
zVM20

# z/VSE V5 on zEnterprise
## Features, Functions, Software Pricing

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# Agenda

- **IBM zEnterprise**
  - z196, z114, zEC12
  - zBX
  - zManager
- **z/VSE Strategy and how it relates to zEnterprise**
  - Hybrid
  - PIE
- **z/VSE Exploitation of zEnterprise**
  - zEC12
  - z196
  - z114
- **Pricing Strategy**
  - z114 Hardware Pricing
  - z114 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**
**IBM zEnterprise™ 114**
**IBM zEnterprise™ EC12**

- 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

# IBM zEnterprise Family

## IBM zEnterprise 196 (2817)

- **Announced 7/10 – Server w/ up to 96 PU cores**
- **5 models – Up to 80-way**
- **Granular Offerings for up to 15 CPs**
- **PU (Engine) Characterization**
  - CP, SAP, IFL, ICF, zAAP, zIIP
- **On Demand Capabilities**
  - CoD, CIU, CBU, On/Off CoD, CPE
- **Memory – up to 3 TB for Server and up to 1 TB per LPAR**
  - 16 GB Fixed HSA
- **Channels**
  - PCIe bus
  - Four LCSSs
  - 3 Subchannel Sets
  - MIDAW facility
  - Up to 240 ESCON channels
  - Up to 288 FICON channels
  - FICON Express8 and 8S
  - zHPF
  - OSA 10 GbE, GbE, 1000BASE-T
  - InfiniBand Coupling Links
- **Configurable Crypto Express3**
- **Parallel Sysplex clustering**
- **HiperSockets – up to 32**
- **Up to 60 logical partitions**
- **Enhanced Availability**
- **Unified Resource Manager**
- **Operating Systems**
  - z/OS, z/VM, z/VSE, z/TPF, Linux on System z

## IBM zEnterprise Blade Extension (2458)

- **Announced 07/10**
- **Model 002 for z196 or z114**
- **zBX Racks with:**
  - BladeCenter Chassis
  - N + 1 components
  - Blades
  - Top of Rack Switches
  - 8 Gb FC Switches
  - Power Units
  - Advance Management Modules
- **Up to 112 Blades**
  - IBM Smart Analytics Optimizer Solution
  - POWER7 Blades
  - IBM System x Blades
  - IBM WebSphere DataPower Integration Appliance XI50 for zEnterprise (M/T 2462-4BX)
- **Operating Systems**
  - AIX 5.3 and higher
  - Linux for Select IBM x Blades
  - Microsoft Windows for x Blades
- **Hypervisors**
  - PowerVM Enterprise Edition
  - Integrated Hypervisor for System x

## IBM zEnterprise 114 (2818)

- **Announced 07/11**
- **2 models – M05 and M10**
  - Up to 5 CPs
- **High levels of Granularity available**
  - 130 Capacity Indicators
- **PU (Engine) Characterization**
  - CP, SAP, IFL, ICF, zAAP, zIIP
- **On Demand Capabilities**
  - CoD, CIU, CBU, On/Off CoD. CPE
- **Memory – up to 256 GB for Server**
  - 8 GB Fixed HSA
- **Channels**
  - PCIe bus
  - Two LCSSs
  - 2 Subchannel Sets
  - MIDAW facility
  - Up to 240 ESCON channels
  - Up to 128 FICON channels
  - FICON Express8 and 8S
  - zHPF
  - OSA 10 GbE, GbE, 1000BASE-T
  - InfiniBand Coupling Links
- **Configurable Crypto Express3**
- **Parallel Sysplex clustering**
- **HiperSockets – up to 32**
- **Up to 30 logical partitions**
- **Unified Resource Manager**
- **Operating Systems**
  - z/OS, z/VM, z/VSE, z/TPF, Linux on System z

# IBM zEnterprise EC12 – new since September 2012

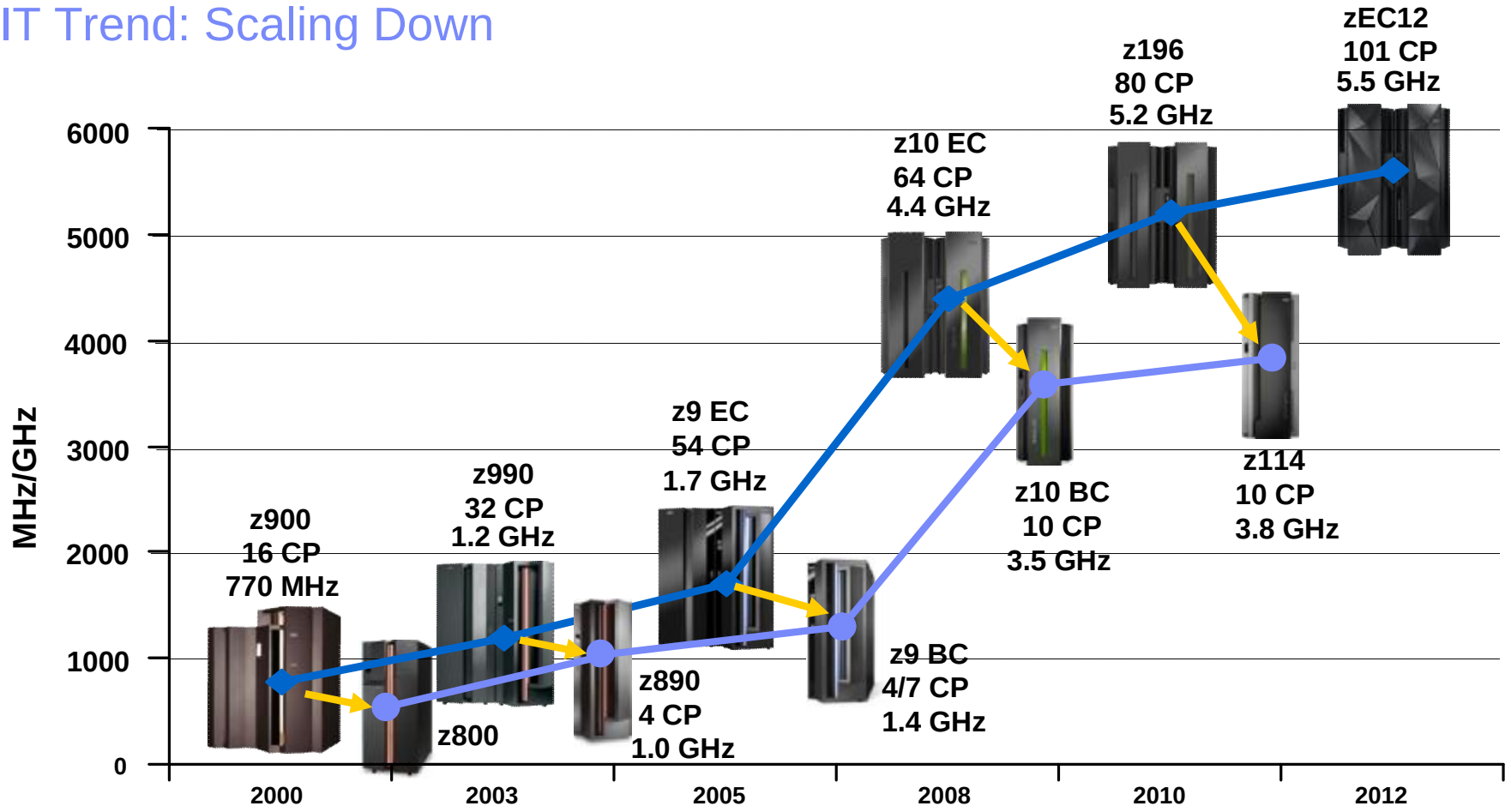
## IBM zEnterprise EC12 (2827)

- **Announced 8/12 – Server w/ up to 101 PU cores**
- **5 models – Up to 101-way**
- **Granular Offerings for up to 20 CPs**
- **PU (Engine) Characterization**
  - CP, SAP, IFL, ICF, zAAP, zIIP
- **On Demand Capabilities**
  - CoD, CIU, CBU, On/Off CoD, CPE, FoD
- **Memory – up to 3 TB for Server and up to 1 TB per LPAR**
  - 32 GB Fixed HSA
- **Channels**
  - PCIe bus
  - Four LCSSs
  - 3 Subchannel Sets
  - FICON Express8 and 8S
  - zHPF
  - OSA 10 GbE, GbE, 1000BASE-T
  - InfiniBand Coupling Links
  - Flash Express
- **Configurable Crypto Express4S**
- **Parallel Sysplex clustering**
- **HiperSockets – up to 32**
- **Up to 60 logical partitions**
- **Enhanced Availability**
- **IBM zAware**
- **Unified Resource Manager**
- **Operating Systems**
  - z/OS, z/VM, z/VSE, z/TPF, Linux on System z

## IBM zEnterprise Blade Extension (2458)

- **First Announced 07/10**
- **Model 003 for zEC12 – 08/12**
- **zBX Racks with:**
  - BladeCenter Chassis
  - N + 1 components
  - Blades
  - Top of Rack Switches
  - 8 Gb FC Switches
  - Power Units
  - Advance Management Modules
- **Up to 112 Blades**
  - POWER7 Blades
  - IBM System x Blades
  - IBM WebSphere DataPower Integration Appliance XI50 for zEnterprise (M/T 2462-4BX)
- **Operating Systems**
  - AIX 5.3 and higher
  - Linux for Select IBM x Blades
  - Microsoft Windows for x Blades
- **Hypervisors**
  - PowerVM Enterprise Edition
  - Integrated Hypervisor for System x

