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What's new for z/VSE, z/VM and Linux on System z

3rd European IBM/GSE Workshop, Dresden, Germany, October 2009

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DS6000	IBM eServer	System z10	zSeries*
DS8000	IBM logo*	System z10 Business Class	z9
Enterprise Storage Server*	IMS	Tivoli	z10
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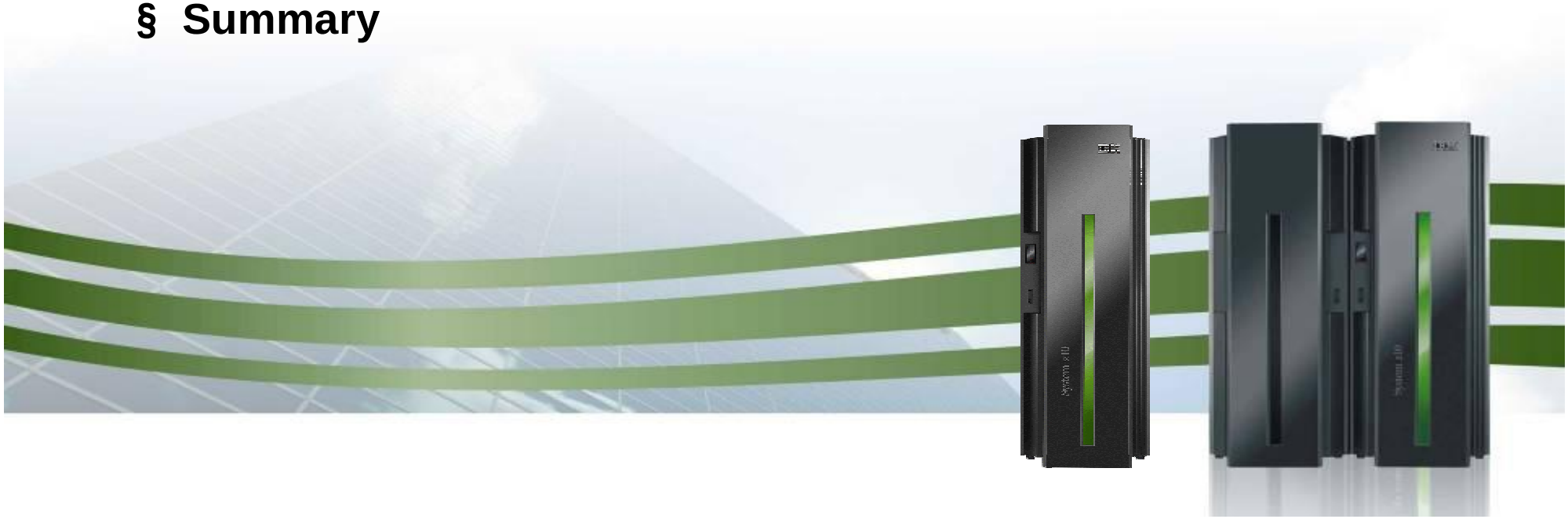
Agenda

- **z/VSE**
- **z/VM**
- **Linux on System z**
- **Summary**



Agenda

- **z/VSE**
  - **z/VSE Roadmap**
  - **z/VSE V4.2.1**
  - **z/VSE Software Pricing Enhancements**
  - **z/VSE V4.3 Preview**
- **z/VM**
- **Linux on System z**
- **Summary**

z/VSE Evolution

z/VSE V4.3 Preview Oct 20, 2009

z/VSE V4.2.1 July 17, 2009
- **EF, PAV, Delivering on SoD**
- **Additional enhancements**

z/VSE V4.2 Oct 17, 2008
- **More tasks, SVC, LDAP Client**
- **SoD** for CICS/VSE, EGL, WMQ**

z/VSE V4.1 March 16, 2007
- **z/Architecture only / 64-bit real addr**
- **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

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

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

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

* 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.
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z/VSE Software Support Status

z/VSE Version.Release	*Marketed*	*Supported*	*End of Support*
z/VSE V4.2	**Yes**	**Yes**	**tbd**
z/VSE V4.1	No	**Yes**	**04/30/2010** (plan to move to 04/2011)
z/VSE V3.1	No	No	07/31/2009
VSE/ESA V2.7	No	No	02/28/2007

z/VSE V4.2.1 Contents – available since July 17, 2009

- **Servers**
  - IBM System z10 Enterprise Class (z10 EC) and z10 Business Class (z10 BC)
  - IBM System z9 Enterprise Class (z9 EC) and z9 Business Class (z9 BC)
  - IBM eServer zSeries 990, 890, 900, and 800
- **Scalability**
  - Up to 512 tasks (2x z/VSE V4.1)
  - Up to 32 GB real processor storage (4x z/VSE V4.1)
  - Turbo dispatcher enhancements (CP balancing)
  - Parallel Access Volume (PAV) feature of IBM System Storage DS8000 & DS6000 series
  - IBM System Storage DS8000 Space Efficient Flashcopy
- **Security**
  - Lightweight Directory Access Protocol (LDAP) sign-on support using a z/VSE LDAP client
  - IBM System z10 extensions to CP Assist for Cryptographic Function (CPACF)
  - SOA Message Layer and Transport layer security
  - IBM System Storage TS1130 and TS1120 're-keying' function
  - Basic Security Manager (BSM) improvements
  - Encryption Facility for z/VSE V1.2 as an optional priced feature supporting OpenPGP format

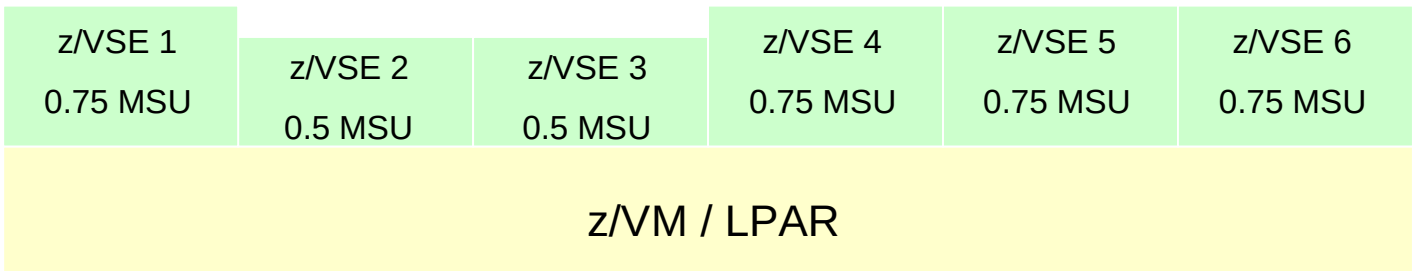
z/VSE V4.2.1 Contents ...

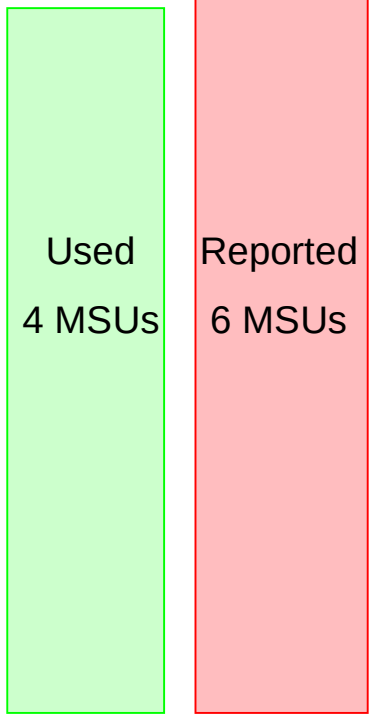
- **Enhanced storage options**
  - IBM System Storage SAN Volume Controller (SVC) access to FCP-attached SCSI disks
  - IBM System Storage TS3400 Tape Library
  - IBM System Storage TS1130 Tape Drive
  - DS8000 Full Disc Encryption
  - IBM Virtualization Engine TS7700 Release 1.5
    - including support for IBM System Storage TS7720 Virtual Tape System
- **Delivering on former Statement of Direction**
  - IBM Rational COBOL Runtime for z/VSE V7.5
  - IBM Rational Business Developer Extension for z/VSE V7.5.1
  - IBM WebSphere MQ for z/VSE V3.0
- **Reemphasizing the former Statement of Direction**
  - z/VSE V4.2 will be the last release to offer CICS/VSE V2.3 and DL/I V1.10
- **Pricing**
  - MWLC (full- or sub-capacity options) eligible on z10 EC, z10 BC, z9 EC, and z9 BC
  - Sub-capacity measurement granularity for workload using less than 1.0 MSU
- **Migration**
  - Fast Service Upgrade (FSU) from z/VSE V4.1 and z/VSE V3.1

New: z/VSE Sub-Capacity Measurement Granularity

- **Problem: z/VM guest systems may cause to over report the customer's MSU use, e.g.**
  - Customer has an LPAR running a z/VM system with 6 z/VSE guests
  - Each z/VSE guest will report a minimum of 1 MSU for each guest system (as designed), regardless, if less than 1 MSU is used
  - As a result, SCRT will report a minimum of 6 MSUs, even though the actual usage might have been less
  - This problem gets even more obvious if customer puts a hard-cap on the LPAR
  - The problem may also occur for z/VSE systems running in a number of LPARs with some of the z/VSE systems only idling
- **Requirement: Allow subcap measurement granularity of less than 1.0 MSU**
  - Requires code changes in SCRT and in z/VSE
- **Solution: SCRT & z/VSE allow MSU measures of less than 1.0**
  - SCRT V18.2 and z/VSE V4.2 PTF DY47029 available since Oct-12-2009

