release to support pre-G5 servers

VSE/ESA V2.5   Sept 29, 2000
- e-business connectors

VSE/ESA V2.4   June 25, 1999
- CICS Transaction Server for VSE/ESA

*) z/VSE V3 can operate in 31-bit mode only. It does not implement z/Architecture and specifically does not implement 64-bit mode capabilities. z/VSE V3 is designed to support selected features of IBM System z hardware.

**) All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice.

z/VSE Support for IBM zEnterprise - Overview
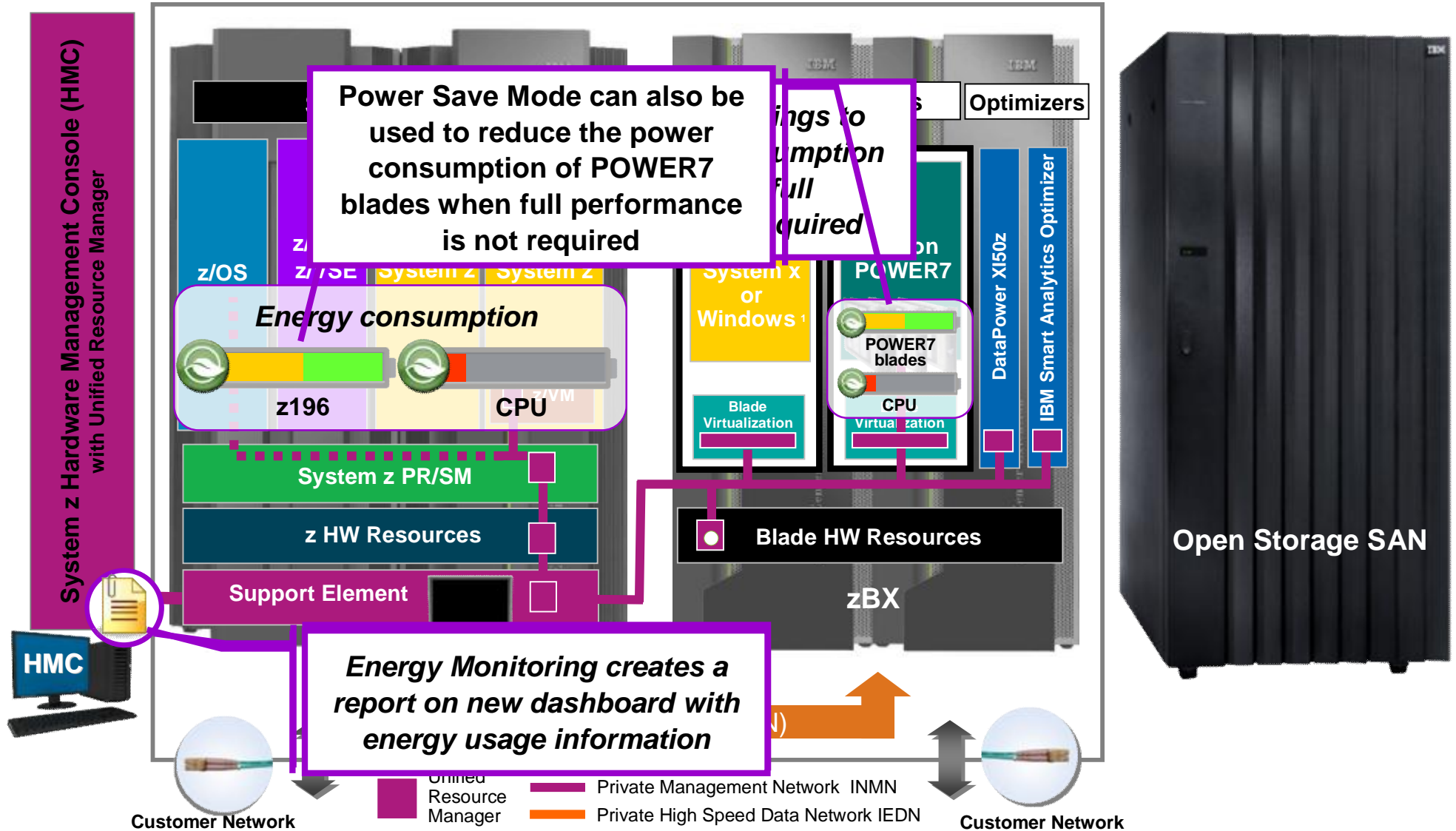
§ zEnterprise compatibility

- **z114 and z196 are supported by z/VSE V4.2, z/VSE V4.3, z/VSE V5.1 (GA 11/2011)**
  - Refer to z/VSE Preventive Service Planning (PSP) buckets
  - z/VSE PTFs are required for subcapacity pricing customers