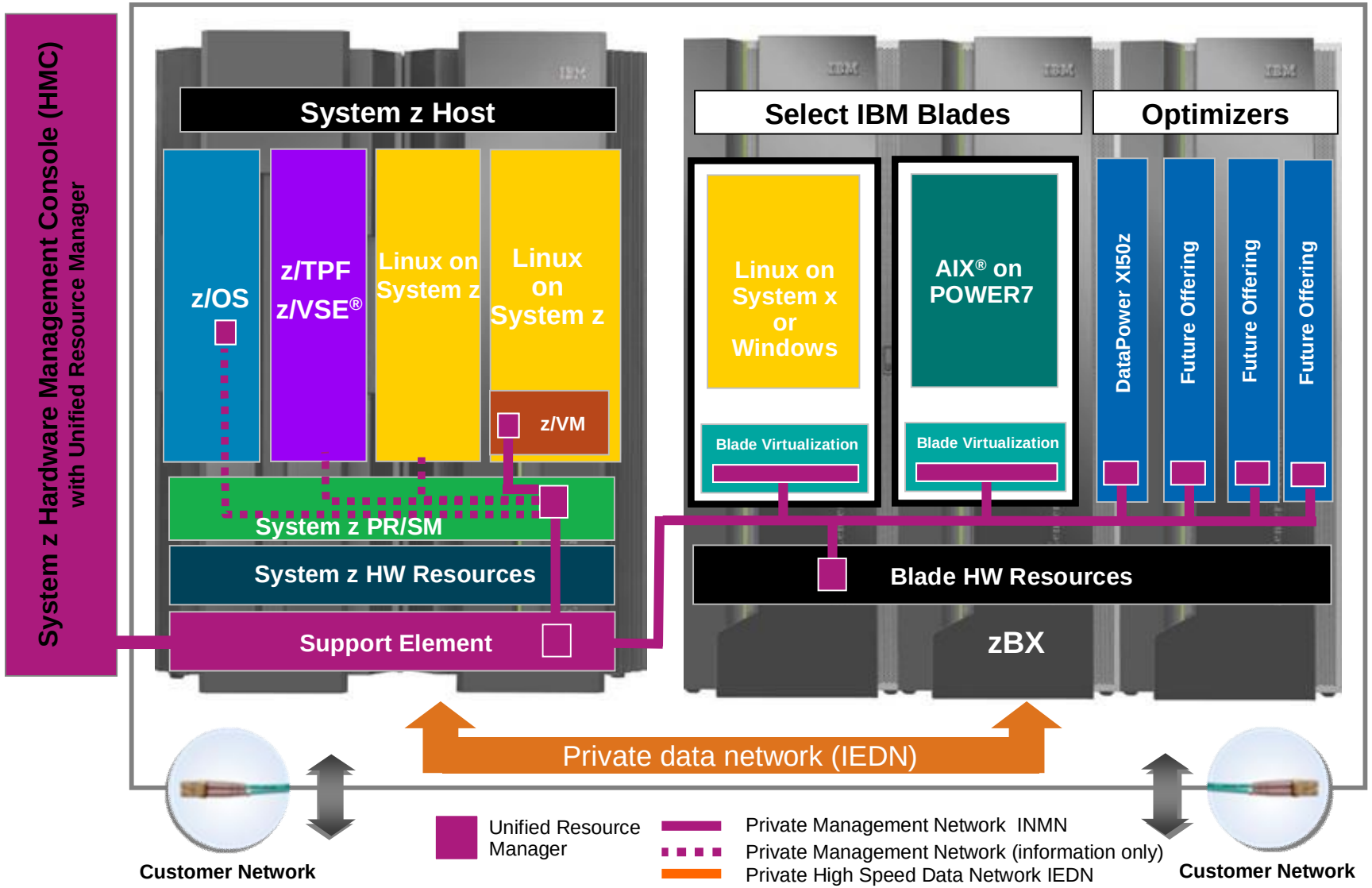
# IT Trend: Scaling Down




OOO = Out of order processing

# Putting zEnterprise System to the Task

*Use the smarter solution to improve your application design*



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  - z114
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  - z114 Software Pricing
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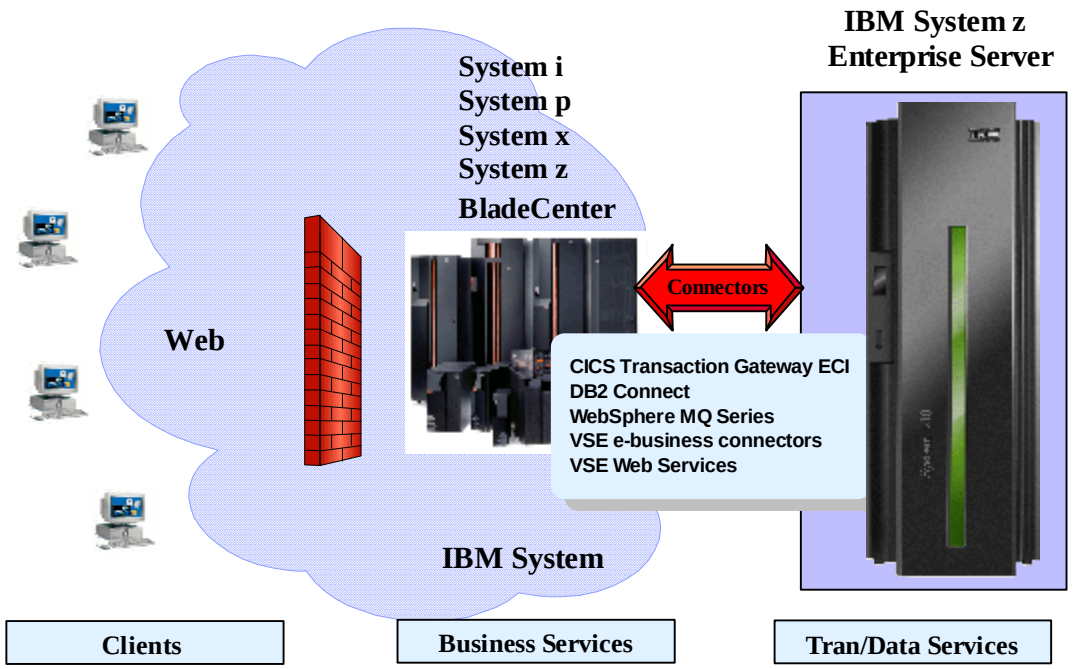
# z/VSE Strategy - Invented in Year 2000

**alias**

- § 3-tier Strategy
- § **Hybrid Strategy**
- § Connector Strategy
- § Migration Strategy
- § Coexistence Strategy
- § Linux Surround Strategy
- § **PIE Strategy**




**P**rotect existing VSE investments

**I**ntegrate using middleware and VSE connectors

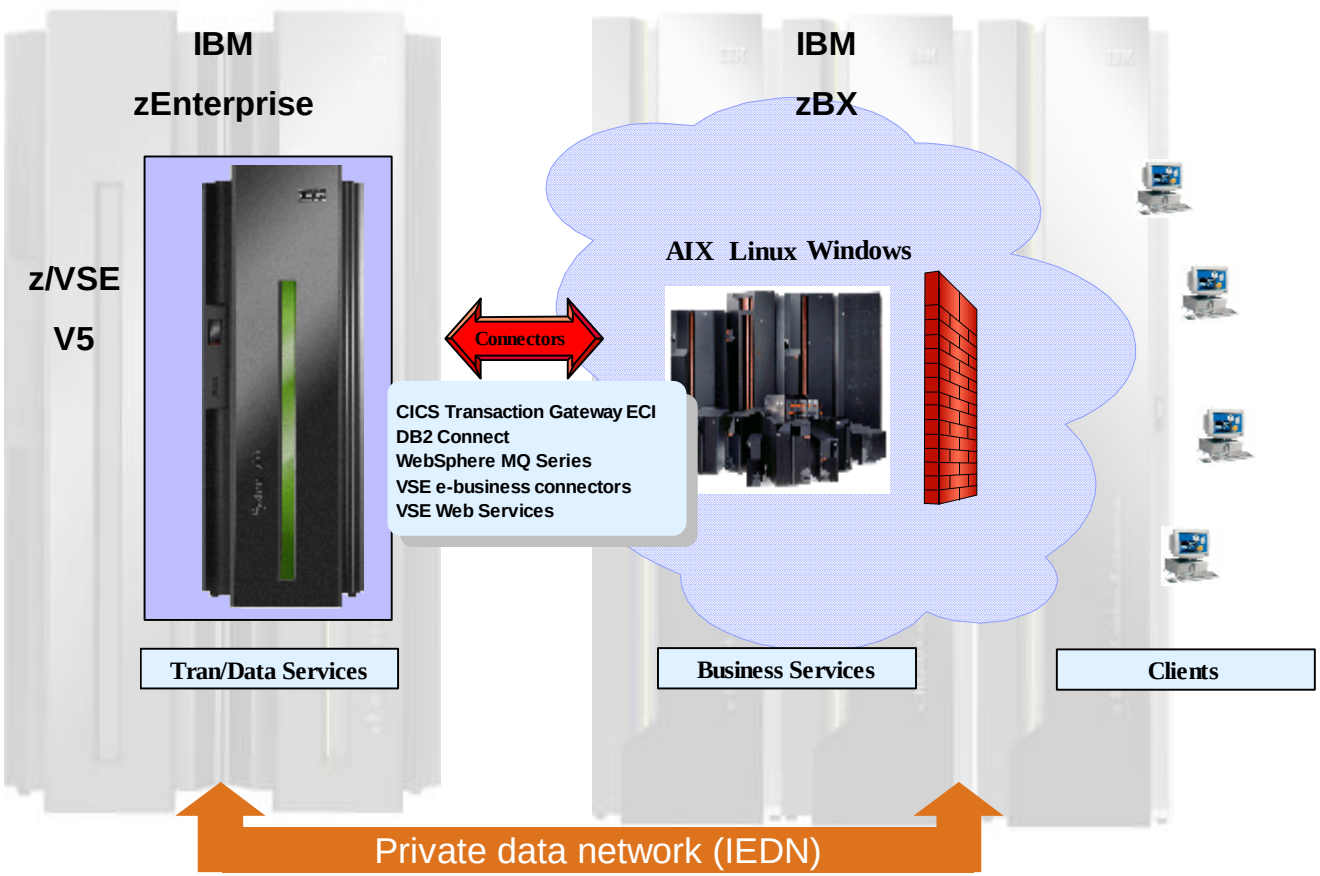
**E**xtend with another platform to access new applications & solutions