1 MSU (= minimum measured subcap granularity per z/VSE system)

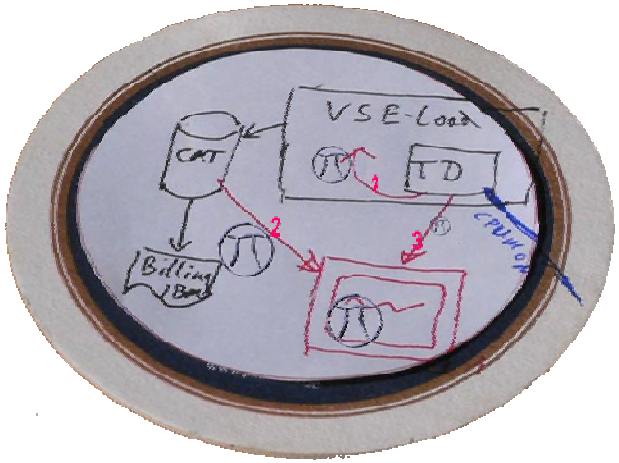


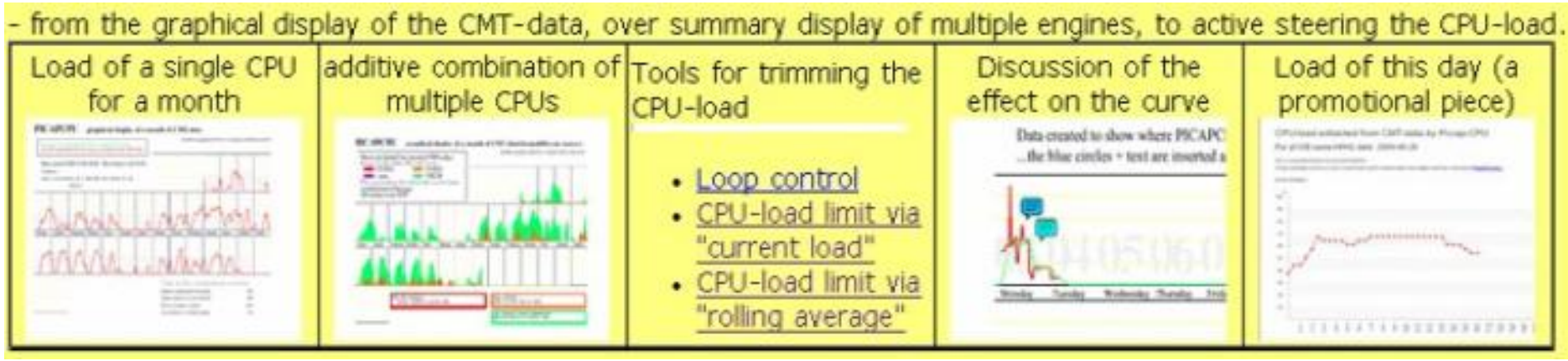


PI CAP CPU – www.picapcpu.de

Tool from PI-Sysprog (Martin Truebner)

- Provides soft-capping of z/VSE CPUs
  - Works for both, z/VSE in the LPAR or z/VM guest
  - Measures CPU load based on z/VSE Turbo Dispatcher data, and triggers actions
  - Allows to control CPU load based on Turbo Dispatcher data, e.g. avoid peaks, detect loops, etc.
- Graphical display of CMT / SCRT data and z/VSE Turbo Dispatcher data
  - Exit for customization
- Almost all code written in VSE/REXX

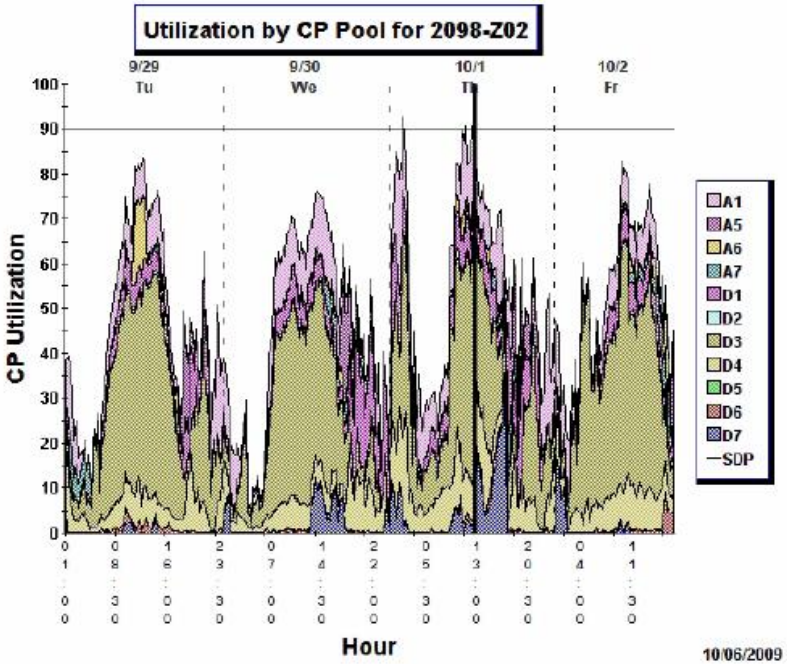




New: z/VSE Capacity Planning Offering

- A brand new z/VSE Capacity Planning Offering is now available
  - for Busines Partners
  - and Customers
- Performance data collection is based on a new version of the CPUMON tool
- Contact techline@us.ibm.com and ask for z/VSE Capacity Planning Support

	Study Interval	Max.	Avg.	LPAR			CEC Capacity		Workload
Partition	CPU%	CPU%	CPU%	Weight	CPs	Cap	Min CPU%	Max CPU%	Mix
A1	14.1%	28.7%	7.5%	135	2.0	N	14%	100%	Mixed
A5	0.2%	30.7%	1.5%	35	2.0	N	4%	100%	Mixed
A6	0.4%	17.8%	0.9%	40	2.0	N	4%	100%	Mixed
A7	1.0%	14.9%	1.4%	10	2.0	N	1%	100%	Mixed
D1	5.7%	30.5%	5.5%	55	2.0	N	6%	100%	Mixed
D2	0.6%	2.1%	0.6%	20	2.0	H	2%	2%	Mixed
D3	56.5%	56.6%	23.1%	580	2.0	N	59%	100%	Mixed
D4	9.5%	24.4%	6.5%	75	2.0	N	8%	100%	Mixed
D5	0.1%	0.4%	0.1%	10	2.0	N	1%	100%	Mixed
D6	1.3%	9.0%	0.6%	10	2.0	N	1%	100%	Mixed
D7	1.1%	34.0%	1.8%	10	2.0	N	1%	100%	Mixed



New: z/VSE V4.3 Preview Announcement – Oct 20, 2009
Planned availability: 4Q 2010

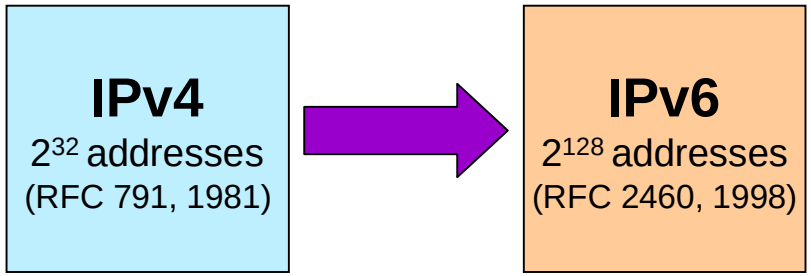
- **Virtual storage constraint relief**
  - Move selected system programs and buffers from 24-bit into 31-bit storage
- **Ease of use through four-digit device addresses**
  - Transparent for system, vendor, and user applications that rely on 3-digit CUUs
- **IBM System z10 technology exploitation**
  - Dynamic add of logical CPs to LPAR without Re-IPL
  - Large page (1 megabyte page) support for data spaces
  - FICON Express8 support
- **Enhanced storage options**
  - Parallel Access Volume (PAV) feature of IBM Systems Storage DS8000 and DS6000
  - DS8000 Remote Mirror and Copy (RMC) feature support through ICKDSF
  - IBM System Storage TS7700 Virtualization Engine Release 1.5
- **Network, security, and auditability enhancements**
  - SNMP agent to retrieve z/VSE specific system and performance data
- **DOS/VS RPG II support for CICS Transaction Server (CICS TS)**
  - Allows RPG programs implemented for CICS/VSE V2.3 to run with CICS TS

New: z/VSE Statement of Direction

Internet Protocol Version 6 (IPv6)

"z/VSE V4.3 intends to provide an IPv6 solution that will enable z/VSE to participate in an IPv6 network."

