
IBM System z
Introduction
February 2008

z/VM Version 5 Release 3
Frequently Asked Questions

Worldwide



ZSQ03012-USEN-03

Table of Contents

z/VM Positioning	3
z/VM V5 Product Features	5
z/VM V5.3 Enhancements Announced on February 6, 2007	18
Additional z/VM V5.3 Enhancements Announced on April 18, 2007	26
Additional z/VM V5.3 Enhancements Announced on February 26, 2008	29
z/VM V5.2 Enhancements Made Available May 26, 2006	31
z/VM & Linux	35
Pricing, Licensing, & Ordering	42
Service & Support	51
Education	54
Related Information	55

z/VM Positioning

Question:

What is IBM System z™ virtualization technology?

Answer:

System z virtualization technology allows customers to create virtual processors, communications, storage and I/O, and networking resources, thus helping to reduce the overhead of planning, purchasing and installing new hardware to consolidate and support new workloads.

Notice that the virtualization technology for System z platforms are composed of multiple dimensions. There is a hardware dimension and a software dimension, and both dimensions were considered at the time that the System z servers were designed. System z virtualization is not an afterthought; it is built in from the beginning.

Question:

What does the hardware dimension provide for System z virtualization technology?

Answer:

The IBM System z hardware provide the foundation dimension with functions critical to the success of virtualization, particularly on a large scale, such as the ability to partition the machine, device sharing, and inter-partition communication.

Question:

What does the software dimension provide for System z virtualization technology?

Answer:

The software dimension can extend the capabilities of the hardware from the standpoint of sharing hardware, virtualizing resource, and communication. It also introduces the flexibility required to support large numbers of virtual servers in an on-demand enterprise. Operational support, control, accountability and maintenance are a large part of the operation of any group of servers.

The z/VM® hypervisor is the IBM System z product providing the software dimension functionality.

Question:

Why is z/VM vital in the area of system virtualization?

Answer:

z/VM is vital because it helps to:

- Create an on demand infrastructure
- Maximize the value of your IT investments
- Make your business become more efficient and responsive
- Integrate your business.

Question:

What does z/VM contribute to an on demand infrastructure?

Answer:

z/VM is a critical component of Linux® on System z. For Linux on System z to embrace on demand business, the new z/VM release contains significant support for Linux virtual servers, including exploitation of the new System z platforms' improved systems management, ease of use enhancements, performance improvements for Linux guests, and enhanced networking for guests.

Question:

How does z/VM help to maximize the value of IT investments?

Answer:

The pricing model on z/VM Version 5 (z/VM V5) can help customers maximize their IT investments because cost of ownership may be lower. It can also provide a variable price per processor that decreases as the customer purchases more processors to run z/VM.

Question:

How does System z virtualization technology help your business become more efficient and responsive?

Answer:

With virtualization technology as its foundation, z/VM provides new function and technology exploitation on the mainframe that helps enable the customer to virtualize processors, communications, memory storage, I/O, and networking resources, with the potential to help reduce the need to plan for, purchase, and install hardware to consolidate and support new workloads.

Question:

How does z/VM help you with business integration?

Answer:

Customers can install z/VM from a DVD to a Small Computer Systems Interface (SCSI) disk, IPL and operate z/VM and Linux guests from SCSI disk, which can help simplify customer business integration, and may also help reduce total cost of computing. z/VM V5.3 provides an interface to allow basic z/VM systems management functions to be performed from the Hardware Management Console (HMC) without having to establish additional network connections or carry out complex configuration of the system. A solution using Geographically Dispersed Parallel Sysplex™ (GDPS®) and z/VM is available and is designed to help improve near-continuous availability by avoiding planned and unplanned DASD outages when running with Linux guests and z/OS® in an LPAR.

z/VM V5 Product Features

Question:

What features are optional for z/VM V5?

Answer:

The priced, optional features of the z/VM V5 base product are the Performance Toolkit for VM™, DirMaint™, RACF® and Remote Spooling Communication Subsystem (RSCS). RSCS FL530 has been added to V5.3 as an optional, priced IPLA feature and can be licensed on IFL and standard processors.

Question:

Which servers are supported by z/VM V5?

Answer:

z/VM V5 is supported on the IBM System z10 EC Enterprise Class (z10 EC), IBM System z9® Enterprise Class [z9™ EC (formerly z9-109)], IBM System z9 Business Class (z9 BC), IBM eServer™ zSeries® 990 (z990), zSeries 890 (z890), zSeries 900 (z900), and zSeries 800 (z800). Only V5.2 and V5.3 support the z10 EC.

Question:

When was z/VM V5.3 announced and made generally available to customers?

Answer:

z/VM V5.3 was announced on February 6, 2007 and was made generally available to customers on June 29, 2007.

Question:

As an overview, what is z/VM 5.3 designed to offer customers?