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

*Natural evolvement into zEnterprise*

**alias**

- § 3-tier Strategy
- § **Hybrid Strategy**
- § Connector Strategy
- § Migration Strategy
- § Coexistence Strategy
- § Linux Surround Strategy
- § **PIE Strategy**




**P**rotect existing z/VSE investments

**I**ntegrate using middleware and z/VSE connectors

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

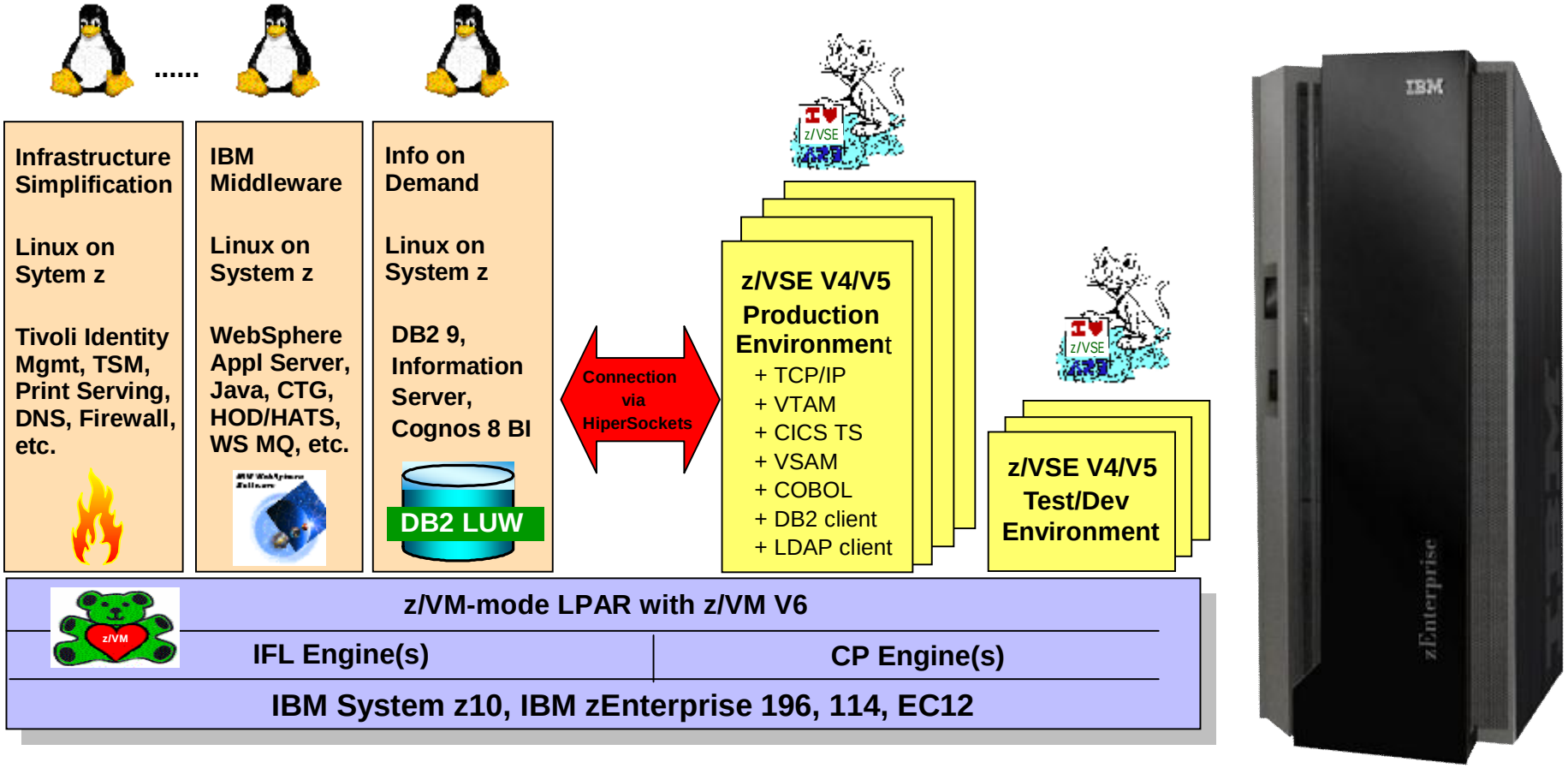
# z/VSE Strategy w/ Linux on System z

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

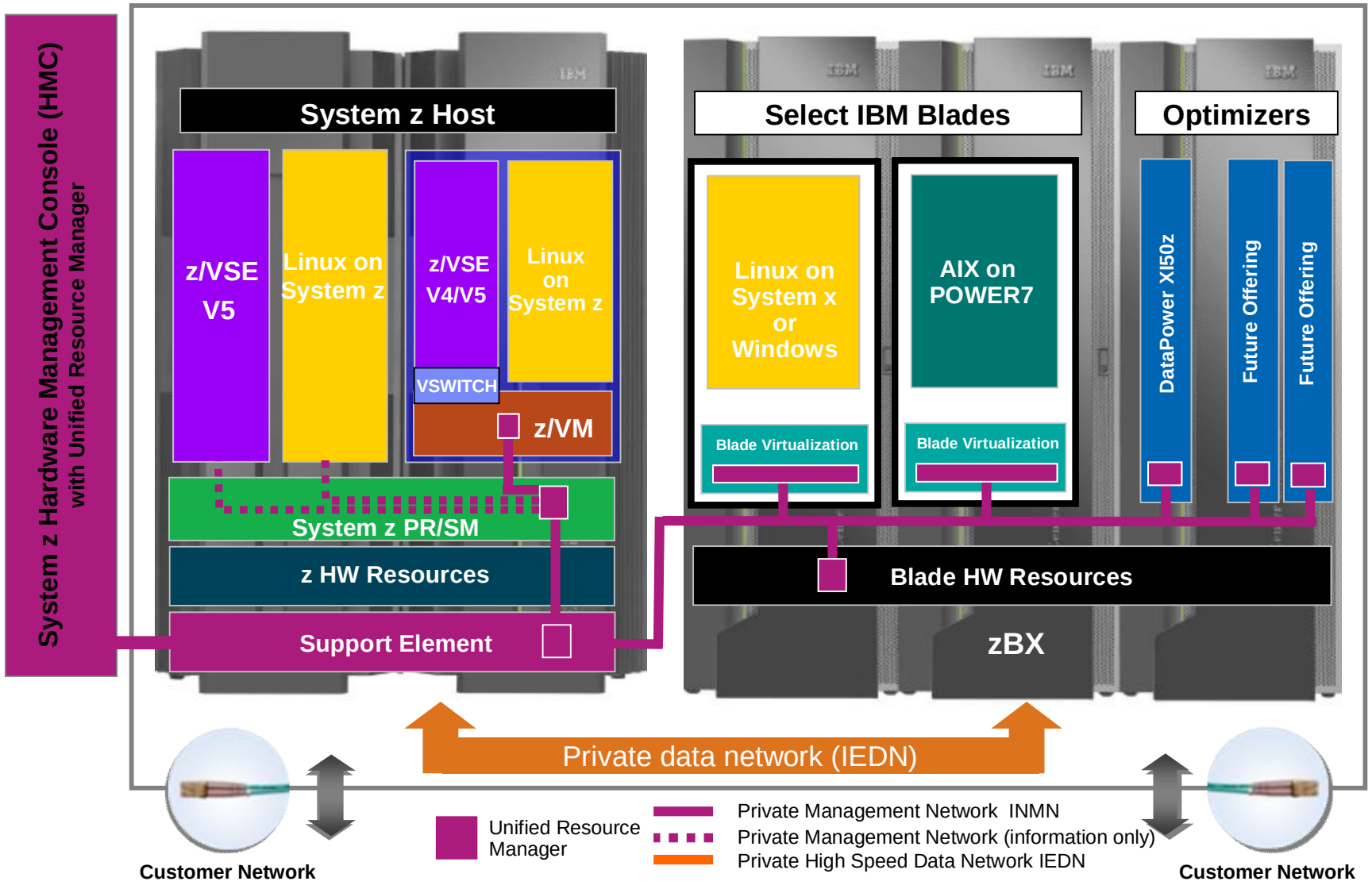
**P**rotect existing VSE investments

**I**ntegrate using middleware and VSE connectors

**E**xtend with Linux on IBM System z technology & solutions



# IEDN to zBX - Supported by z/VSE 5.1



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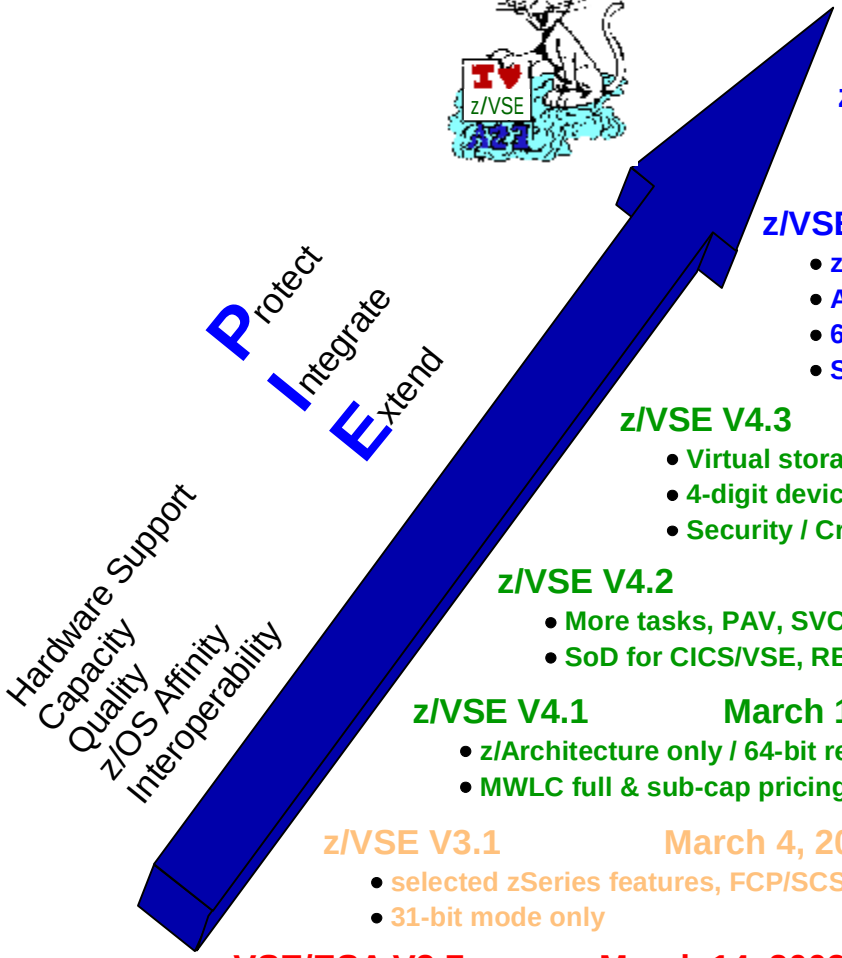
# z/VSE Evolution


**z/VSE V5.1++ Jun 14, 2013**
- zEnterprise EC12 exploitation, 64-bit I/O
- Security and DB connector enhancements
- SoD for IPv6/VSE pricing, DVD base install

**z/VSE V5.1+ Jun 15, 2012**
- CICS Explorer, LFP in LPAR
- DB CLI connector

**z/VSE V5.1 Nov 25, 2011**
- zEnterprise 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

[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.

# z/VSE Support for IBM zEnterprise EC12 (zEC12)

## § z/VSE Release Support

- z/VSE supports the zEC12 with z/VSE V4.2, V4.3 and V5.1