- IPv6 is the "next generation" protocol designed by the Internet Engineering Task Force (IETF) to replace the current version Internet protocol, IP Version 4 (IPv4)
- IPv6 removes the IP addressing limitation of IPv4
- IPv6 is expected to gradually replace IPv4, both coexisting for a number of years
- Availability of IPv6 support addresses long term requirements of the commercial community and government agencies
  - IPv6 is a strategic direction and a requirement of US Government projects



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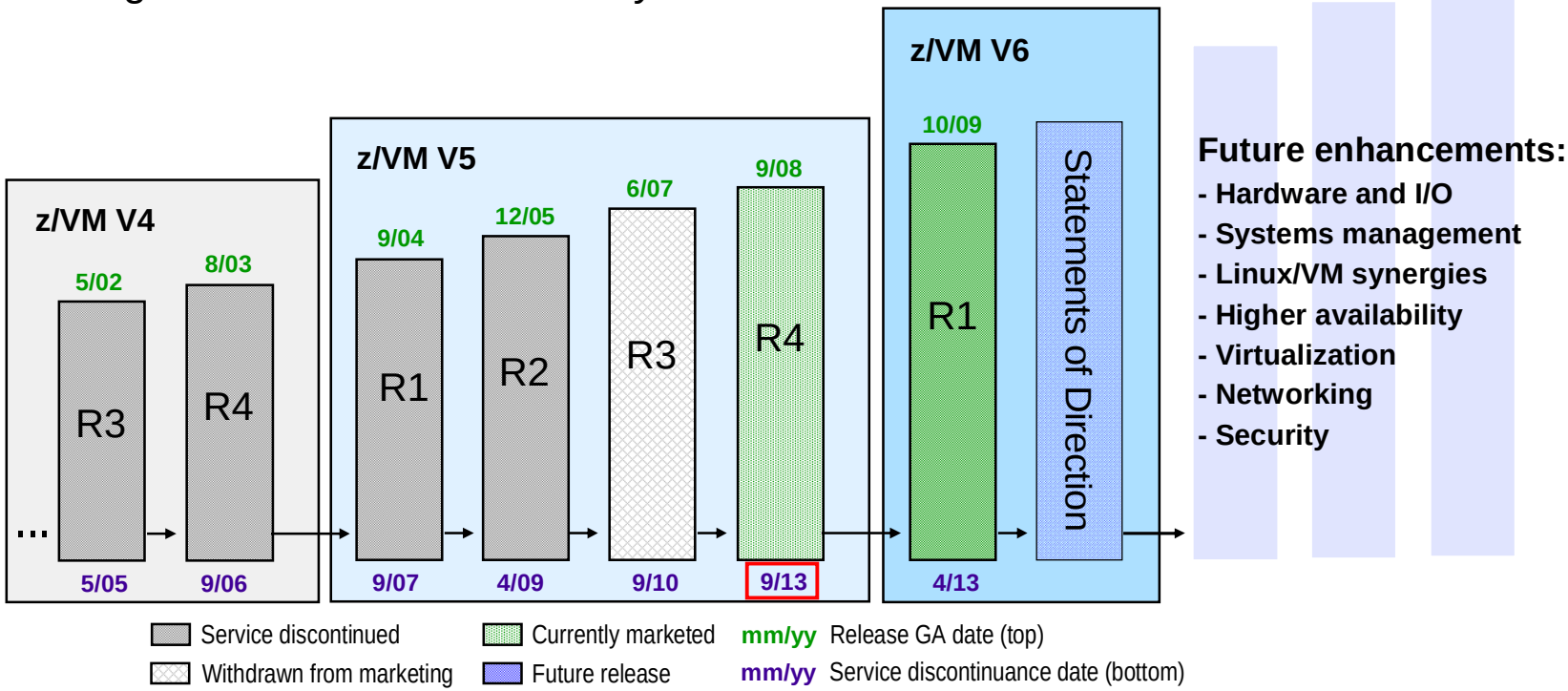
Agenda

- **z/VSE**
- **z/VM**
  - **z/VM Roadmap**
  - **z/VM V6.1**
  - **z/VM Statement of Direction**
  - **z/VM-Mode LPAR for System z10**
- **Linux on System z**
- **Summary**

z/VM Release History

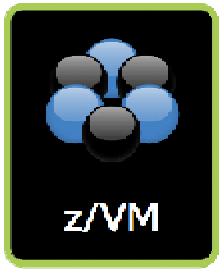
z/VM: helping clients "do more with less"

- Higher core-to-core consolidation ratios
- Higher levels of resource sharing and utilization
- Higher levels of staff efficiency



IBM has received certification of z/VM V5.3 from the German Federal Office of Information Security (Bundesamt für Sicherheit in der Informationstechnik) for conformance to the Controlled Access and Labeled Security protection profiles (CAPP and LSPP) of the Common Criteria standard for IT security, ISO/IEC 15408, at Evaluation Assurance Level 4+ (EAL 4+).
While z/VM V5.4 and V6.1 have not been officially evaluated for conformance, they are designed to meet the same standards.

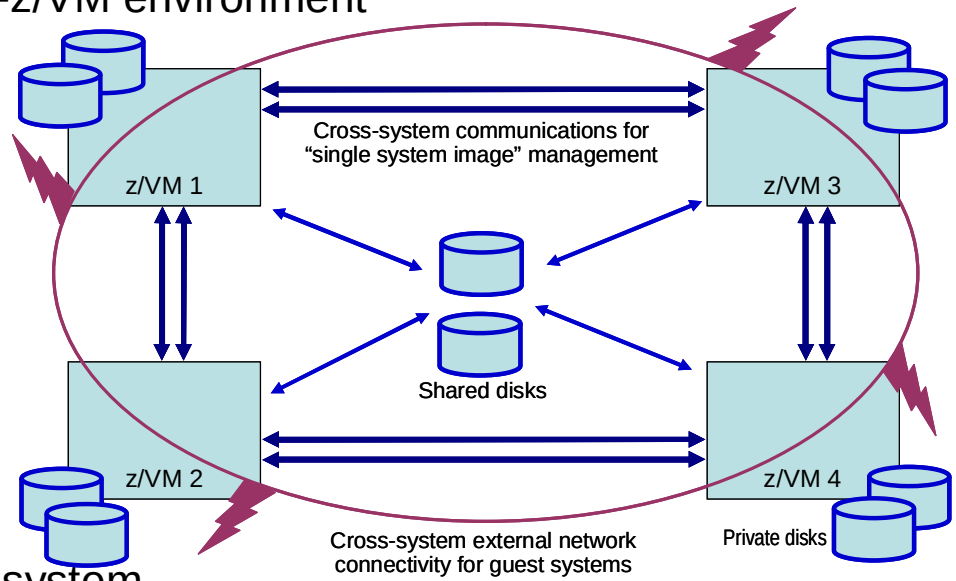
z/VM V6.1
The Foundation for System z Virtualization Growth
Announced October 20, 2009; available October 23, 2009



- **Establishes a new z/VM technology base for IBM System z10 and future systems**
  - z/VM V6.1 only operates on System z10 EC, z10 BC, and future generation servers
  - Acknowledges the ***highly attractive economics*** of workload consolidation on System z10 servers
  - Allows optimization of z/VM function for greater business value on newer hardware
- **New function and packaging for z/VM V6.1**
  - Exploitation of the System z10 server cache management instructions to help improve the performance of z/VM virtual networking for guest-to-guest streaming workloads
  - Better integration with IBM Systems Director by providing the z/VM Manageability Access Point (zMAP) agent (including the Platform Agent for Linux) with z/VM V6.1 for easier agent installation
  - Support for FICON Express8 – designed to provide faster access to data (link data rate of 8 Gbps)
  - Support for Crypto Express3 – the next generation cryptographic feature for System z (z/VM support is planned to be available in 11/2009)
  - Support for IBM System Storage DS8000 Extended Address Volumes (planned availability 12/2009)
  - Inclusion of several functional enhancements previously delivered in the z/VM V5.4 service stream
- **Product announcement includes statements of direction for future z/VM support**
  - z/VM hypervisor clustering support: "Single System Image" (SSI)
  - Linux virtual machine mobility support: "Live Guest Relocation" (LGR)

z/VM V6 Statements of Direction
Clustered Hypervisor Support and Guest Mobility

- Clients can cluster up to four z/VM systems in a **Single System Image** (SSI)
- Provides a set of shared resources that can be used by both z/VM and hosted virtual machines, with full awareness of sharing by the clustered z/VM systems – be they on the same and/or different System z10 servers
  - Directory, minidisks, spool files, Virtual Switch MAC addresses
- Helps simplify systems management for a multi-z/VM environment
  - Single user directory
  - Cluster management from any system
    - Apply maintenance to all systems in the cluster from one location
    - Issue commands from one system to operate on another
  - Built-in cross-system capabilities
  - Service consolidation: run one copy of service virtual machines for the cluster
  - Resource coordination and protection: network and disks



- Dynamically move Linux guests from one z/VM system to another in the cluster via **Live Guest Relocation** (LGR)
  - Helps reduce planned outages; enhances workload management
  - With z/VM: dynamically move work to available resources **and** dynamically move resources to work