§ zEnterprise exploitation

- **z196 exploitation**
  - Static power save mode for use with SCRT

- **z114 and z196 exploitation**
  - Fast Path to Linux on System z in a z/VM-mode LPAR
    (also available on z10 BC/EC)
  - z/VSE z/VM IP Assist (VIA)
  - Fast Path to Linux on System z in an LPAR environment
  - 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 supports Intra Ensemble Data Network (IEDN)
  - z/VSE V4 can participate in an IEDN data network using z/VM's VSWITCH support
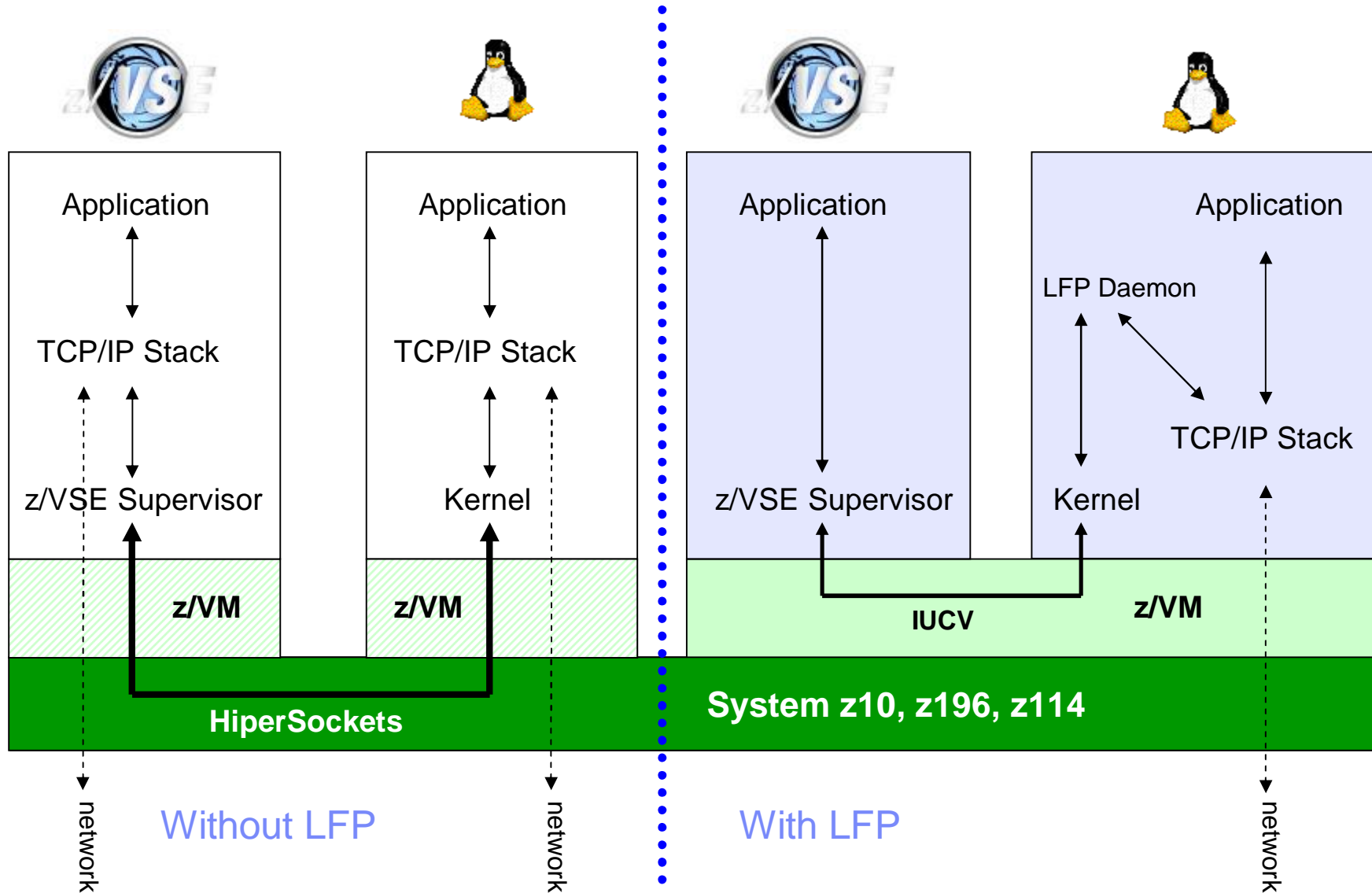
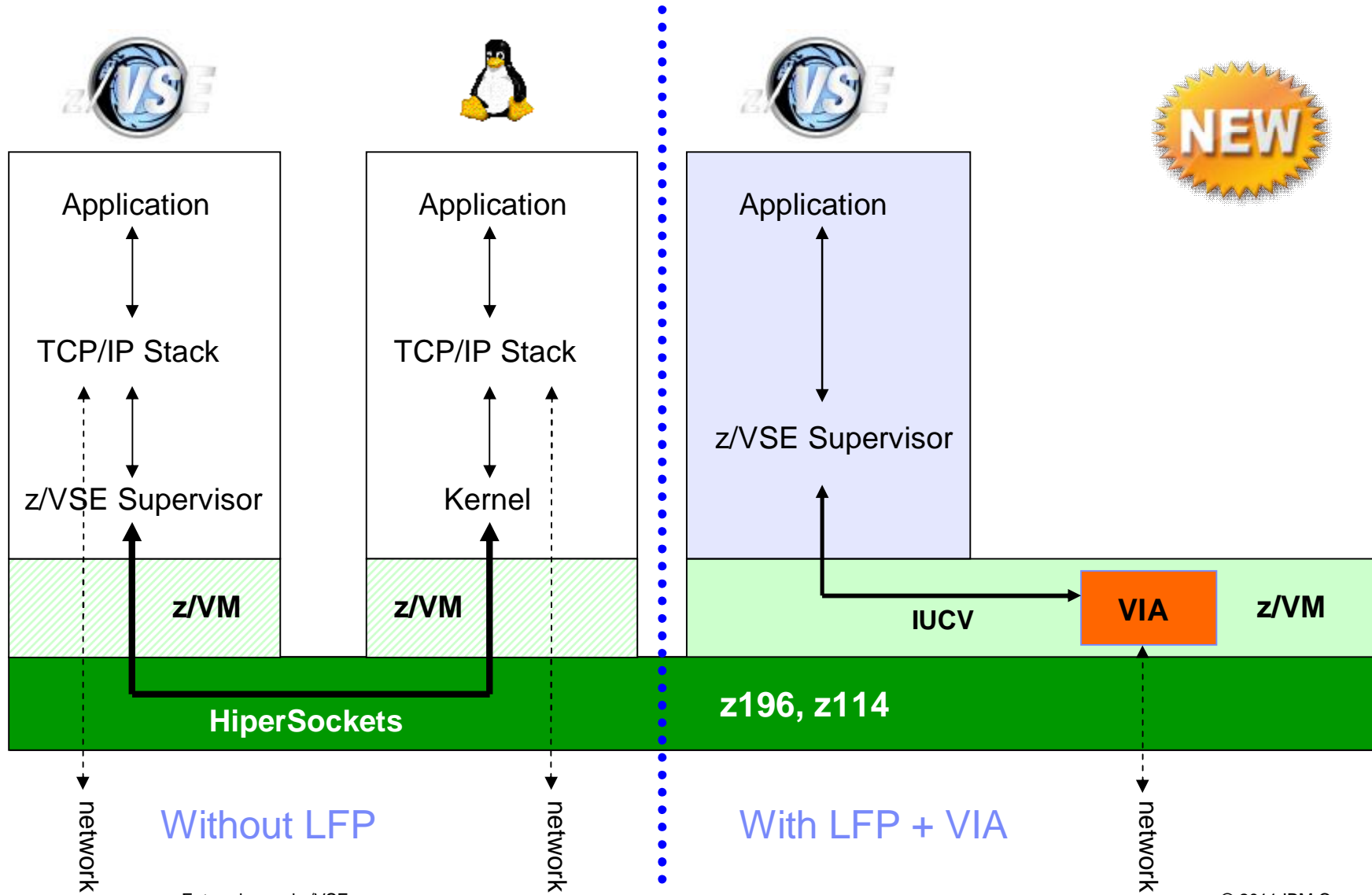# Static Power Save Mode - Supported by z/VSE 4.3 + 5.1
Energy Management on z196

Power Save Mode can also be used to reduce the power consumption of POWER7 blades when full performance is not required

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

Optimizers

z/OS   z/VSE   System z   System z

Energy consumption

z196   **CPU**

System x or Windows [1]

POWER7

POWER7 blades

CPU

DataPower XI50z

IBM Smart Analytics Optimizer

System z PR/SM

z HW Resources

Blade Virtualization   Virtualization

Support Element

Blade HW Resources

zBX

Open Storage SAN

HMC

Energy Monitoring creates a report on new dashboard with energy usage information

Customer Network

Unified Resource Manager

Customer Network

███	Private Management Network INMN
███	Private High Speed Data Network IEDN

zEnterprise and z/VSE

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Linux Fast Path in a z/VM-mode LPAR - Supported by z/VSE 4.3 + 5.1

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

Application

z/VSE Supervisor

IUCV

z/VM

Application

LFP Daemon

TCP/IP Stack

Kernel

z/VM

System z10, z196, z114

network

Without LFP

network

With LFP

network

zEnterprise and z/VSE   © 2011 IBM Corporation

z/VSE z/VM IP Assist (VIA) - Supported by z/VSE V5 + z/VM V6

With z/VM IP Assist (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	Kernel	z/VSE Supervisor

z/VM   **z/VM**

IUCV   **VIA**   **z/VM**

HiperSockets   **z196, z114**

network   Without LFP   network   With LFP + VIA   network

NEW

SoD: Linux Fast Path in an LPAR - Supported by z/VSE 5.1 (after GA)

Statement of Direction:

Linux Fast Path in LPAR environment:
IBM intends to provide the Linux Fast Path function for LPAR environments Exploiting the zEnterprise HiperSockets Completion Queue.
For more information see the statement of direction In Hardware Announcement 111-136, (RFA54680) dated July 12, 2011.

All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal Without notice.