  - No PTFs are required to run z/VSE on zEC12
  - For IOCP, EREP and HLASM PTFs, see PSP (subset 2827/ZVSE of 2827DEVICE)

## § Configurable Crypto Express4s – new with zEC12

- z/VSE toleration PTF required to use Crypto Express4s
  - Toleration PTF (DY47414) will be 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

## § OSA-Express4s 1000BASE-T – new with zEC12

- No z/VSE PTF required
- 1000BASE-T supported with existing z/VSE functionality

## § SCRT – Subcapacity Pricing

- z/VSE 4.2 requires DY47111 (same as for z196, z114)

# Overview of z/VSE Support for IBM zEnterprise 196 / 114

## § zEnterprise compatibility

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

## § zEnterprise exploitation

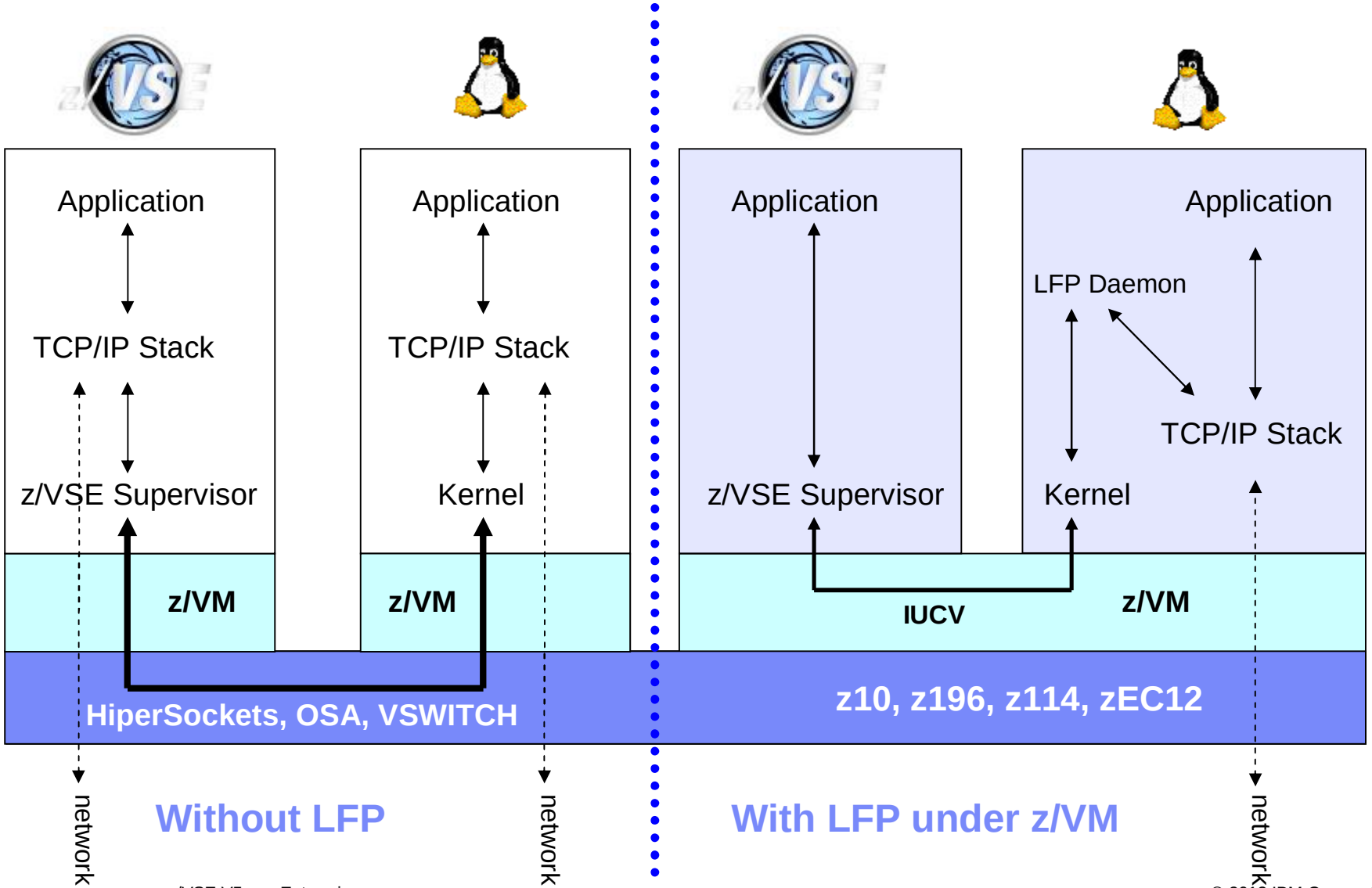
- **z196 exploitation**
  - Static power save mode for use with SCRT
    (exclusive to the high-end zEnterprise, ie. z196 and zEC12)

- **z114 and z196 exploitation**
  - Fast Path to Linux on System z in a z/VM-mode LPAR
  - z/VSE z/VM IP Assist (VIA)
  - Fast Path to Linux on System z in an LPAR environment
  - Dynamic add of logical CPs
  - Large page (1 MB frames) support for data spaces
  - Dynamic add / remove of cryptographic processors
  - Crypto Adjunct Processor (AP) Queue interrupt facility
  - 4096-bit RSA key support with configurable Crypto Express3