Note: All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

z/VM Single System Image Cluster – Frequently Asked Questions

- Up to four (4) systems in a cluster
- Up to 16 CTCs between any two member systems
- Common Layer 2 Ethernet LAN connections
- Requires at least one 3390
- Common directory
- Shared DASD configuration
- Shared SYSTEM CONFIG
- Shared spool
- Cross-system LINK management
- Single- or multi-configuration virtual machines
- Cross-system CP commands
- Relocation of Linux guests within the cluster
- Common resource verification
- Multi-system installation with single point of maintenance

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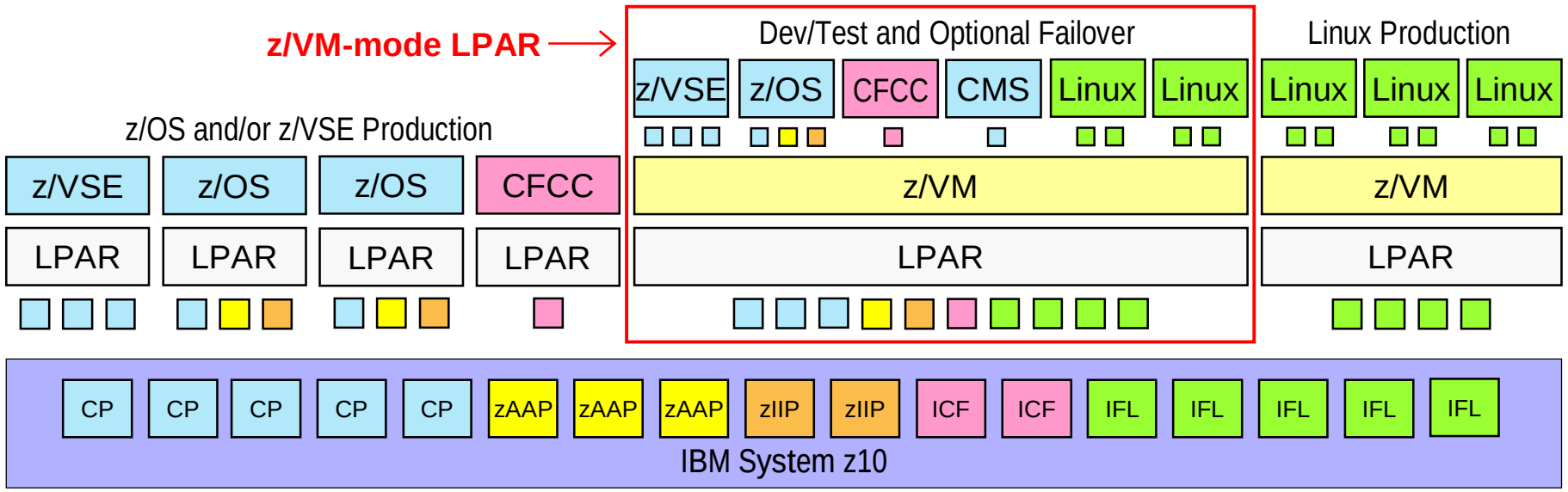
Integrated New Function in z/VM V6.1
Previously delivered in the z/VM V5.4 Service Stream

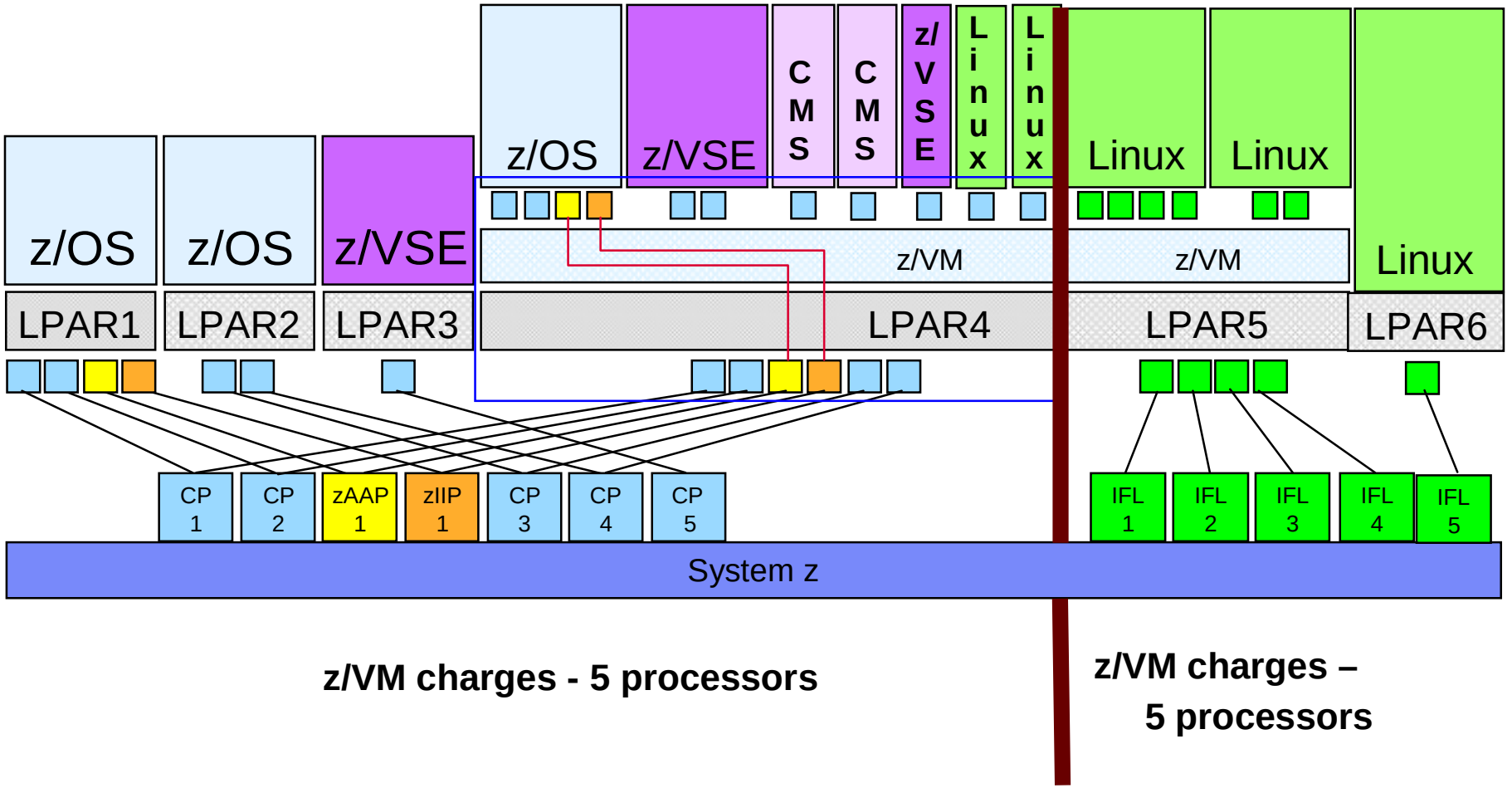
- Port isolation security that provides the ability to restrict guest-to-guest communications within a z/VM Virtual Switch by exploiting OSA-Express QDIO data connection isolation with required minimum MCLs
- Additional support for Linux guests using Dynamic Storage Reconfiguration (DSR)
- SSL server that operates in a CMS environment instead of requiring a Linux distribution
- Providing I/O device information from the I/O definition file (IODF) using Hardware Configuration Definition (HCD) for the World-Wide Port Name (WWPN) prediction tool
- Support for the IBM FlashCopy SE feature on the IBM DS8000 which provides a space-efficient snapshot capability that can greatly reduce the storage capacity needed for point-in-time copies
  - The PTFs for APARs VM64605 and VM64684 are required and have been pre-applied to the supplied Recommended Service Update (RSU)
- Multiple file dump support
- Support for the IBM System Storage Enterprise 3592 Tape Controller Model C06 and 3592 Tape Drive Model E06, including DFSMS/VM