Application

z/VSE Supervisor

Application

LFP Daemon

TCP/IP Stack

Kernel

HiperSockets CQ

z196, z114

network

zEnterprise and z/VSE   © 2011 IBM Corporation
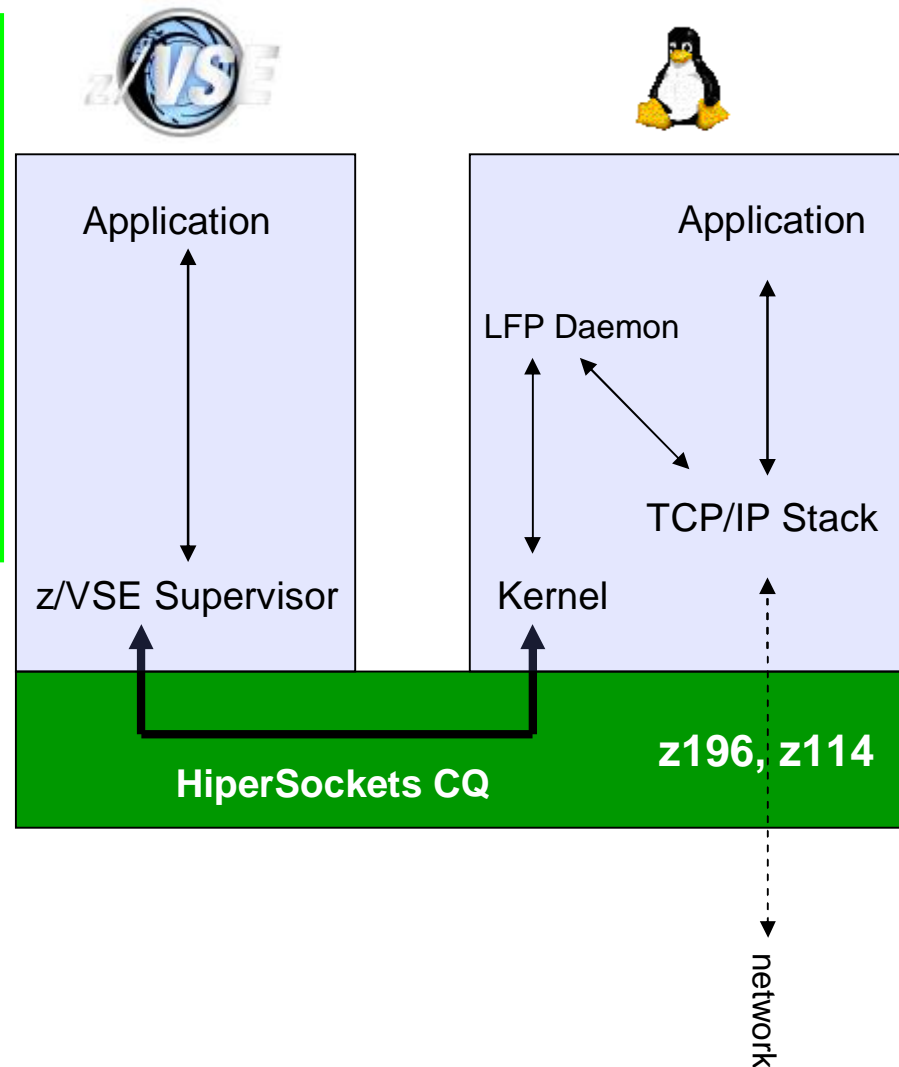
Dynamic Add of CPs and Large Pages - Supported by z/VSE 4.3 + 5.1

§ **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 the z/VSE V4.3 system dependent on workload needs

§ **Large page (1 megabyte page) support for data spaces***
  – Better exploitation of large processor storage
  – Transparent to applications