- **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

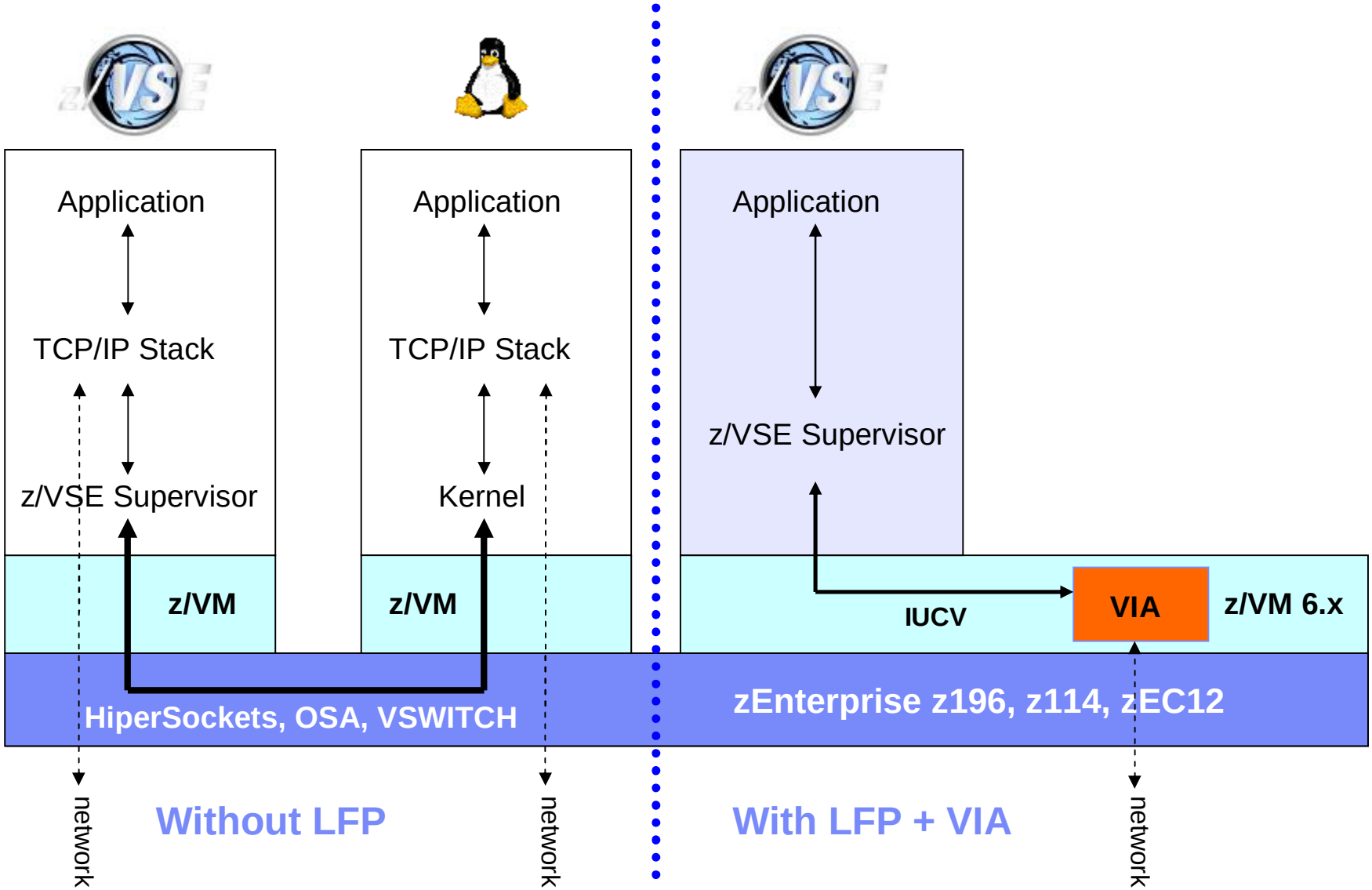
# Linux Fast Path in a z/VM environment - Supported by z/VSE 4.3

*Faster communication between z/VSE and Linux applications*



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

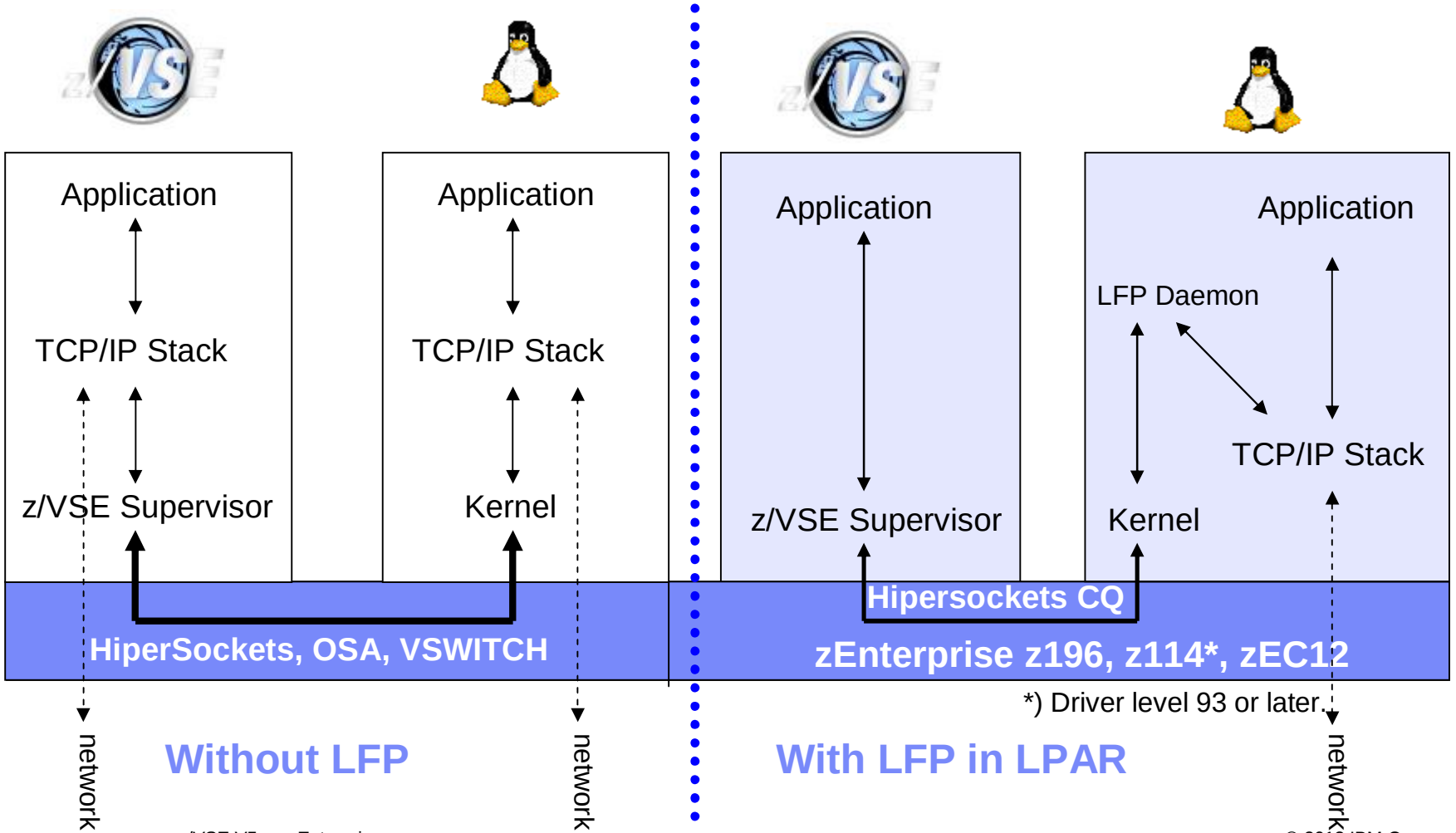
*With z/VM IP Assist (VIA), no Linux on System z is needed to utilize the LFP advantage*