z/VM-Mode LPAR Support for IBM System z10

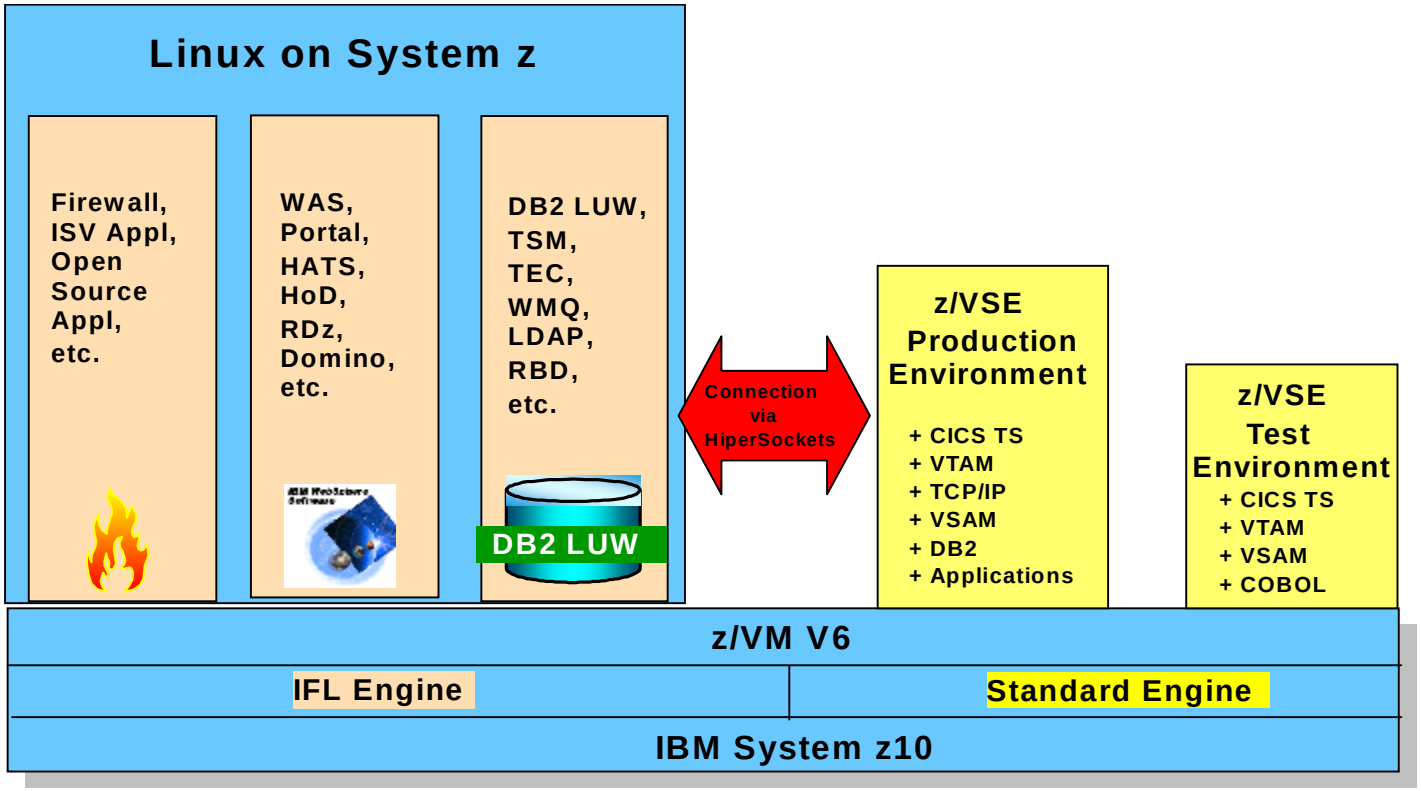
- **New LPAR type for IBM System z10: *z/VM-mode***
  - Allows z/VM V5.4 (and higher) users to configure all CPU types in a System z10 LPAR
- **Offers added flexibility for hosting mainframe workloads**
  - Add *IFLs* to an existing standard-engine z/VM LPAR to host Linux workloads
  - Add *CPs* to an existing IFL z/VM LPAR to host z/OS, z/VSE, or traditional CMS workloads
  - Add *zAAPs* and *zIIPs* to host eligible z/OS specialty-engine processing
  - Test integrated Linux and z/OS and z/VSE solutions in the same LPAR
- **No change to software licensing**
  - Software continues to be licensed according to CPU type



Example of IPLA Charges for z/VM Version 6



z/VM Pricing for a typical z/VSE-Linux Environment



1x LPAR with z/VM V6 on System z10 with 1x CP and 1x IFL → 2x z/VM Licenses

Agenda

- **z/VSE**
- **z/VM**
- **Linux on System z**
  - **IFL Pricing**
  - **IBM Code Drops, Middleware, Performance, XIV Support**
  - **Linux Distributions**
  - **IBM Systems Director VMControl Image Manager for Linux on System z**
- **Summary**

Yahoo! Finance: Survey Predicts Continued Strong Growth of Linux Use on Mainframes* June 15, 2009

"The study surveyed 100 IT executives and managers at companies with at least $2 billion in annual revenue about their use of the Linux operating system on IBM mainframes. 93% of respondents projected that their use of IBM's IFL (Integrated Facility for Linux) specialty mainframe processor would increase or at least remain steady over the course of the next two years. ***42% projected that their use of the IFL would grow between 21% and 40%,*** and 10% projected that it would grow more than 76%."

"The two main reasons cited by respondents for this increased use of Linux on the mainframe were: 1) the desire to take advantage of computing capacity available on their mainframe's central processors and/or IFLs, and 2) ***their assessment that using Linux on the mainframe would be more cost-effective than other platforms***. Respondents also said they were using Linux on the mainframe to support "green" computing initiatives and infrastructure consolidation strategies."

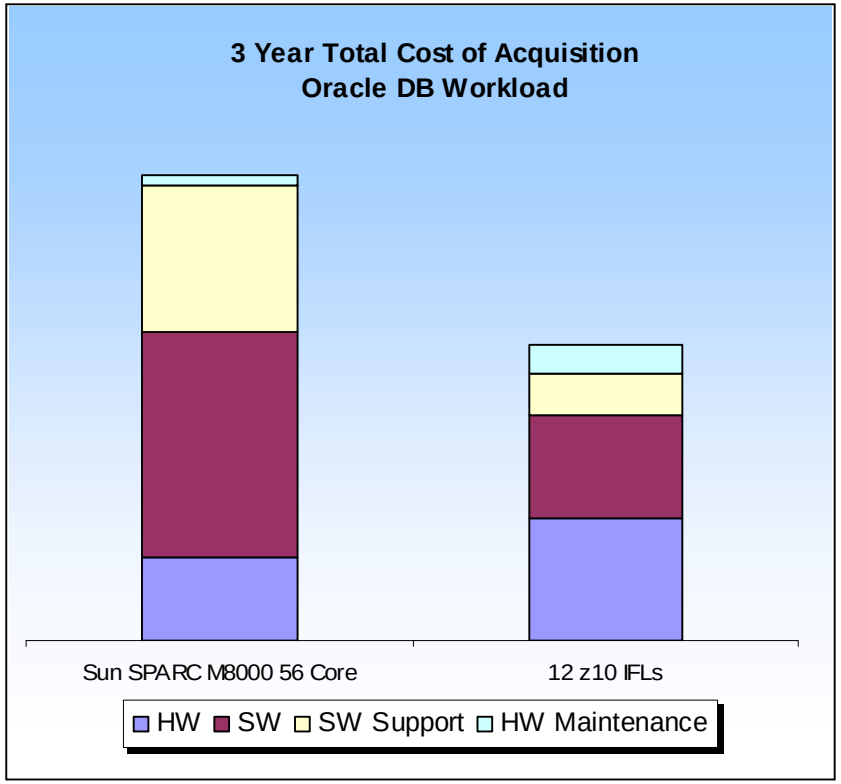
* http://finance.yahoo.com/news/Survey-Predicts-Continued-prnews-15547427.html?.v=1

Even Better Economics for Linux Workloads on System z

New Price Actions Lower Cost of Acquisition

- **IFL prices for System z10 EC™ reduced to $75k USD(1)**
- **Reduced memory prices extended to all new workloads running on z10 servers – Now $2250 USD(2)**
- **Improved maintenance pricing to align with new IFL price**
- **Combine with zRewards for a powerful one-two punch**

Save up to 36% with System z before energy, administration, and floor space considerations



(1) Prices are stated in US currency and may vary by country. This is for IFLs only; zIIPs and zAAP remain at $125K. Specialty engines do not include Internal Coupling Facilities (ICFs).
(2) New workloads defined consistent with zNALC terms and conditions and also include all Linux workloads. Prices will vary by country. Limited to 16 GB per qualifying new processor.

Data is based on real client opportunity and on internal standardized costing tools and methodologies. Client results will vary by types of workloads, technology level of consolidated servers, utilization factor, and other implementation requirements. Savings will vary by client.

Open Source Code Drop for Linux on System z

4Q08 Code drop content (Nov 2008)

- Toolchain support for z9 + z10 instructions with GCC + binutils
- Automatic CPU detection
- Support for HiperSockets multiwrite SBALs on output queues
- Toolchain support for decimal floating point (DFP) with GCC, binutils + GDB
- Server time protocol (STP) support for clock synchronization
- HiperSockets IPv6 support for Layer 3
- Enable to attach and use standby memory that is configured for a logical partition or z/VM guest
- Dynamic memory attach/detach

Exploitation of z/VM 5.4 features:

- Expanded shared memory addressability: Linux on System z can now use discontiguous Saved Segments (DCSS) above 2047 MB (2 GB) of virtual storage
- Capability to dump Linux guests to SCSI disks

Other enhancements:

- Processor-type safety-check, preventing a kernel to run a processor if it was compiled to exploit instructions of a newer machine
- New IPL tools
- zipl can dump on multiple ECKD DASD devices
- Enhanced zfcp trace facility
- zfcp performance data collection
- zfcp Host Bus Adapter application programming interface
- glibc support for 31/64-bit compatible utmp (glibc-2.8-utmp-compat)

2Q09 Code drop content (May 2009)

HW Exploitation:

- Standby memory add via SCLP
- Kernel vdso support

Toolchain:

- z10 new instruction support
- HW decimal floating point (DFP) accelerated libgcc

Virtualization:

- Linux support for dynamic memory attach/detach
- Extra kernel parameter via VMPARM
- TTY terminal server over IUCV

Network:

- HiperSockets enhanced SIGA
- Secondary unicast addresses for qeth layer2 devices

Storage:

- FCP performance data reports
- FCP LUN discovery tool
- DS8000 disk encryption
- DS8000 support: Large Volume support
- High Performance FICON

Security:

- Enablement for next generation Crypto cards
- Crypto Device Driver use of Thin Interrupts

RAS:

- FCP SCSI error recovery hardening
- Large image dump on DASD
- Shutdown actions tool
- Automatic IPL after dump

Note: This list shows the major items only. A complete list can be found at developerWorks.