) Not available in a z/VM guest environment

zEnterprise and z/VSE

Dynamic Add / Remove of Crypto Engines - Supported by z/VSE 4.3 + 5.1

§ **System z10, z196, z114**

  – **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.
```

zEnterprise and z/VSE   © 2011 IBM Corporation

Crypto AP-Queue Interrupt Facility - Supported by z/VSE 4.3 + 5.1

§ **Crypto Adjunct Processor (AP) Queue Interrupt Facility**
  – Exploitation of the z10 and zEnterprise 196 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 w/ 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 Express 3 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**"

zEnterprise and z/VSE

IEDN to zBX - Supported by z/VSE 5.1
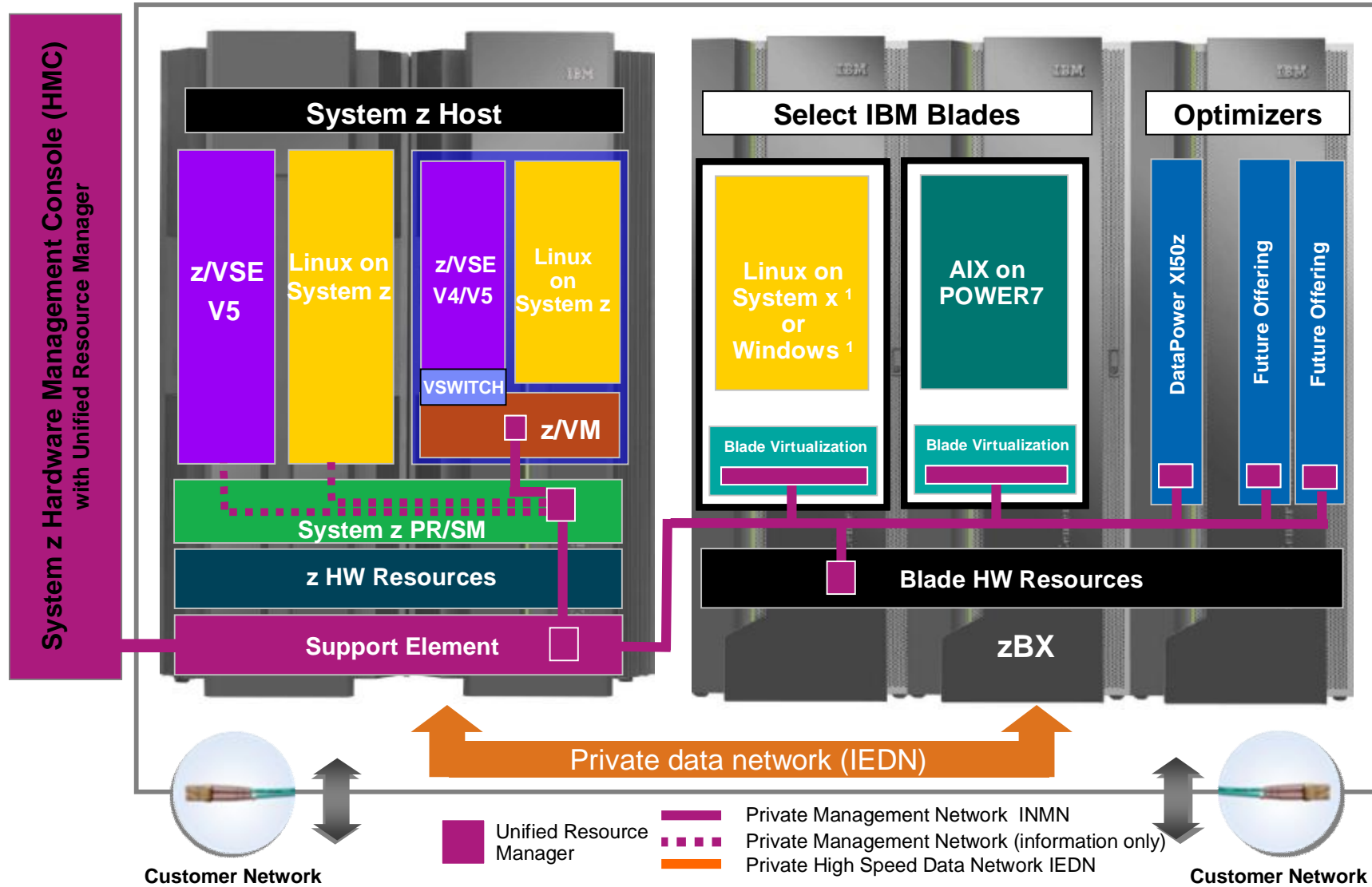
System z Hardware Management Console (HMC)
with Unified Resource Manager

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 [1] or Windows [1]

AIX on POWER7

Blade Virtualization

Blade Virtualization

Blade HW Resources

zBX

Optimizers

DataPower XI50z

Future Offering

Future Offering

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

[1] All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represents goals and objectives only.

zEnterprise and z/VSE

Agenda

§ **zEnterprise**
- **z196, z114**
- **zBX**
- **zManager**

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

§ **z/VSE Exploitation of zEnterprise**
- **z/VSE V5.1**
- **z/VSE V4.3**

§ **Pricing Strategy on zEnterprise**
- **Hardware Pricing**
- **Solution Edition**
- **z/VSE Software Pricing**

§ **Wrap-up**

z114 Pricing Strategy: Enhance Platform Competitiveness

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**

Note: Items marked in 'blue' are of relevance to z/VSE, z/VM, and/or Linux on System z.

z114 Pricing compared to z10 BC - IFL, zIIP/zAAP, Memory

Component	Approx. % Increase z114 over z10 BC	z114 Pricing (Street)	z10 BC Pricing (Street)	% Price Reduction (z114 Over z10 BC)	z10 BC Upgrade Costs ($K)	% Price Performance Improvement
IFL	16% (in MIPS)	$35K/Eng.	$47.5K/Eng.	26%	$5/Eng.	58%
zAAP/zIIP	16% (in MIPS)	$40K/Eng.	$47.5K/Eng.	16%	$6/Eng.	40%
Memory (Traditional Workloads)	3% (in TBs)	$1.5K/GB	$6K/GB	75%	$.75/GB*	N/A
Memory (New Workloads)	3% (in TBs)	$1.5K/GB	$2.25K/GB	33%	$.75/GB*	N/A

Note (*) – 8GB or 16GB to carry forward free on upgrade, depending on z10 BC memory configuration

Source: IBM, with Clipper computations

Source: Clipper Group Report TCG2011024LI

zEnterprise and z/VSE

Memory and IFL Pricing on z114
Aligning with industry practice

- Reduce memory price from $6k/GB and $2,25k/GB for new workload on z10 BC to $1,5k/GB for all workloads on z114

- Customers "repurchase" memory on upgrade at 50% ($750/GB Street Price) of purchase price

- Reduce per engine street price for an IFL from $47.5k on z10 BC to $35k on z114