# Linux Fast Path in an LPAR environment - Supported by z/VSE 5.1+

*Faster communication between z/VSE and Linux applications*

**à** Exploits the HiperSockets Completion Queue support of IBM zEnterprise



# 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

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

## § System z10, z196, z114, zEC12

- **Add / Remove of an AP (Crypto card) without 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.
```

# 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 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**"

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# 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**<br>§ Introduce **$75k z114 Hardware Entry Price** (down 25% from z10 BC)<br>§ 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**<br>§ 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)**<br>§ 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

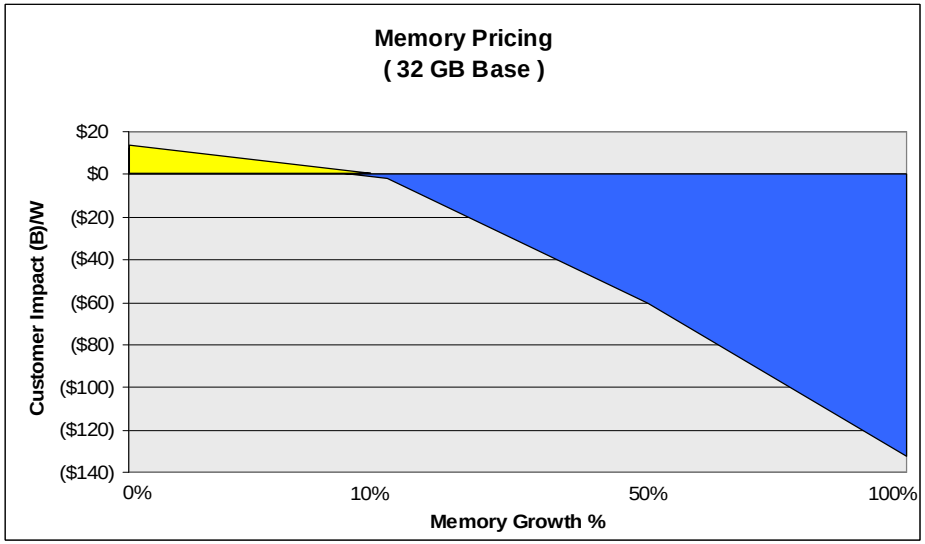
*Source: IBM, with Clipper computations*

Source: Clipper Group Report TCG2011024LI

# Memory and IFL Pricing on z114

## *Aligning with industry practice*

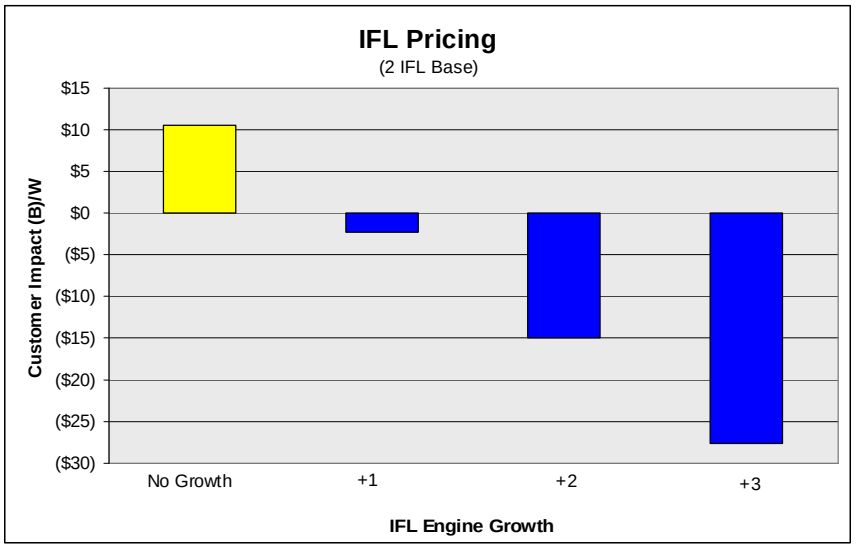
- Reduce memory price from $6k/GB and $2,25k/GB for new workload on z10 BC to $1,5k/GB for all workloads on z114
- Customers “repurchase” memory on upgrade at 50% ($750/GB Street Price) of purchase price




- 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.

- 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 |

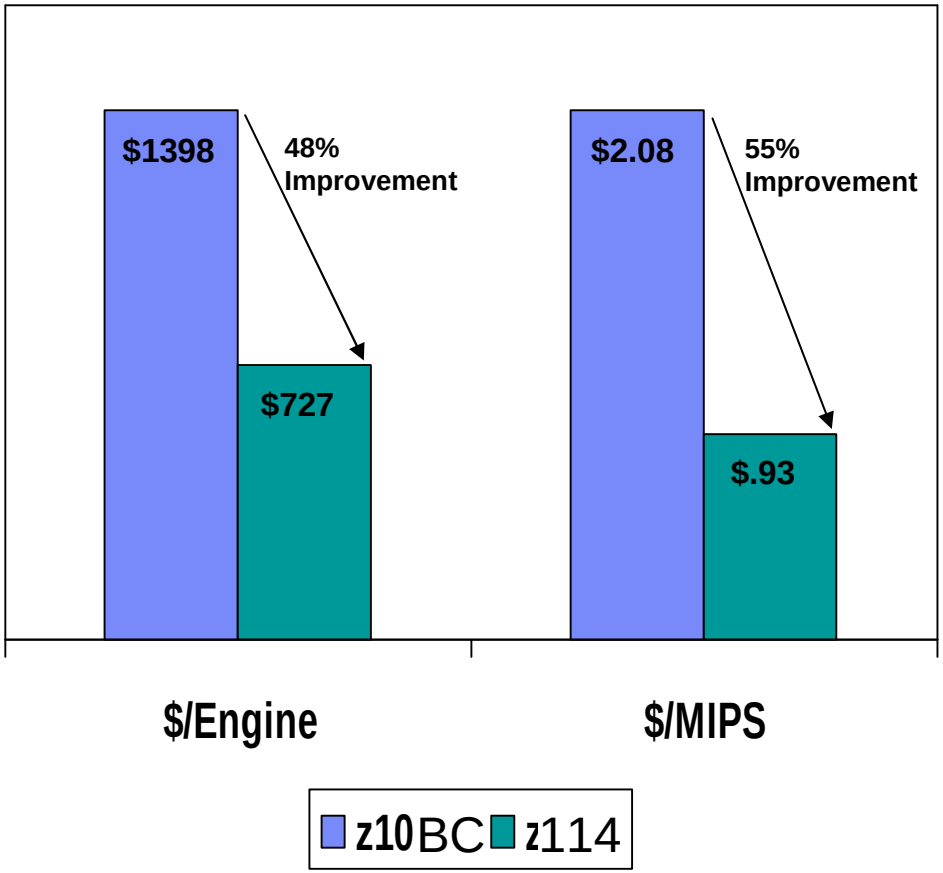



- A customer with 2 IFL’s on a z10 BC would be better off with the methodology change if 1 IFL is added when upgrading to z114.

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.

# IFL Maintenance Pricing on z114

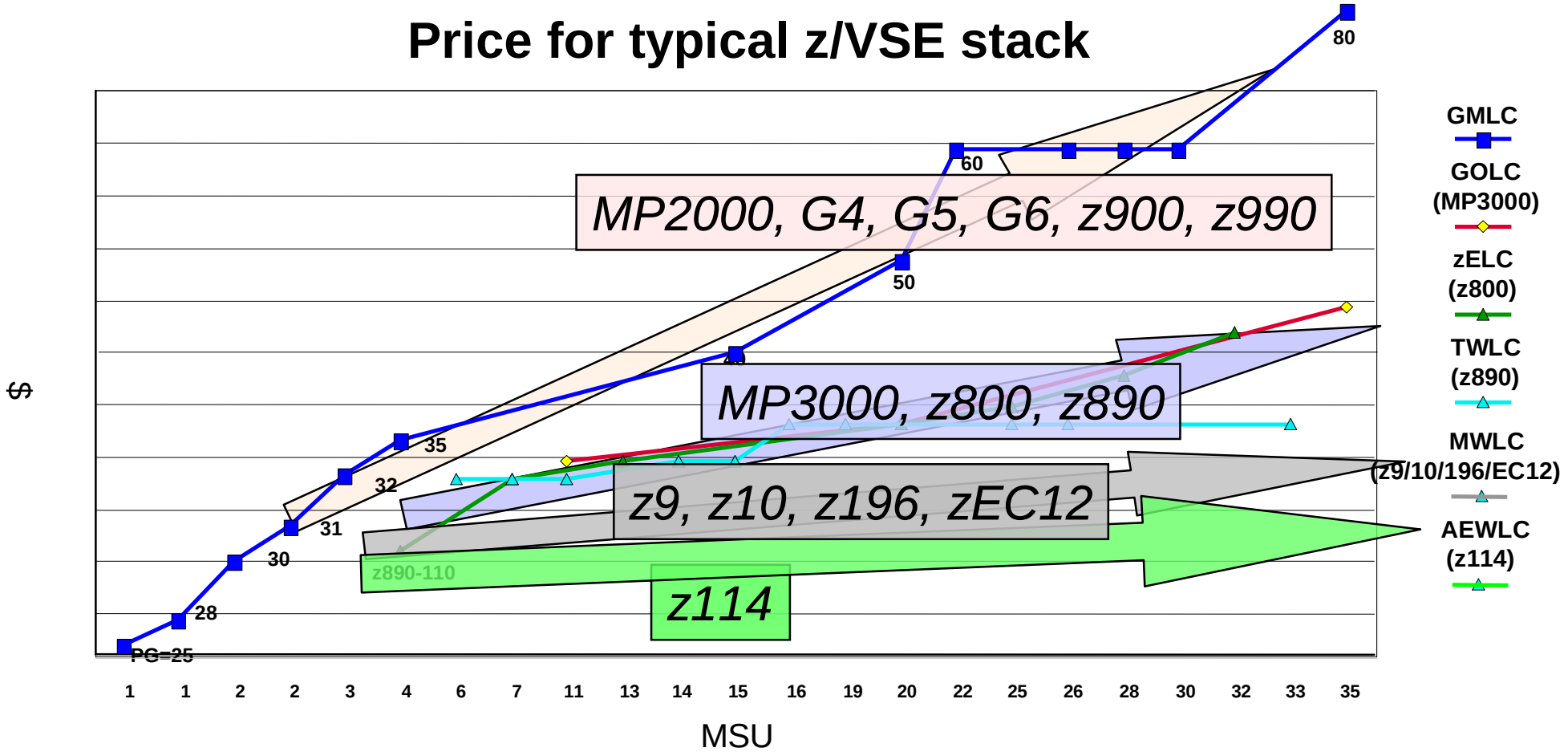
*Deliver significant price performance*




- 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.

# AEWLC – Advanced Entry Workload License Charge on z114




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

# 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.***

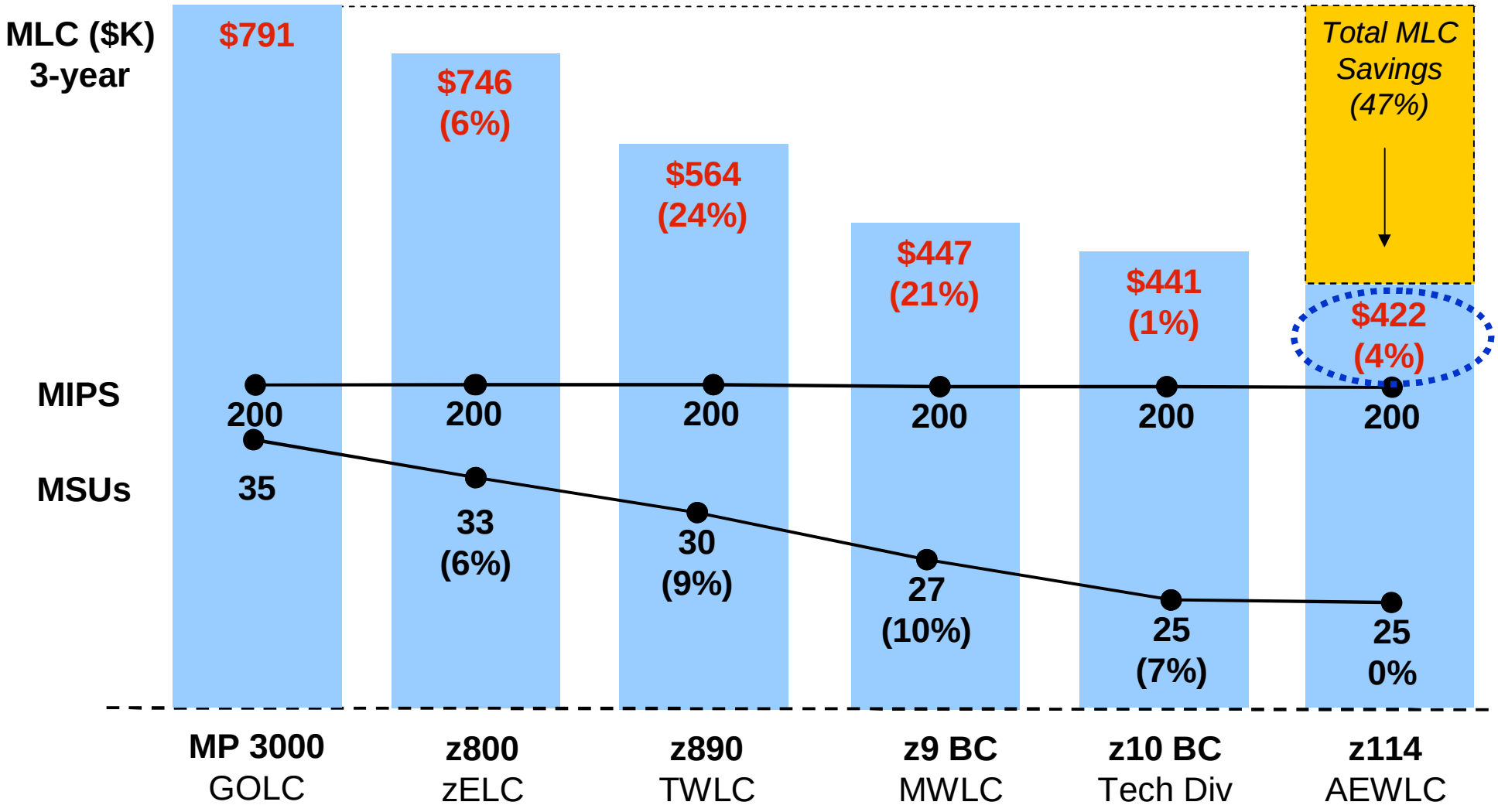
| Sample market segment ranges | Savings for a Sample Stack of z/VSE SW: MWLC on z10BC to AEWLC on z114 |
|---|---|
| (3 msus) | 0% |
| 4-17 MSUs | -2% |
| 18-30 MSUs | -4% |
| 31-45 MSUs | -4% |
| 46-87 MSUs | -5% |
| 88+ MSUs | -5% |

← ***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%** |

# MLC Price Performance across HW Generations for z/VSE

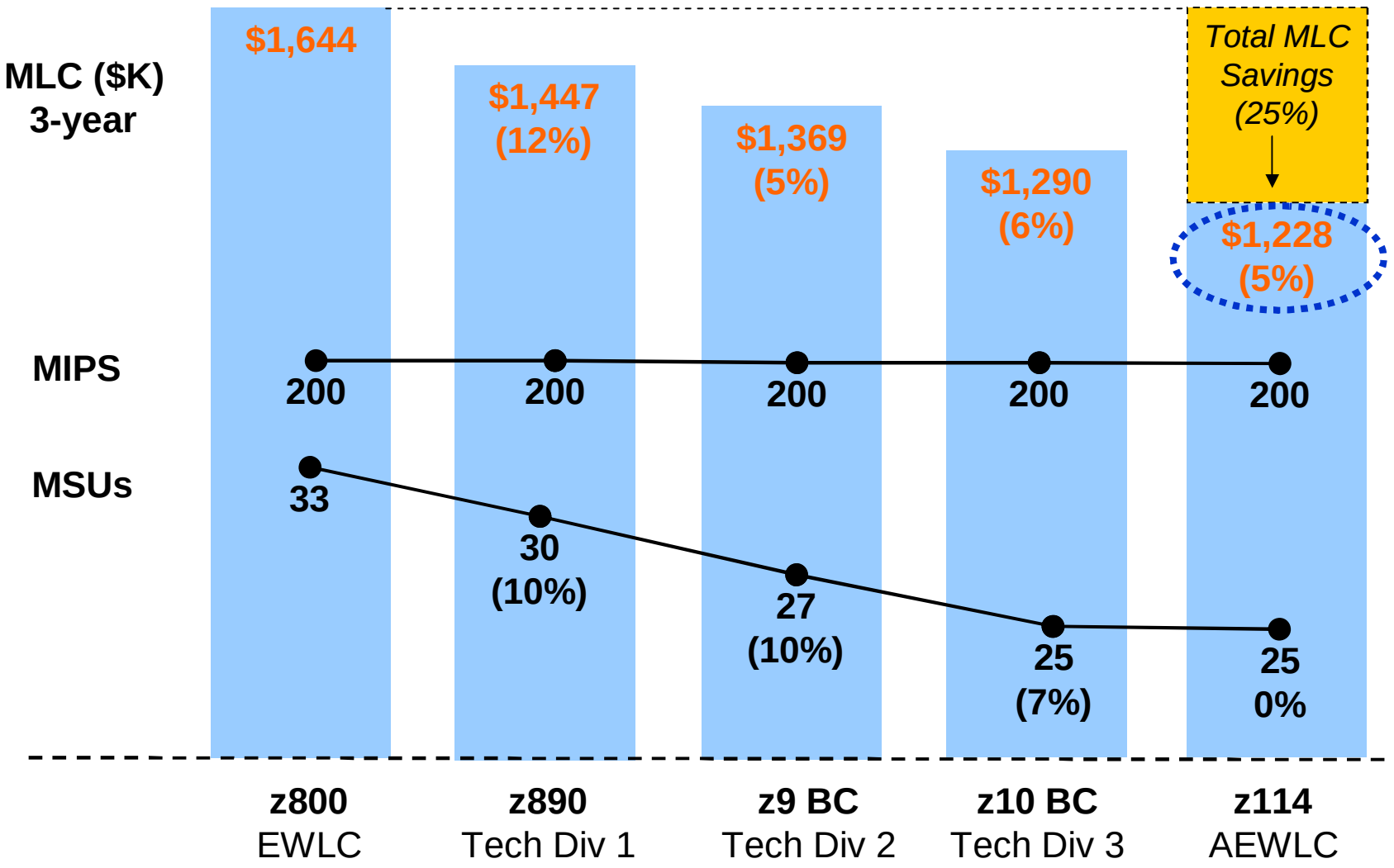
** 200 MIPS example for a typical z/VSE stack*




* 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