IBM Software for Linux on System z

2009-10-02

WebSphere/AIM

- CICS Transaction Gateway
- IBM Java SE
- WebSphere Application Server
- WebSphere Application Server ND
- WAS Community Edition
- WebSphere Extended Deployment
- WS Business Events
- WS Business Modeler Publishing Server
- WS Business Monitor
- WS Business Services Fabric
- WS Commerce
- WS Enterprise Service Bus
- WS Message Broker
- WS MQ
- WS MQ File Transfer Edition
- WS Process Server
- WS Service Registry & Repository
- WS sMash

Information Management

- Alphablox
- Cognos 8 Business Intelligence
- DataQuant
- DB2 for LUW
- DB2 Connectit
- Content Integrator
- DB2 Content Manager
- DB2 Content Manager OnDemand
- Filenet P8
  - Content Manager
  - Records Manager
- Information Server
  - WS DataStage
  - WS Federation Server
  - WS QualityStage
- Informix Dynamic Server
- InfoSphere Master Data Management Server
- InfoSphere Warehouse for z/OS

STG & GTS

- IBM Active Energy Manager
- IBM VMControl – Image Manger
- IBM Systems Director
- IBM Integrated Removable Media Manager
- z/VM

Lotus/Workplace

- Domino
- WS Portal
- Lotus Forms

Rational

Asset Manager
BuildForge
ClearCase
Team Concert for System z

Tivoli

Service and Process Automation (SPA)

- Application Dependency Discovery Manager
- Business Continuity Process Manager
- Change & Configuration Management Database
- Dynamic Workload Broker
- Provisioning Manager
- Provisioning Manager for SW (TCM)
- Provisioning Manager for OS Deployment
- Release Process Manager
- Service Request Manager
- Service Automation Manager
- System Automation
- System Automation Application Manager
- Workload Scheduler

Service, Availability and Performance Mgmt (SAPM)

- Business Systems Manager
- Composite App Manager
  - for Appl Diagnostics
    - Web Resources
    - WebSphere
  - for SOA
- Monitoring
  - for Applications
  - for Databases
- NetView
- OMEGAMON XE for z/VM and Linux

Security Mgmt

- Access Manager
- Director Integrator
- Director Server
- Federated Identity Manager
- Identity Manager

Network Mgmt

- Enterprise Console
- NetCool/Omnibus
- Network Manager IP Edition

Asset Management

- Asset Management for IT
- Maximo Asset Management
- License Compliance Manager
- Usage and Accounting Manager

Storage Mgmt

- Storage Manager
- TPC Agent

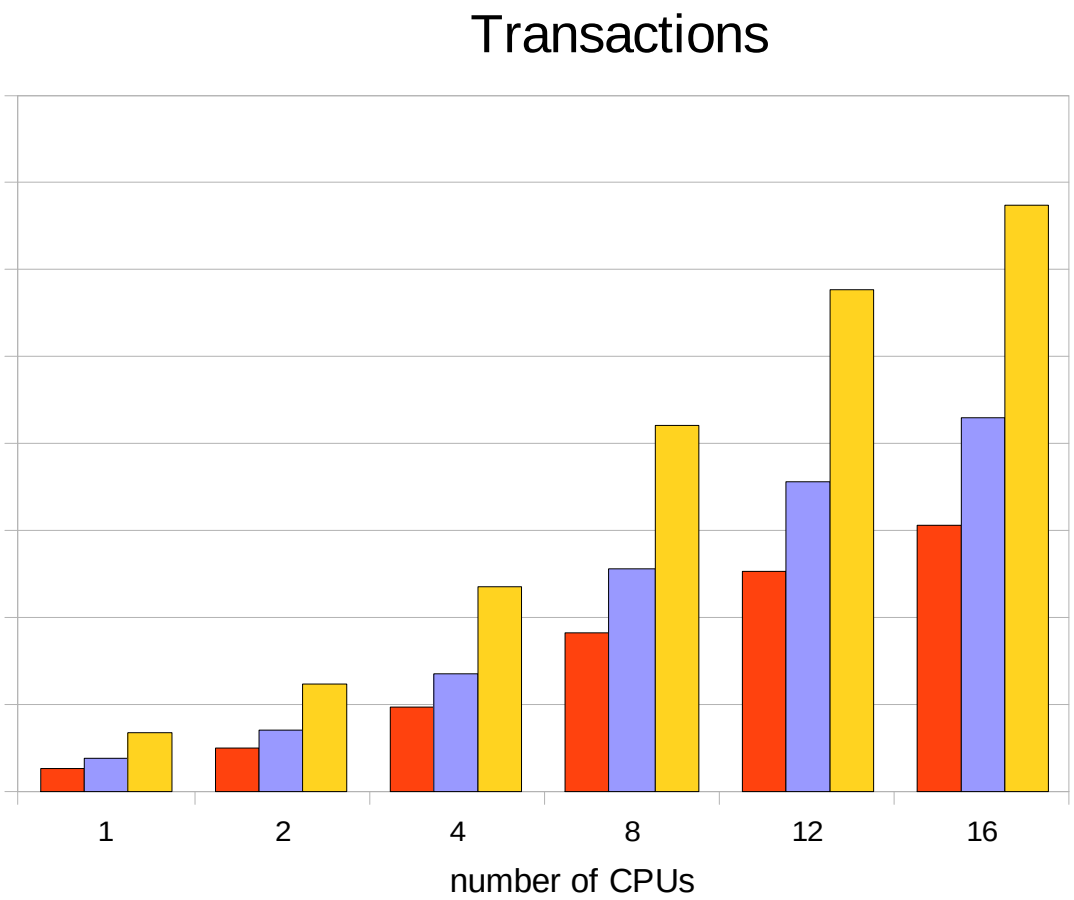
IBM Systems Director VMControl Image Manager for Linux on System z Version 2.1
Announced July 21, 2009; available July 24, 2009

- VMControl Image Manager is a plug-in to IBM Systems Director V6.1
  - Effectively replaces the "z/VM Center" extension of IBM Director V5.20
- Provides support to manage and automate the deployment of virtual images from a centralized location
  - A virtual image consists of an operating system instance and the software stack, such as middleware and applications, running on that operating system
- VMControl Image Manager provides a graphical interface to create and deploy Linux images on z/VM and AIX images on Power systems
  - Definition of these system images is based on the industry-standard Open Virtualization Format (OVF) specifications – facilitates importation of virtual images
  - Deploy an all-in-one solution instead of OS, middleware, and application piece parts
  - Clone already-tested system configurations
  - Propagate virtual image updates to all instances
- IBM Systems Director and VMControl Image Manager help support a Dynamic Infrastructure
  - Helps improve responsiveness to changing business needs
  - May increase operational productivity
  - Can help reduce service and support costs

60-day Free Trial
Available via download

Linux on System z Performance – System z9 vs z10

- **Informix IDS 11 OLTP Workload**
  - z9 to z10 throughput improvement = 65% - 82%
  - x numbers of z10 CPUs can do the same work as 2x z9 CPUs



More details at:

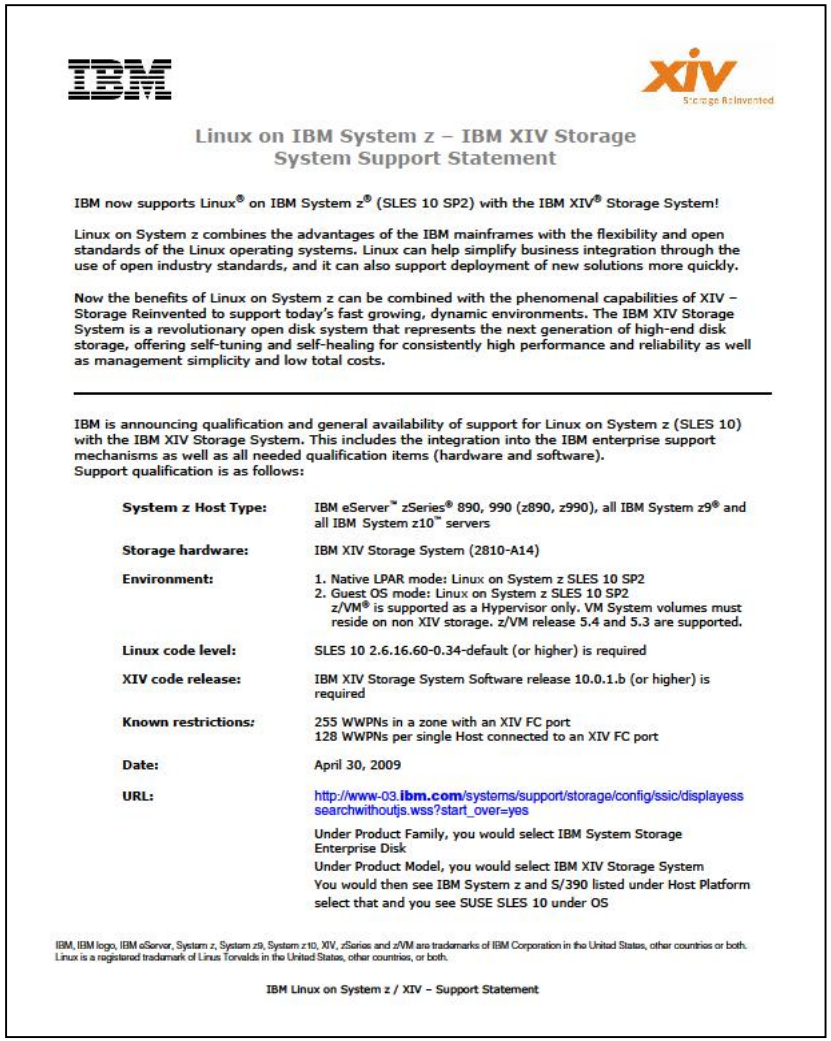
http://www.ibm.com/developerworks/linux/linux390/perf/index.html