- Introduce upgrade fee for upgrades from older technology to z114/z196 to make up for the increased performance of new engines

	IFL		zIIP/zAAP		ICF	
	z114	z196	z114	z196	z114	z196
Upgrade from z10	$5k	$17k	$6k	$30k	$20k	$57k
Upgrade from z9	$10.5k	$33k	$12k	$60k	$39k	$114k

Memory Pricing
(32 GB Base)
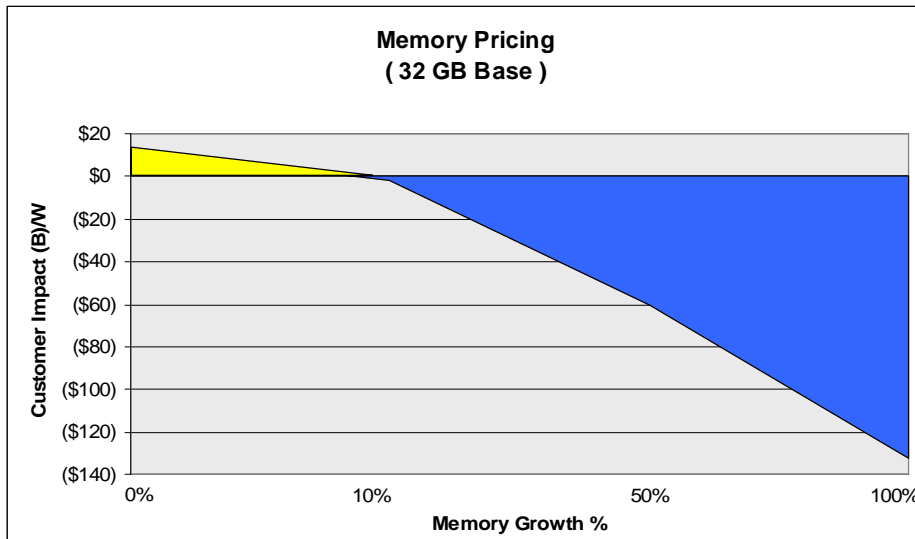
- A customer with 32 GB of memory on a z10 BC would be better off with the methodology change if memory is increased by 10% when upgrading to z114.

IFL Pricing
(2 IFL Base)
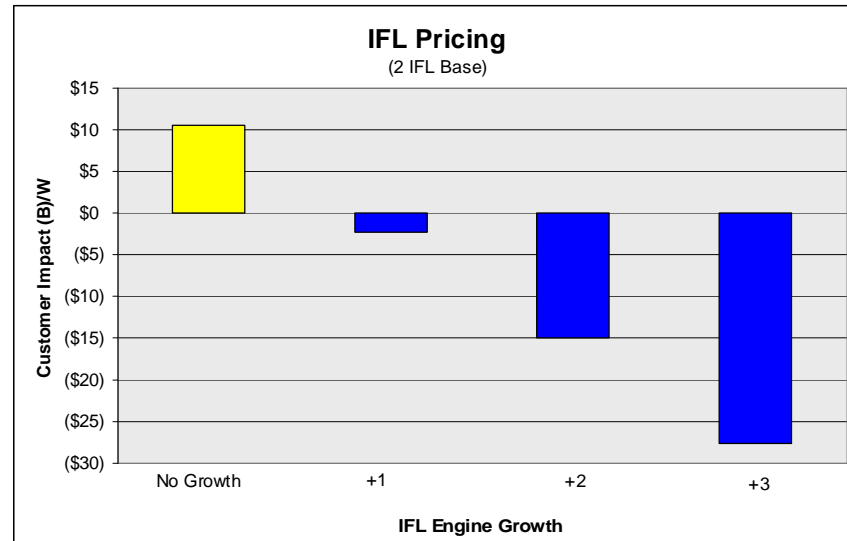
- A customer with 2 IFL's on a z10 BC would be better off with the methodology change if 1 IFL is added when upgrading to z114.

Note 1: First 8 GB free or up to 16 GB carry forward free.
Note 2: All prices are US prices, will vary by GEO.

zEnterprise and z/VSE

CP Maintenance Pricing on z114
Deliver continued price performance

Maintenance Price Performance Improvement

900 MIPS Example
- Up to 5% Price Performance with No Growth
- Additional 5% price performance when growing 30% to 1170 MIPS

Legend:
- z114 – No MIPS Growth
- z114 – 30% MIPS Growth
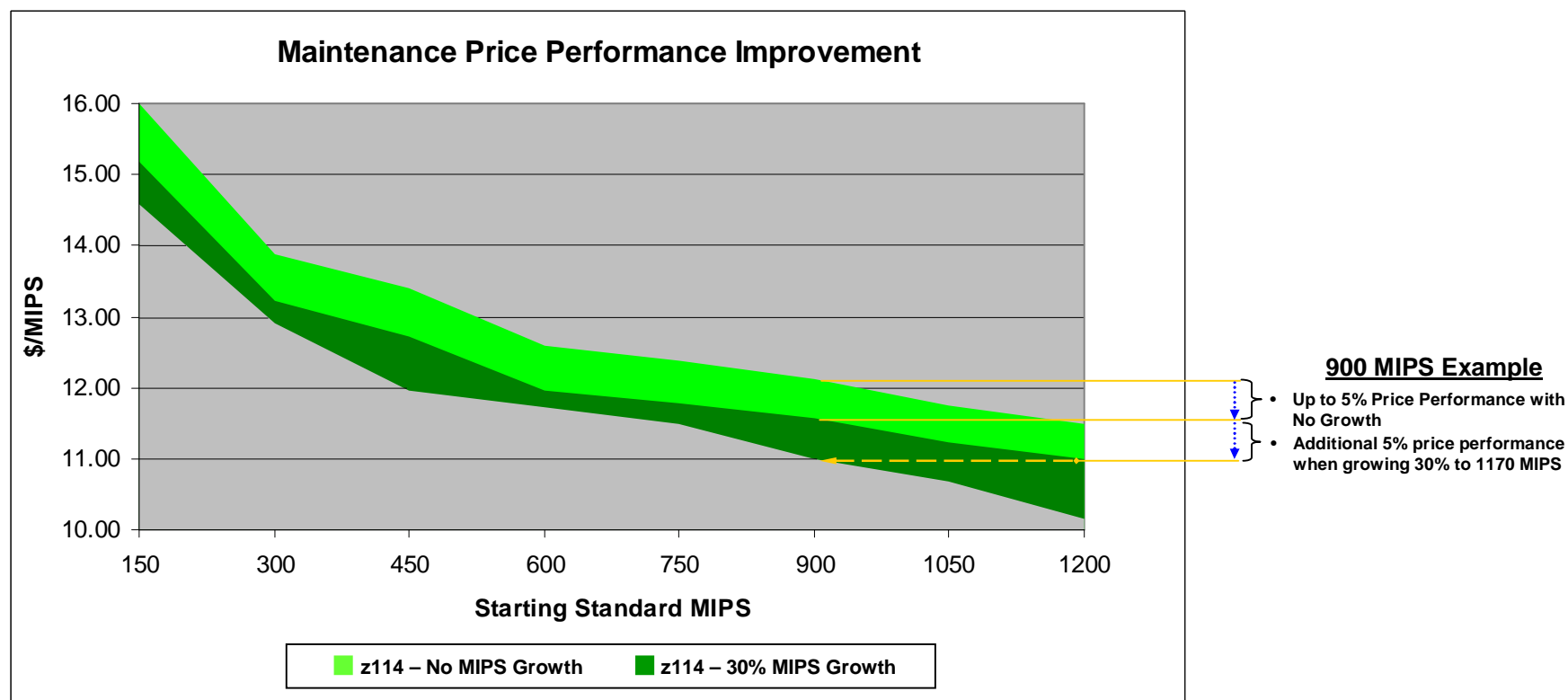
§ **When growing MIPS 30% from z10 BC to z114, price performance improvement on processor maintenance averages 10%**
  - A no growth upgrade averages 5% price performance improvement

* All prices are US prices, will vary by GEO. z114 M05 pricing shown.

IFL Maintenance Pricing on z114
Deliver significant price performance

$/Engine — z10BC: $1398, z114: $727 — 48% Improvement

$/MIPS — z10BC: $2.08, z114: $.93 — 55% Improvement

Legend: ☐ z10BC ☐ z114
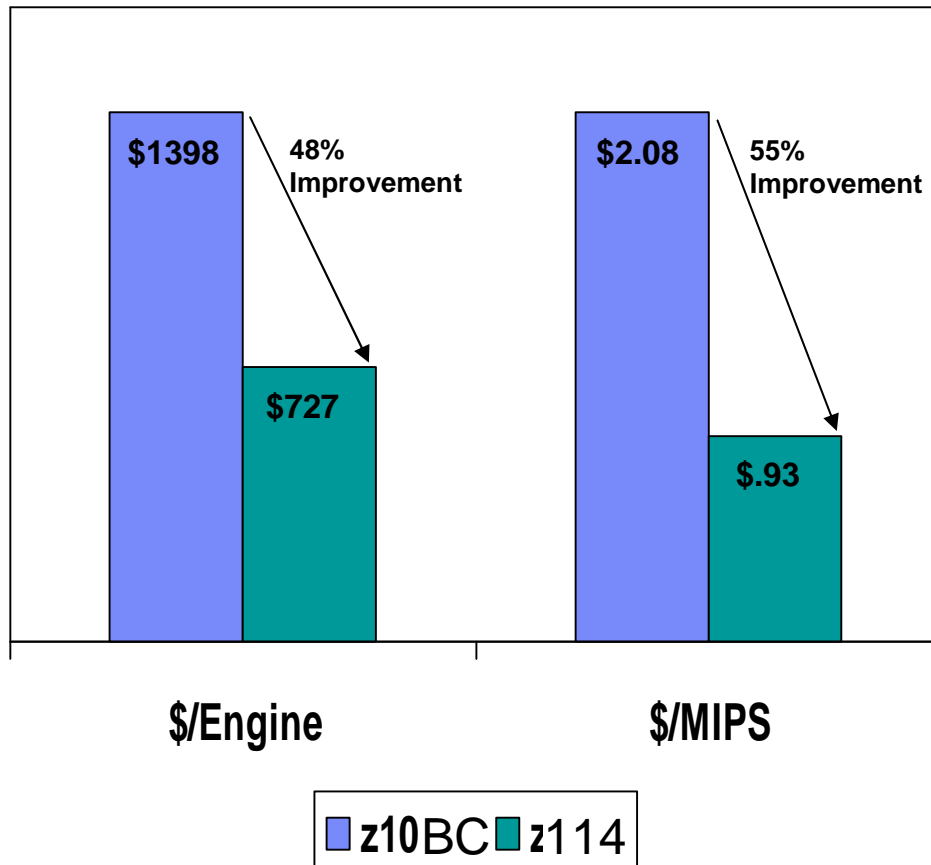
§ **z10 BC strategy is to deliver price performance**

– **Via greater engine size**

– **Via improved delegation**

§ **z114 strategy is to deliver price performance:**

– **Via greater engine size**

– **Via list price reduction**

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

System z Solution Editions
Unmatched value, competitively priced

§ *Enterprise Linux*

§ *Cloud Computing*

§ *Data Warehousing*

§ *SAP*

§ *WebSphere®*

§ *ACI*

§ *Chordiant*

§ *Application Development*

§ *GDPS®*

§ *Security*

§ **Special package pricing for new workloads on IBM System z10™ and IBM zEnterprise™**

– IBM System z® hardware (standalone footprint or isolated LPAR)

– Prepaid hardware maintenance

– Comprehensive middleware stack

– Services and Storage (as needed)

§ **Mainframe qualities of service**

– Security, availability and scale

– Industry leading virtualization, systems management and resource provisioning

§ **Solution Edition Futures**

– Exploitation of IBM zEnterprise BladeCenter® Extension (zBX) workload optimizers and IBM Unified Resource Manager

System z Solution Edition for Enterprise Linux and the Enterprise Linux Server
Transforming the economics of large scale integration

§ Description