# MLC Price Performance across HW Generations for z/OS

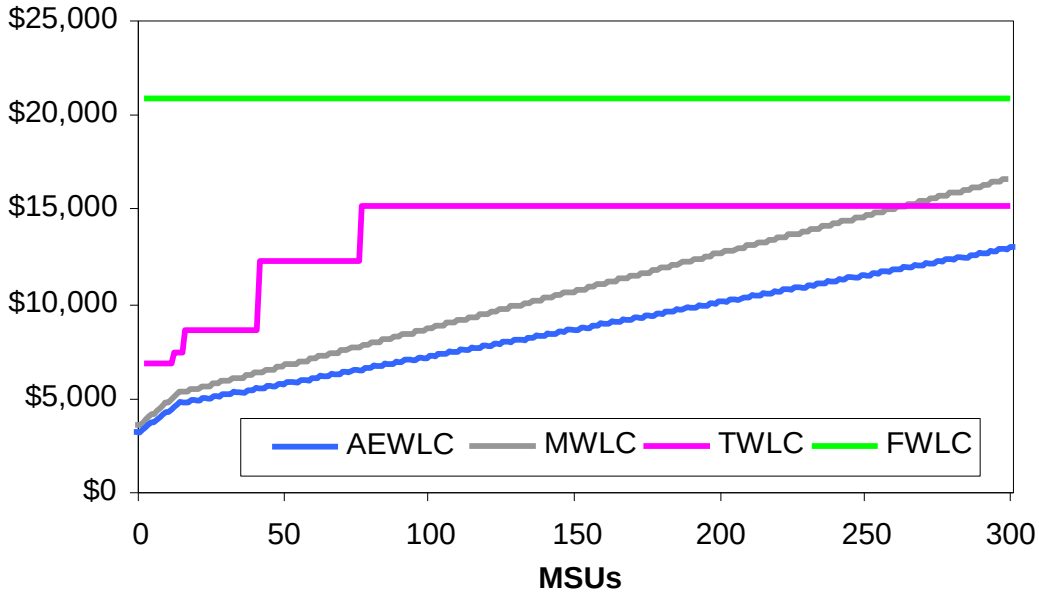
** 200 MIPS example for a typical z/OS stack*



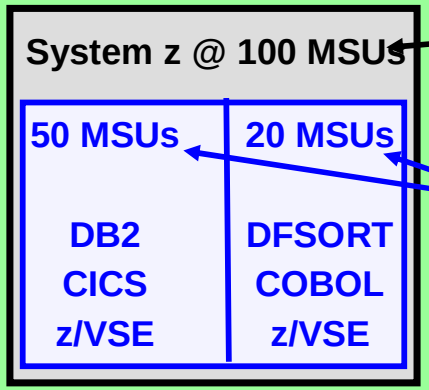

* MLC savings will vary significantly by customer - actual customer configuration must be priced out to be accurate.

# 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




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.

# PVU Table
## *Processor Value Units*

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

| Processor Technologies | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Processor Brand | | | Processor Type | | | | | | | | | |
| | | | | Cores per socket | | | | | | | | | |
| 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, zEC12 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

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

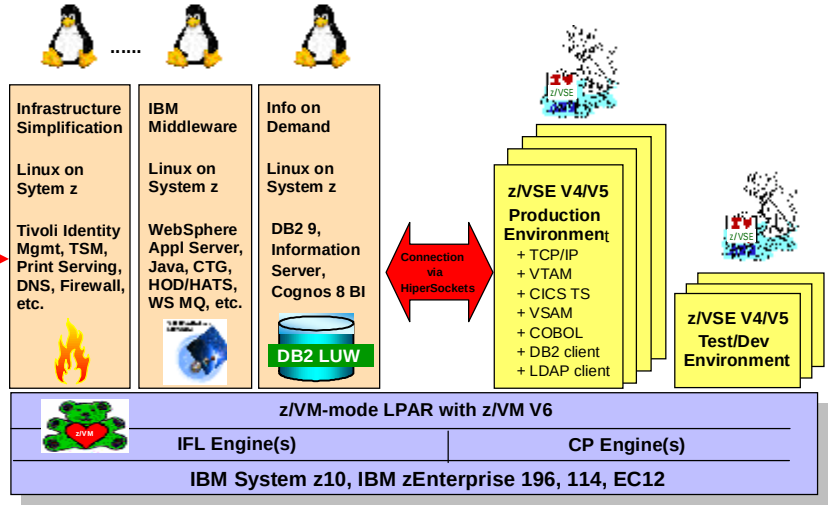
6) z114 refers to IBM zEnterprise 114

# Agenda

- **IBM zEnterprise**
  - z196, z114, zEC12
  - zBX
  - zManager
- **z/VSE Strategy and how it relates to zEnterprise**
  - Hybrid
  - PIE
- **z/VSE Exploitation of zEnterprise**
  - zEC12
  - z196
  - z114
- **Pricing Strategy**
  - z114 Hardware Pricing
  - z114 Software Pricing
- **Wrap-up**

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

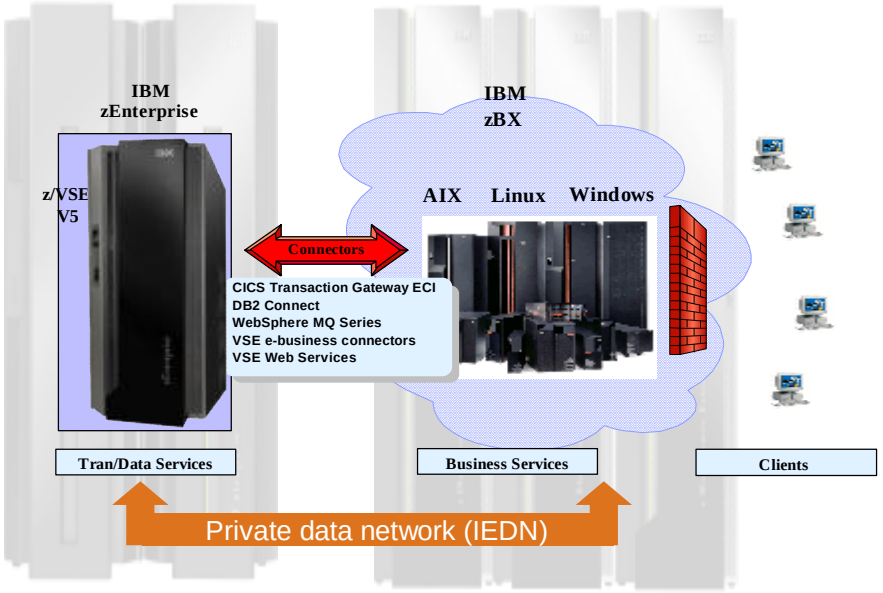
Rational
Tivoli
Lotus
WebSphere
DB2
COGNOS




**Protect** existing VSE investments

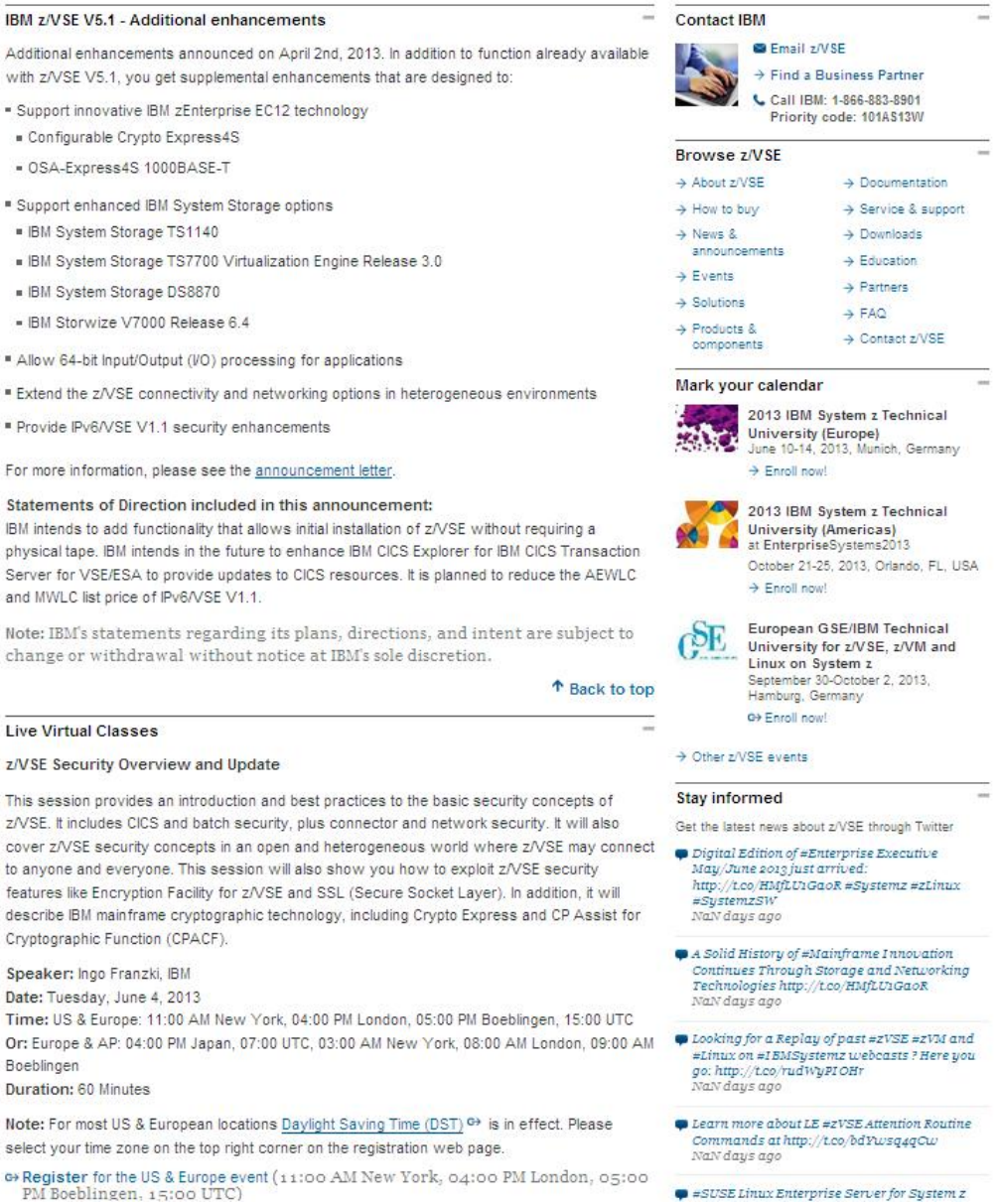
**Integrate** using middleware and VSE connectors

**Extend** with another platform to access new applications & solutions



# For more information, please see the z/VSE web site:

http://www.ibm.com/zvse/



**IBM z/VSE V5.1 - Additional enhancements**

Additional enhancements announced on April 2nd, 2013. In addition to function already available with z/VSE V5.1, you get supplemental enhancements that are designed to:

- Support innovative IBM zEnterprise EC12 technology
  - Configurable Crypto Express4S
  - OSA-Express4S 1000BASE-T
- Support enhanced IBM System Storage options
  - IBM System Storage TS1140
  - IBM System Storage TS7700 Virtualization Engine Release 3.0
  - IBM System Storage DS8870
  - IBM Storwize V7000 Release 6.4
- Allow 64-bit Input/Output (I/O) processing for applications
- Extend the z/VSE connectivity and networking options in heterogeneous environments
- Provide IPv6/VSE V1.1 security enhancements

For more information, please see the announcement letter.