Linux on System z – XIV Support Statement

April 30, 2009

IBM is announcing qualification and general availability of support for Linux on System z (SLES 10) with the IBM XIV Storage System.

- IBM eServer™ zSeries® 890, 990 (z890, z990), all IBM System z9® and all IBM System z10™ servers
- IBM XIV Storage System (2810-A14)
- Environment:
  - Native LPAR mode: Linux on System z SLES 10 SP2
  - Guest OS mode: Linux on System z SLES 10 SP2 z/VM® is supported as a Hypervisor only. VM System volumes must reside on non XIV storage. z/VM release 5.3 (and higher) is supported.
- SLES 10 2.6.16.60-0.34-default (or higher) is required



Linux on IBM System z – IBM XIV Storage System Support Statement

IBM now supports Linux® on IBM System z® (SLES 10 SP2) with the IBM XIV® Storage System!

Linux on System z combines the advantages of the IBM mainframes with the flexibility and open standards of the Linux operating systems. Linux can help simplify business integration through the use of open industry standards, and it can also support deployment of new solutions more quickly.

Now the benefits of Linux on System z can be combined with the phenomenal capabilities of XIV – Storage Reinvented to support today's fast growing, dynamic environments. The IBM XIV Storage System is a revolutionary open disk system that represents the next generation of high-end disk storage, offering self-tuning and self-healing for consistently high performance and reliability as well as management simplicity and low total costs.

IBM is announcing qualification and general availability of support for Linux on System z (SLES 10) with the IBM XIV Storage System. This includes the integration into the IBM enterprise support mechanisms as well as all needed qualification items (hardware and software).
Support qualification is as follows:

System z Host Type:	IBM eServer™ zSeries® 890, 990 (z890, z990), all IBM System z9® and all IBM System z10™ servers
Storage hardware:	IBM XIV Storage System (2810-A14)
Environment:	1. Native LPAR mode: Linux on System z SLES 10 SP2 2. Guest OS mode: Linux on System z SLES 10 SP2 z/VM® is supported as a Hypervisor only. VM System volumes must reside on non XIV storage. z/VM release 5.4 and 5.3 are supported.
Linux code level:	SLES 10 2.6.16.60-0.34-default (or higher) is required
XIV code release:	IBM XIV Storage System Software release 10.0.1.b (or higher) is required
Known restrictions:	255 WWPNs in a zone with an XIV FC port 128 WWPNs per single Host connected to an XIV FC port
Date:	April 30, 2009
URL:	http://www-03.ibm.com/systems/support/storage/config/ssic/displayessearchwithoutjs.wss?start_over=yes Under Product Family, you would select IBM System Storage Enterprise Disk Under Product Model, you would select IBM XIV Storage System You would then see IBM System z and S/390 listed under Host Platform select that and you see SUSE SLES 10 under OS

IBM, IBM logo, IBM eServer, System z, System z9, System z10, XIV, zSeries and z/VM are trademarks of IBM Corporation in the United States, other countries or both. Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

IBM Linux on System z / XIV – Support Statement

s390-tools

- s390-tools is a software package with a set of user space utilities to be used with Linux on System z distributions
- It is **the** essential tool chain for Linux on System z
- Contains everything needed to analyze e.g. a system crash - from the boot loader to dump related tools
  - Change – chccwdev, chchp, chreipl, chshut, chzcrypt
  - Display – lscss, lschp, lsluns, lsqeth, lsreipl, lsshut, lstape, lszcrypt, lszfcp
  - DASD – dasdfmt, dasdinfo, dasdview, fdasd, tunedasd
  - Monitor – mon_fsstatd, mon_procd, zipmon
  - Network – ip_watcher, osasnmpd, qetharp, qethconf
  - Tape – tape390_crypt, tape390_display
  - Dump & Debug – dbginfo, dumpconf, zfcpdump, zfcpdbf, zgetdump, scsi_logging_level
  - z/VM – vmconvert, vmcp, vmur
  - Boot - zipl
  - Misc – cpuplugd, iucvconn, lucvtty, ts-shell
- V1.8.0 was released in 11/2008, latest version is V1.8.1, released in 5/2009
- s390-tools software package is contained in all major IBM supported distributions
  - Novell SUSE Linux Enterprise Server 10
  - Novell SUSE Linux Enterprise Server 11
  - Red Hat Enterprise Linux 4
  - Red Hat Enterprise Linux 5

Linux on System z Distributions - Kernel 2.6 based

- **Novell SUSE Linux Enterprise Server 9 (GA 08/2004)**
  - Kernel 2.6.5, GCC 3.3.3, Service Pack 4 (GA 12/2007)
- **Novell SUSE Linux Enterprise Server 10 (GA 07/2006)**
  - Kernel 2.6.16, GCC 4.1.2, Service Pack 3 (GA 10/2009)
- **Novell SUSE Linux Enterprise Server 11 (GA 03/2009)**
  - Kernel 2.6.27, GCC 4.3.3
- **Red Hat Enterprise Linux AS 4 (GA 02/2005)**
  - Kernel 2.6.9, GCC 3.4.6, Update 8 (GA 05/2009)
- **Red Hat Enterprise Linux AS 5 (GA 03/2007)**
  - Kernel 2.6.18, GCC 4.1.2, Update 4 (GA 09/2009)

Novell SLES 11 – available since March 24, 2009

Summary of new features:

- **IBM System z9 and z10 full hardware exploitation**
  - ALS (Architecture Level Set) implemented, i.e. SLES11 is not supported on older System z technology
- **z/VM 5.4 (and higher) exploitation and ease of use**
- **FICON/ECKD enhancements**
  - HyperPAV, High Performance FICON infrastructure
- **FCP/SCSI enhancements to ease configuration**
- **Network enhancements**
  - OSA Express3 installer support, HiperSockets IPv6 layer3 support for z/OS communication
- **New Security/Crypto hardware support**
  - Long random numbers, new HW Crypto enablement
- **Customer Service/Analysis enhancements**
  - Kernel message catalog, Call Home data, automatic Shutdown/Restart/Dump, large image dump on DASD, FCP trace and performance analysis
- **Web 2.0 Open Source stack support**
- **SLES 11 specific device drivers book**

Novell

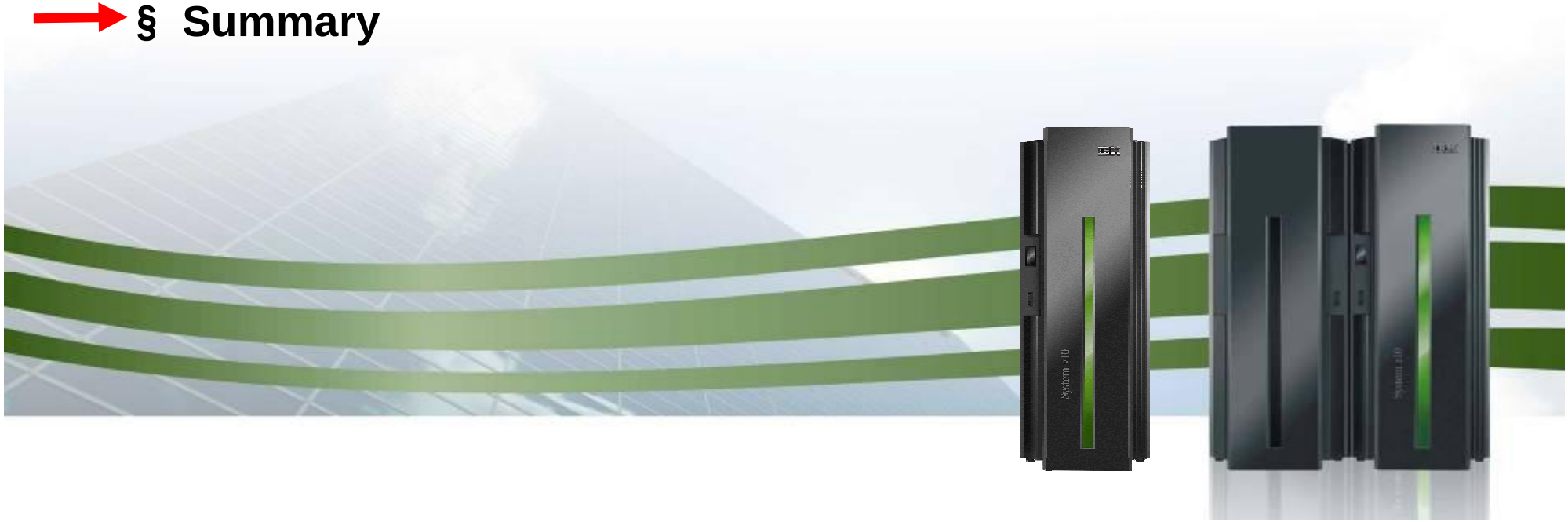
Novell SUSE Linux Enterprise Server Mono Extension