- System z Solution Edition for Enterprise Linux
  - Integrated Facility for Linux (IFL) processors, memory and z/VM added to an existing mainframe

- Enterprise Linux Server
  - Standalone System z Linux® server with IFLs, memory, I/O connectivity, and z/VM® virtualization software

- Linux available from distribution partners (Novell SUSE and Red Hat)

§ Customer Value

- Run at 90% utilization or more

- Consolidate distributed servers to reduce TCO

- Reduce lead time for server provisioning

- Manage system capacity with high degree of certainty

- Improve disaster recovery and systems availability

IBM Case Study:

BCBS Minnesota achieves significant TCO reduction with virtualized Linux on System z

Click here to learn more

System z Solution Edition for Cloud Computing
A service automation and management framework for System z

§ Description

– Foundation solution that can be customized for a wide range of cloud workloads

– Base offering – System z Solution Edition for Enterprise Linux, Tivoli® Cloud Software Stack and IBM Lab Services

– Supports WebSphere CloudBurst™ Appliance

– Customizable options for virtual server deployments

§ Customer Value

– Enterprise qualities of service for cloud workloads

– Rapid provisioning of workloads

– Self service access to IT assets

– Speed delivery of new IT services

– Reduce costs and increase flexibility
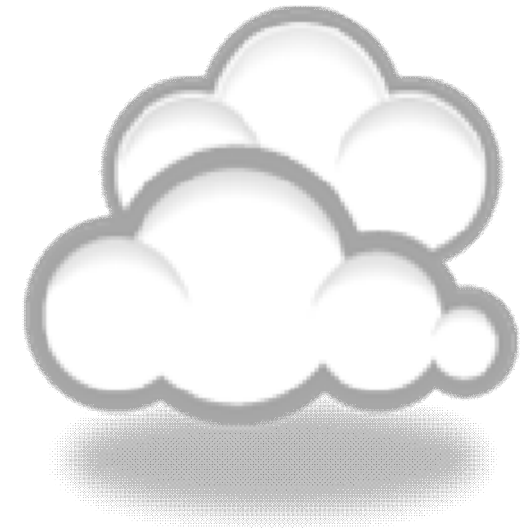
Analyst Case Study:

The Department of the Interior's National Business Center uses System z as a strategic Enterprise Cloud Platform.

Click here to learn more

zEnterprise and z/VSE   © 2011 IBM Corporation

z114 Software Pricing

§ MLC Software – New AEWLC metric provides MLC price performance

- **Modeled after EWLC, same full cap default, and same sub-cap benefits**
  - **AEWLC is for standalone z114 only; it does not aggregate**
- **All products having EWLC or MWLC announced with AEWLC**
- **Companion metric TWLC still used for non-variable software**
- **AEWLC on a z114 provides** 3%-18% savings compared to EWLC on a z10 and provides **up to 5% savings compared to MWLC on a z10**
  - **Not a "per product" comparison, savings for typical software stacks**
- Existing AWLC Transition program works for z114 machines the same as it does for z196 machines when in a Sysplex with z10/z9 machines
- Integrated Workload Pricing (IWP) available with AEWLC (same as AWLC)
- **zELC pricing used for Entry Model z114-A01 (same as z10 BC A01)**

§ zIPLA Software

- **zOTC software and the associated S&S will continue to be priced using System z Value Units, typically based upon MSUs**

Note: Items marked in 'blue' are of relevance to z/VSE, z/VM, and/or Linux on System z.

AEWLC – Advanced Entry Workload License Charge on z114

Price for typical z/VSE stack

MP2000, G4, G5, G6, z900, z990

MP3000, z800, z890

z9, z10, z196

z114

Legend:
- **GMLC**
- **GOLC (MP3000)**
- **zELC (z800)**
- **TWLC (z890)**
- **MWLC (z9/10/196)**
- **AEWLC (z114)**
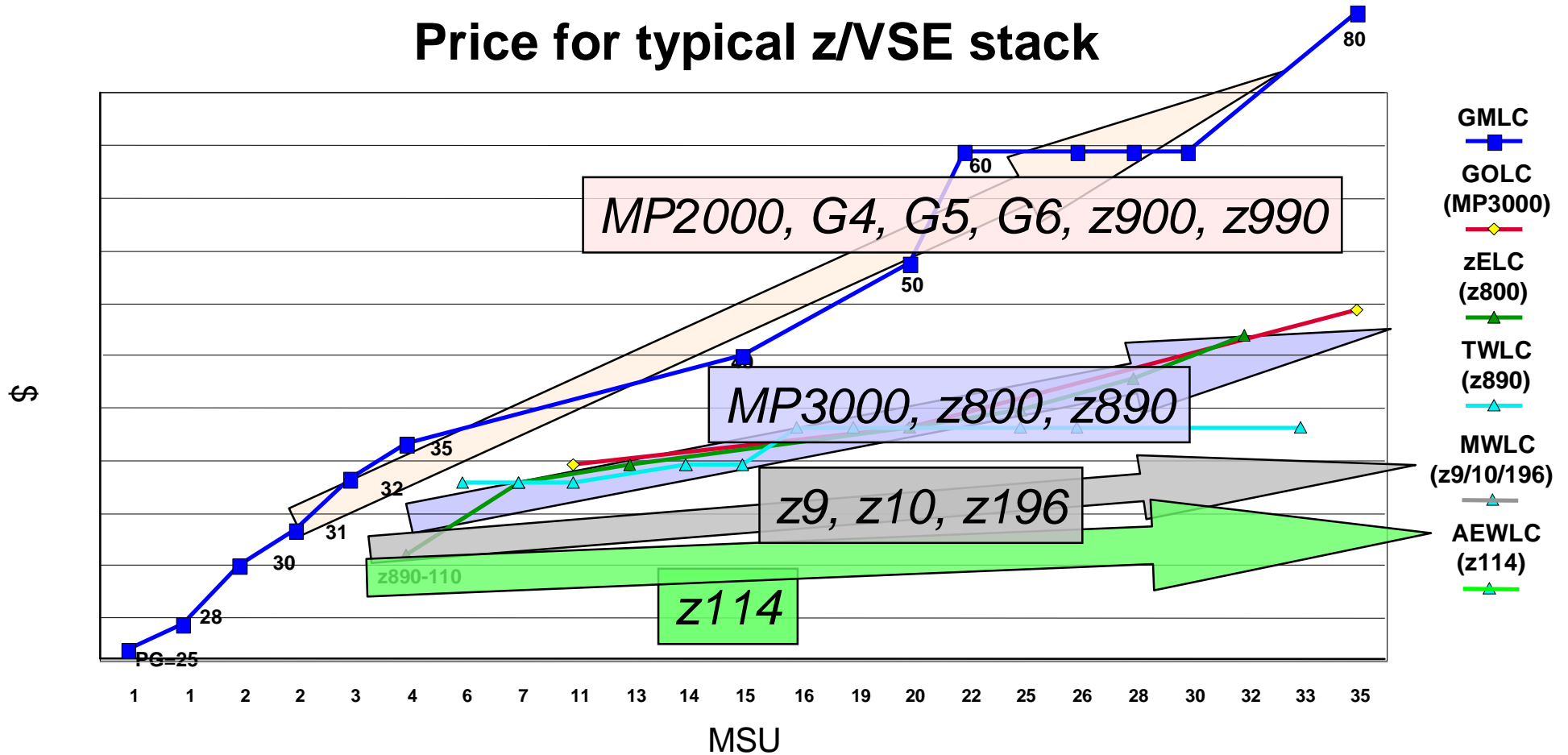
§ *"I just got our April software bill from IBM for the first month on our z9 under z/VSE 4.1 and MWLC. We were paying $22,965 per month on our z800 under z/VSE 3.1.2. The April bill is for the same software and it is $12,318: a difference of $10,647 per month."* **Mike Moore, IT Manager, Alabama Judical Datacenter, Alabama**

With upgrade from z10 BC, new AEWLC curve may provide MLC price/performance up to 5% for MWLC stacks

Total MLC savings will vary significantly by customer based on Sub-capacity and specific software stacks, actual customer configuration must be priced out to be accurate

Visible savings are at a Software Stack level, and may differ for individual products or features.

Sample market segment ranges	Savings for a Sample Stack of z/VSE SW: MWLC on z10BC to AEWLC on z114
(3 msus)	0%
4-17 MSUs	-2%
18-30 MSUs	-4%
31-45 MSUs	-4%
46-87 MSUs	-5%
88+ MSUs	-5%

← *Majority of z/VSE customers will see savings from 2-4%*

	MSUs	MWLC	AEWLC	Savings	MSUs	MWLC	AEWLC	Savings
z/VSE Central Functions,	5	2,207	2,187	0.91%	15	2,837	2,717	4.23%
CICS TS for VSE/ESA	5	1,908	1,892	0.84%	15	2,448	2,352	3.92%
Stack Total:		4,115	4,079	0.87%		5,285	5,069	4.09%

	MSUs	MWLC	AEWLC	Savings	MSUs	MWLC	AEWLC	Savings
z/VSE Central Functions,	20	3,026	2,880	4.82%	50	3,656	3,450	5.63%
CICS TS for VSE/ESA	20	2,610	2,495	4.41%	50	3,150	3,005	4.60%
Stack Total:		5,636	5,375	4.63%		6,806	6,455	5.16%

zEnterprise and z/VSE

Improved TCO through new Pricing Metric and Sub-Capacity Pricing

§ **z/VSE price/performance through new pricing metric**
  – Advanced Entry Workload License Charge (**AEWLC**)
  – AEWLC requires z114 and current z/VSE software (z/VSE V4 or V5)
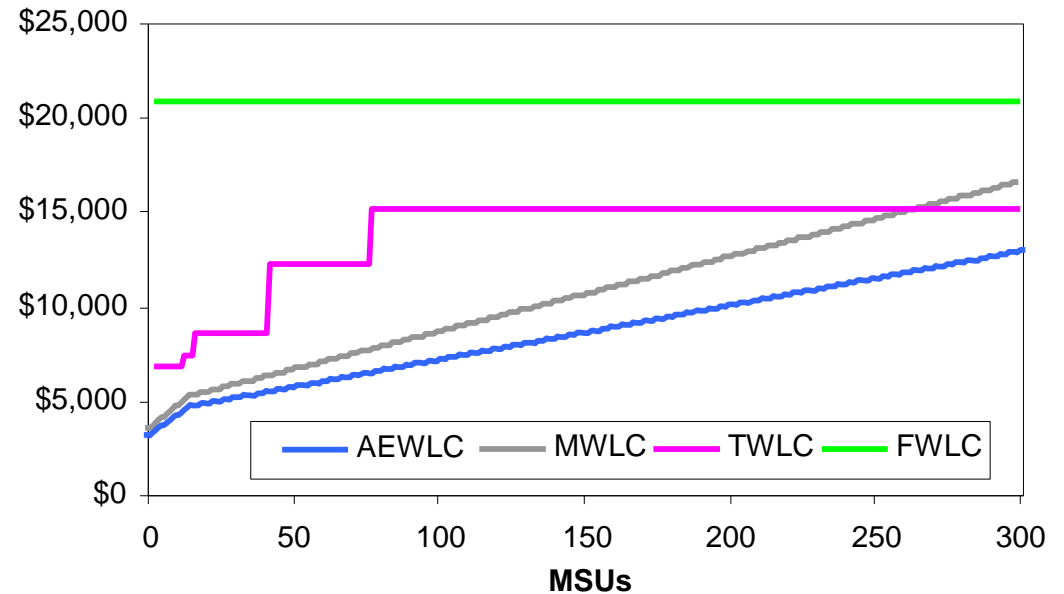
§ **Additional price/performance through sub-capacity option**
  – Some hardware footprint **consolidations** more attractive now
 – Presence of z/VSE V3 or VSE/ESA™ forces full-capacity pricing

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.
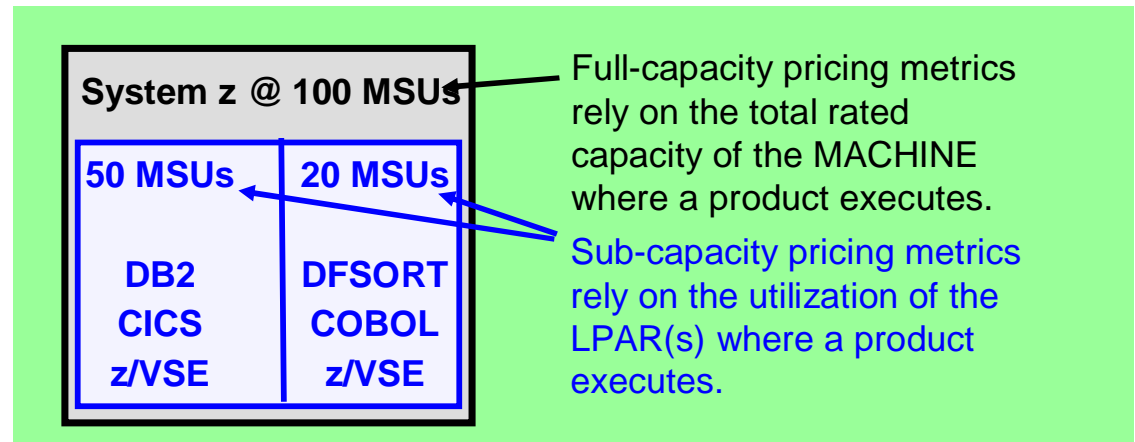
(*) z9 BC A01, z10 BC A01, and z114-A01 are priced zELC.

Sub Capacity Reporting Tool: Sample Report

zEnterprise and z/VSE
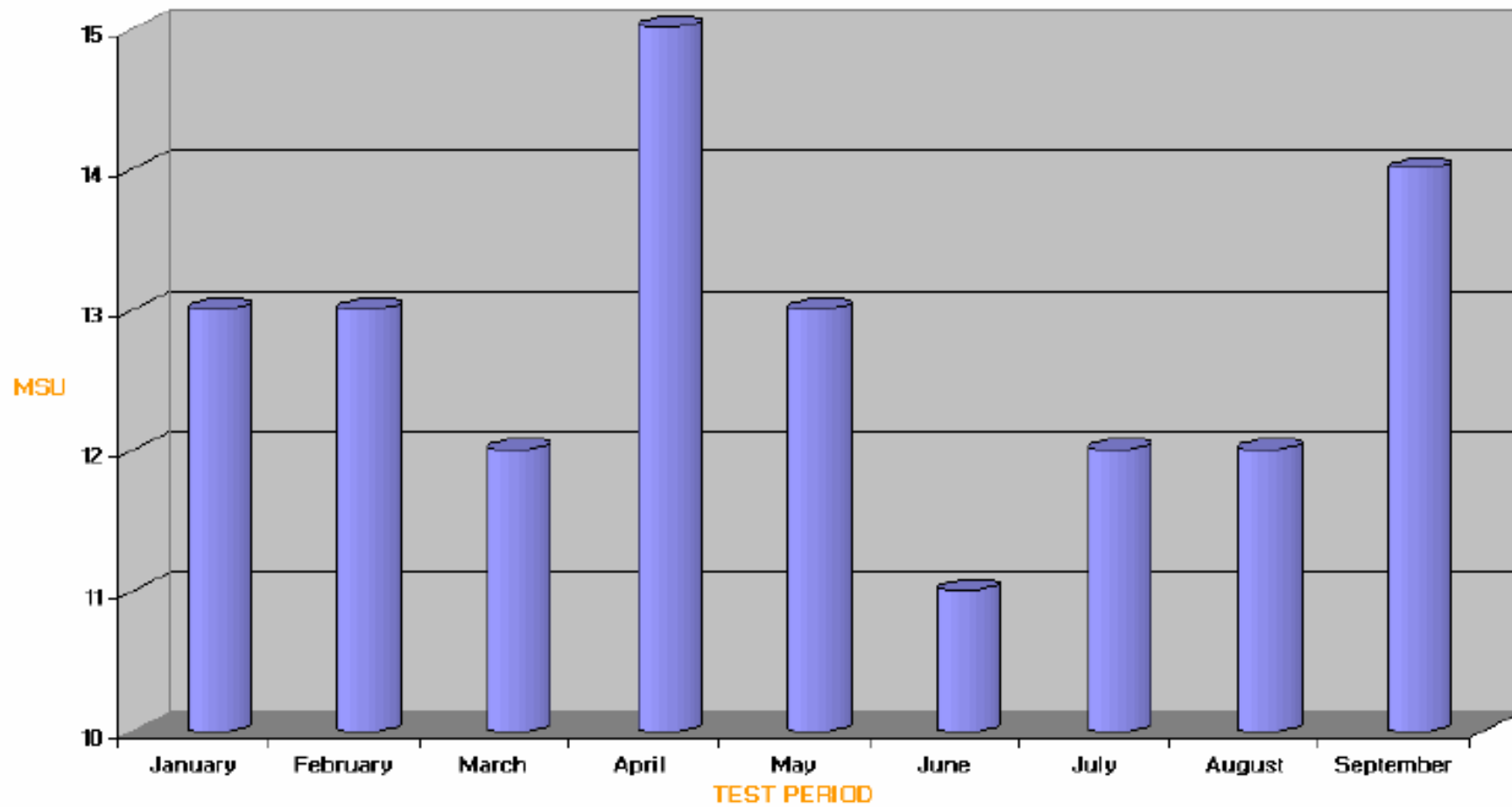
z/VSE Software Pricing continues to drive z9 / z10 / zEnterprise Adoption

z9/z10/zEnterprise CECs with z/VSE V4

zEnterprise and z/VSE
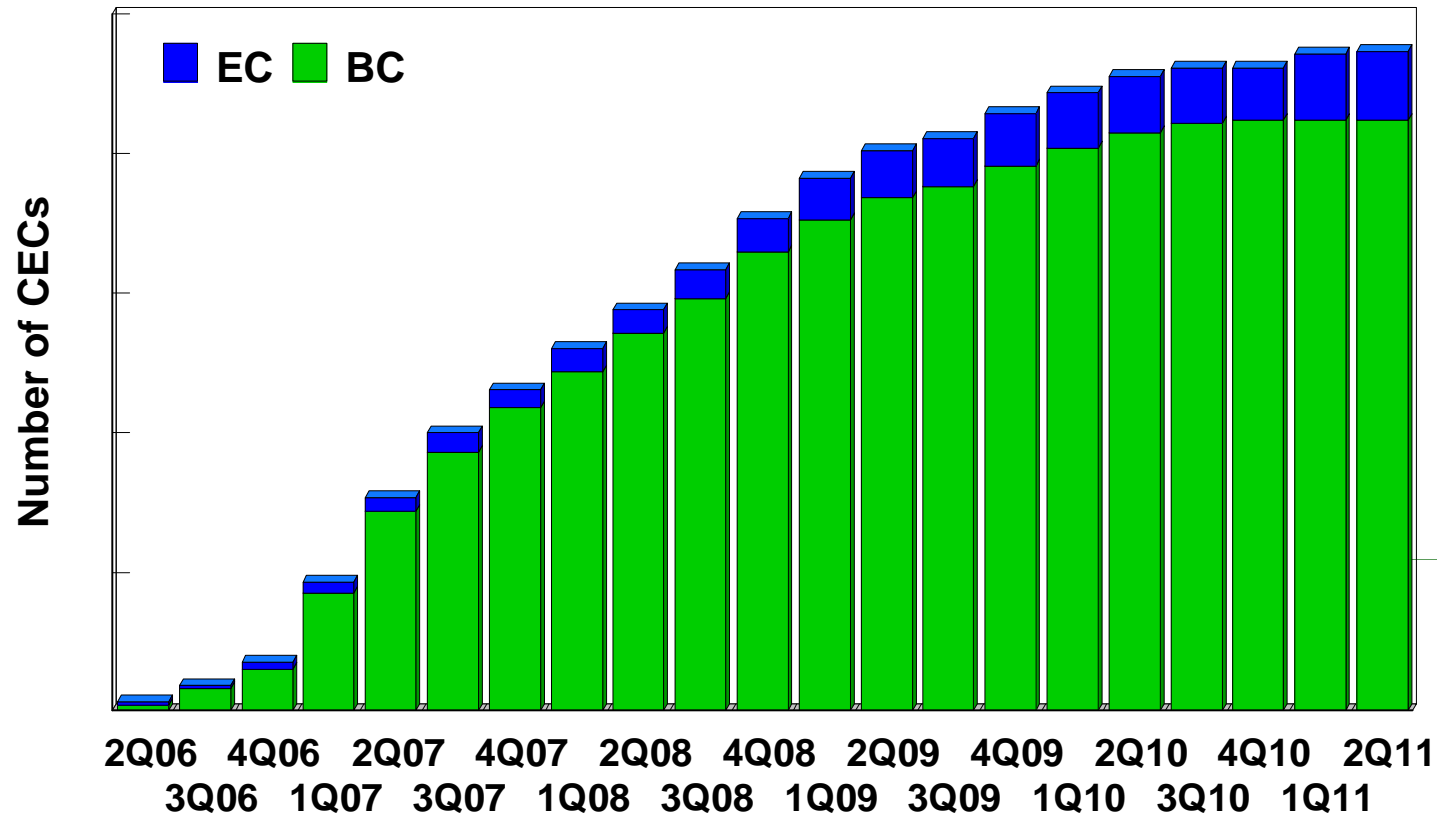
PVU Table
Processor Value Units

PVU Website Link:
click here

http://ibm.com/software/lotus/passportadvantage/pvu_licensing_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 processor technology is dependent on the maximum possible number of sockets on the server.

5) z196 refers to IBM zEnterprise 196

6) z114 refers to IBM zEnterprise 114