**Statements of Direction included in this announcement:**
IBM intends to add functionality that allows initial installation of z/VSE without requiring a physical tape. IBM intends in the future to enhance IBM CICS Explorer for IBM CICS Transaction Server for VSE/ESA to provide updates to CICS resources. It is planned to reduce the AEWLC and MWLC list price of IPv6/VSE V1.1.

**Note:** IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion.

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**Live Virtual Classes**

**z/VSE Security Overview and Update**

This session provides an introduction and best practices to the basic security concepts of z/VSE. It includes CICS and batch security, plus connector and network security. It will also cover z/VSE security concepts in an open and heterogeneous world where z/VSE may connect to anyone and everyone. This session will also show you how to exploit z/VSE security features like Encryption Facility for z/VSE and SSL (Secure Socket Layer). In addition, it will describe IBM mainframe cryptographic technology, including Crypto Express and CP Assist for Cryptographic Function (CPACF).

**Speaker:** Ingo Franzki, IBM
**Date:** Tuesday, June 4, 2013
**Time:** US & Europe: 11:00 AM New York, 04:00 PM London, 05:00 PM Boeblingen, 15:00 UTC
**Or:** Europe & AP: 04:00 PM Japan, 07:00 UTC, 03:00 AM New York, 08:00 AM London, 09:00 AM Boeblingen
**Duration:** 60 Minutes

**Note:** For most US & European locations Daylight Saving Time (DST) is in effect. Please select your time zone on the top right corner on the registration web page.

**Register** for the US & Europe event (11:00 AM New York, 04:00 PM London, 05:00 PM Boeblingen, 15:00 UTC)

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**2013 IBM System z Technical University (Europe)**
June 10-14, 2013, Munich, Germany
Enroll now!

**2013 IBM System z Technical University (Americas)**
at EnterpriseSystems2013
October 21-25, 2013, Orlando, FL, USA
Enroll now!

**European GSE/IBM Technical University for z/VSE, z/VM and Linux on System z**
September 30-October 2, 2013, Hamburg, Germany
Enroll now!

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*A Solid History of #Mainframe Innovation Continues Through Storage and Networking Technologies http://t.co/HMfLU1GaoR*
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*Learn more about LE #zVSE Attention Routine Commands at http://t.co/bdYwsq4qCw*
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*#SUSE Linux Enterprise Server for System z*

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**IBM System x Technical Symposium**
November 12 - 14, 2013 | Dubai, United Arab Emirates

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