Answer:

z/VM V5.3 is designed to offer:

- Enhanced memory and processor utilization to help relieve additional storage constraints
- Guest support enhancements, including a z/OS testing environment for the virtualization and simulation of specialty processors: System z Application Assist Processors (zAAPs) and System z9 Integrated Information Processors and System z10 Integrated Information Processors (zIIPs)
- Support for selected features of the IBM System z10 EC
- Comprehensive security with a new LDAP server and RACF feature, including support for password phrases
- Delivery of RSCS FL530 as a priced, optional IPLA feature
- Enhancements for the use of virtual networks
- Further exploitation of IBM System and Tape Storage devices
- Management enhancements for Linux and other virtual images
- VSWITCH Support for IEEE 802.3ad link aggregation

Question:

Were there any Statement of Directions (SODs) associated with the z/VM V5.3 February 6, 2007 announcement?

Answer:

Yes, the February 6, 2007 announcement included a Statement of Direction on:

- Common Criteria Certification: IBM intends to evaluate z/VM V5.3 with the RACF Security Server optional feature for conformance to the Controlled Access Protection Profile (CAPP) and Labeled Security Protection Profile (LSPP) of the Common Criteria standard for IT security, ISO/IEC 15408, at Evaluation Assurance Level 4 (EAL4). This new SOD represents a modification to IBM's previously expressed Statement of Direction of July 27, 2005, which stated IBM's intent "to evaluate z/VM V5.2 with the RACF for z/VM optional feature for conformance to the Controlled Access Protection Profile (CAPP) and Labeled Security Protection Profile (LSPP) of the Common Criteria standard for IT security, ISO/IEC 15408, at Evaluation Assurance Level 4 (EAL4)." **IBM is** currently in evaluation for Common Criteria Certification of z/VM V5.3 with the RACF Security Server optional feature. Based on additional assessment of requirements, IBM no longer intends to evaluate z/VM V5.2.
- OSA-Express2 link aggregation and failover support: IBM intends to provide virtual switch (VSWITCH) support for IEEE Standard 802.3ad Link Aggregation in z/VM V5.3. This support is designed to allow all OSA-Express2 features that are associated with a virtual switch to be grouped and used as a single "fat pipe," helping to increase bandwidth and provide processor-seamless failover in the event of a link failure. This z/VM support requires associated OSA-Express2 support that is planned to be available on IBM System z9 servers. This statement of direction was satisfied with the availability of the z9 EC and z9 BC enhancements on May 11, 2007 and the general availability of z/VM V5.3 on June 29, 2007.
- RPC server support: IBM intends to withdraw support for the RPC/CSL interface from the System Management API server in a future z/VM release.
- TCP/IP functions: IBM intends to withdraw support for the Network Database (NDB) system, Trivial File Transfer Protocol (TFTP) server, X25 interface (includes X25IBI server), and SNALINK server in a future z/VM release.
- 3480 Distribution Medium: IBM intends to withdraw 3480 tape as a distribution medium in a future z/VM release. z/VM is planned to continue distribution on 3590 and 3592 tape and on DVD, and electronic delivery of z/VM from ShopzSeries.

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

Question:

What improvements does z/VM 5.3 bring to the System z platform?

Answer:

With z/VM V5.3, enhancements to scalability, security, and virtualization technology can help enable increased workloads on IBM System z servers and enhance its security characteristics.

z/VM V5.3 provides support for larger logical partitions (LPARs) to improve scalability and to facilitate growth. A single z/VM partition can now contain LPARs with up to 256 GB of real storage (memory), twice the limit over the previous release, and up to 32 Processor Units

(PUs), a 33% increase over the previous release and more than 1 terabyte (TB) of total virtual memory¹ in use by guests. The PUs can be:

- Central Processor (CP)
- System z Application Assist Processor (zAAP)
- System z9 Integrated Information Processor and System z10 Integrated Information Processor (zIIP)
- Integrated Facility for Linux (IFL)

z/VM V5.3 and Linux on System z collaborate to make more informed choices about how memory is managed. This level of cooperation improves the ability of z/VM to run more virtual servers in the same amount of memory.

This new release provides an increased focus on security capabilities with the introduction of an LDAP server and client services for a more comprehensive security solution on z/VM. Security is also enhanced to support the use of password phrases in z/VM through a new RACF feature, more security-rich TCP/IP sessions, and enhanced data protection by exploiting drive-based data encryption of the IBM System Storage™ TS1120 Tape Drive.

z/VM V5.3 extends its world-class virtualization technology by providing guest support for zAAPs and zIIPs, the Modified Indirect Data Address Word (MIDAW) facility, and ASCII consoles. Manageability, reliability, and usability of virtual networks have also been improved.

The z/VM hypervisor is designed to help clients extend the business value of mainframe technology across the enterprise by integrating applications and data while providing exceptional levels of availability, security, and operational ease. The mainframe virtual machine technology available with z/VM is designed to run hundreds to thousands of Linux servers on a single mainframe beside other System z operating systems, such as z/OS or as a large-scale Linux-only enterprise server solution. z/VM V5.3 can also help to improve the productivity by hosting non-Linux workloads such as z/OS, z/VSE™ and z/TPF.