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

Processor Vendor	Processor Name	Server model numbers	Maximum number of sockets per server	One-Core (1)	Dual-Core (2)	Quad-Core (4)	Hexa-Core (6)	Octi-Core (8)	16-Core (16)	IFL Engine	Proc. Model Number	PVUs per Core
IBM	POWER7 [4]	770,780,795	> 4			■	■	■			All	120
		750,755,775 PS704	4				■	■			All	100
		PS700-703, 710-740	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
	z196, System z10 [1,5]	All	All							■	All	120
	z114, System z9 z990, S/390 [1,2,6]	All	All							■	All	100
	PowerPC 970	All	All			■					All	50
	PowerXCell™, Cell/B.E.™ 8i [3]	All	All	■							All	30
HP / Intel®	Itanium® 1,2	All	All		■	■					All	100
	PA-RISC	All	All		■						All	100
Sun / Fujitsu	SPARC64 VI, VII	All	All		■	■					All	100
	UltraSPARC IV	All	All		■						All	100
	SPARC T3	All	All					■	■		All	70
	UltraSPARC T2	All	All				■	■	■		All	50
	UltraSPARC T1	All	All				■	■	■		All	30
Any	Any single-core	All	All	■							All	100

* Requirements as of Publish Date: July 12, 2011

System z

zEnterprise and z/VSE

Agenda

- § **zEnterprise**
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  - **z/VSE Software Pricing**
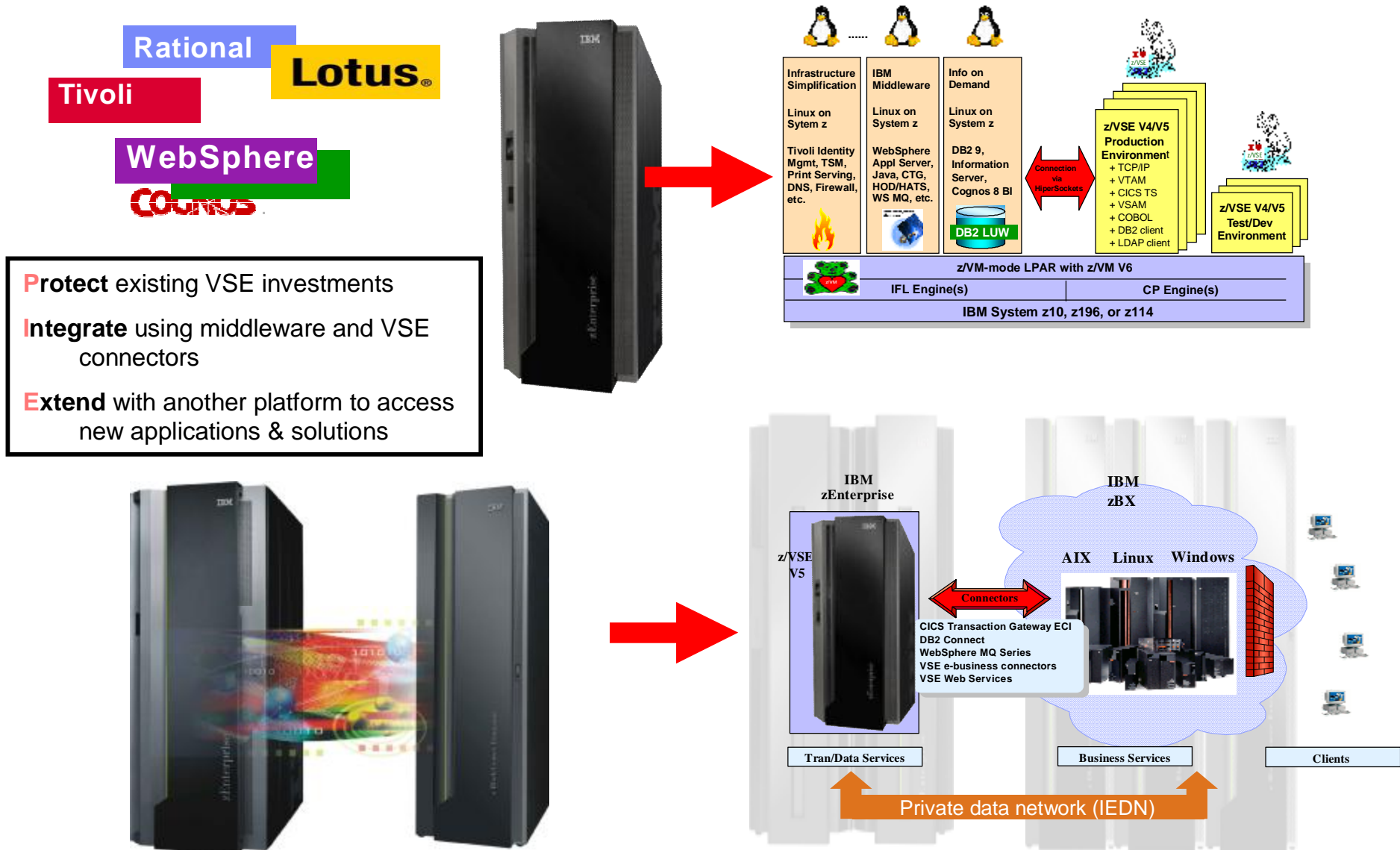
- § **Wrap-up**

zEnterprise and z/VSE

The IBM zEnterprise System Summary

Extending System z strengths to a new dimension

§ Data server for mission-critical data

§ Designed to meet the need of today's heterogeneous data centers

– Data consolidation

– Server consolidation

§ Enables a mixed set of workloads to be deployed on best fit technologies

§ Delivers lower acquisition and operating costs than a one size fits all approach

§ Reduces risk by extending the reach of System z qualities of service

§ Improves service through tighter integration for multi-tier workloads

§ Better security control through deduplication, network simplification, and System z platform security can help you meet privacy and audit requirements

IBM zEnterprise can do IT all - Think inside the box and/or think zBX !

Rational

Lotus.

Tivoli

WebSphere

COGNOS.

Protect existing VSE investments

Integrate using middleware and VSE connectors

Extend with another platform to access new applications & 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 9, Information Server, Cognos 8 BI

DB2 LUW

Connection via HiperSockets

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

z/VSE V4/V5 Test/Dev Environment

z/VM-mode LPAR with z/VM V6

IFL Engine(s) | CP Engine(s)

IBM System z10, z196, or z114

IBM zEnterprise

IBM zBX

z/VSE V5

AIX   Linux   Windows

Connectors

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

Tran/Data Services

Business Services

Clients

Private data network (IEDN)

zEnterprise and z/VSE

For more information, please see the z/VSE web site:
http://www-03.ibm.com/servers/eserver/zseries/zvse/

Thank You

zEnterprise and z/VSE