- **A .NET application framework that allows you to run .NET-based applications on SUSE Linux Enterprise Server**
  - Run .NET applications on Linux (including ASP.NET)
  - Mainframe support for .NET applications
  - Performance and scalability advantages over Windows
  - Target Linux from Visual Studio
- **Develop anywhere – Deploy anywhere**
  - Includes a tool chain for Linux
  - Runtime is binary-compatible with .NET on Windows
- **A complete and modern development platform for Linux**
  - The necessary software to develop and run .NET client and server applications across platforms on Linux, Solaris, MacOS X, Windows, and Unix
- **A thriving open source project with a growing community**
- **What can you do with Mono?**
  - Migrate Microsoft .NET desktop and server applications to Linux without significant investment in rewriting code
  - Target multiple platforms and increase addressable market
  - Leverage existing expertise in computer languages for more efficient development

Source: Mark Post, Technical Support Engineer, Novell

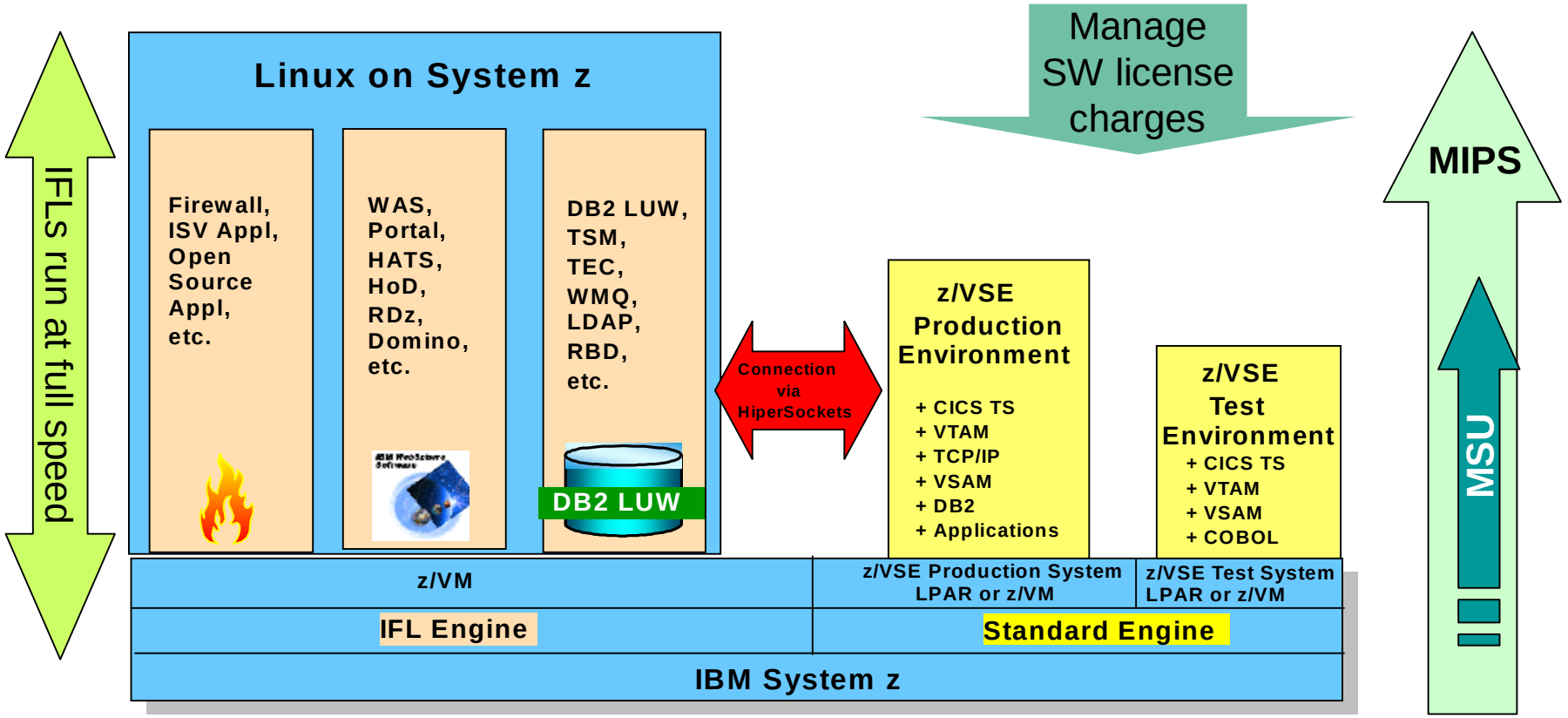
Agenda

- **z/VSE**
- **z/VM**
- **Linux on System z**
- **Summary**



z/VSE PIE Strategy – Protect, Integrate, Extend

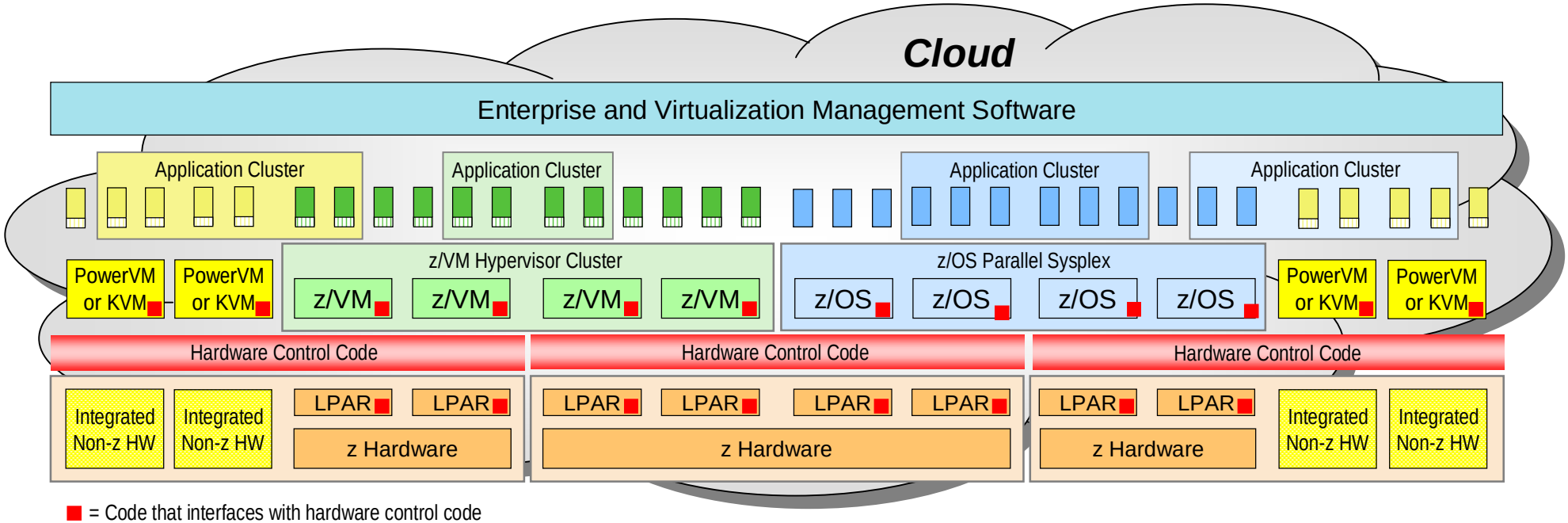
- **Combine z/VSE with z/VM virtualization technology and with new applications on Linux on System z10**
- **Midrange Workload License Charge for z/VSE V4 and System z10 and z9 allows to "manage" MSU consumption and software cost**
- **Sub-capacity pricing option for z/VSE ("pay for what you use")**



IBM Multi-Architecture Virtualization Strategy
Federated Hypervisor Support with System z
Enabling Integrated Workload Optimization – "Fit for Purpose"

- System z futures: hosting a federation of platform management functions, including
  - Resource monitoring
  - Workload management
  - Availability management
  - Image management
  - Energy management
- Integrates with hardware management and virtualization functions
- Controls hypervisors and management agents on blades
- Open integration to enterprise-level management software

Note: All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice, and represent goals and objectives only.



Questions