For the most current information on z/VM, refer to the z/VM Web site at:

<http://www.ibm.com/eserver/zseries/zvm/>

Note: ¹ The actual amount of usable real and virtual memory is dependent on the amount of real memory in the z/VM logical partition, the hardware server model, firmware level, and configuration, and the number of guests and their workload characteristics.

Question:

How is z/VM 5.3 marketed?

Answer:

The same marketing channels will be used for z/VM V5.3 as with the other z/VM V5 products. That includes:

- IBM Business Consulting Services (BCS)
- Global System Integrators (SIs)
- Regional SIs
- Regional Independent Software Vendors (ISVs)
- Face-to-Face
- Business Partners (BPs)
- TeleWeb (ibm.com/sales/ibmcom/dwnlds/TeleWeb.html)

Question:

What versions and releases of VM provide exploitation support for the z9 EC, z9 BC, z990, and z890?

Answer:

z/VM V5.1, V5.2, and V5.3.

Question:

What versions and releases of z/VM provide exploitation support for the z10 EC?

Answer:

z/VM V5.2 and V5.3 with applicable PTFs.

Question:

What features does z/VM V5 exploit on the z10 EC, z9 EC, z9 BC, z990, and z890?

Answer:

Unless otherwise stated, z/VM V5.1, V5.2, and V5.3 provide exploitation support for the following z9 EC, z9 BC, z990, and z890 without requiring any additional PTFs:

All supported levels of z/VM

- Four LCSSs (Logical Channel SubSystems), two on the z890
- Spanned internal and external channels
- Dynamic I/O configuration across all LCSSs

z/VM V5.1, V5.2, V5.3

- External I/O measurement facilities
- Adapter interruptions for OSA-Express and FCP channels
- QDIO performance assist for V=V guests (pageable guests) in Linux and VM (with PTF for APARs VM63385 and PQ81850 on z/VM 4.4). Additional information can be found at: www.vm.ibm.com/perf/aip.html
- Enhanced performance (QDIO Enhanced Buffer-State Management [QEBSM]) assists for z/VM guests for OSA-Express, FCP, and HiperSockets™ (V5.2 and V5.3 only). This is integrated on the z9 EC and z9 BC. The z990 and z890 servers require MCL updates for this new assist. MCL112 in the J13484 stream must be installed prior to IPLing z/VM V5.2 and V5.3 to avoid system outages.
- Up to 30 LPARs on the z9 BC, z990, and z890
- Up to 60 LPARs on the z10 EC and z9 EC
- Guest IPL from FCP-attached disks
- OSA-Express – Integrated Console Controller
- Support for up to 24 CPs in a single z/VM image; up to 32 CPs on V5.3
- System use of SCSI FCP disks, including IPLing, paging, spooling, etc. (z/VM V5 only)

- FCP-attached SCSI disks QDIO efficiency improvements (V5.1 requires the PTF for APAR VM63534)
- Reduced number of I/O requests to the VM SCSI stack (V5.1 requires the PTF for APAR VM63725)
- PCICA support for Linux and z/OS guests (z/OS guests supported on z/VM V5 only and not supported on z9 EC)
- PCIXCC support for Linux and z/OS guests (z/VM V5 only and not supported on z9 EC and z9 BC)
- Crypto Express2 support (coprocessor) for Linux and z/OS guests Crypto Express2 supported as an accelerator card for SSL acceleration for Linux and z/OS guests (V5.1 requires the PTF for APAR VM63646)
- z/VM installation from a CD-ROM or DVD using the Hardware Management Console (HMC) (DVD install on z/VM V5 only, CD-ROM install on V5.1 only)
- Virtual switch (VSWITCH) exploitation of OSA-Express, OSA-Express2, and OSA-Express3 Ethernet features with the Layer 2 (V5.1 requires PTFs for APARs VM63538 and PQ97436)
- VSWITCH exploitation of OSA-Express2 and OSA-Express3 IEEE 802.3ad link aggregation
- OSA-Express2 and OSA-Express3 features support up to 640 connections (TCP/IP stacks) per LPAR (V5.1 requires PTFs for APARs VM63524 and PQ91421)
- OSA-Express feature support for 160 TCP/IP stacks (V5.1 requires PTFs for APARs VM63524 and PQ91421)
- FICON® Express2 features (V5.1 requires the PTF for HCD/HCM APAR VM63610)
- FICON Express4 features (V5.1 requires the PTF for APAR VM63744 (for z/VM SCSI disk use))
- OSA-Express2 – Open Systems Adapter for NCP (OSN) support (V5.1 requires the OSA/SF PTFs for APARs OA11650 and OA15097 for displaying information about OSN features, V5.1 requires the PTF for APAR VM63722)
- N_Port identifier virtualization (NPIV) for FCP channels (V5.1 requires the PTF for APAR VM63744 for CP use of NPIV). V5.2 requires the PTF for APAR VM63952 to allow guest operating systems and z/VM users to query hardware-defined virtual port names. Also, z/VM V5.1 cannot be installed from DVD to SCSI disks when NPIV is enabled. z/VM V5.2 and V5.3 can be installed from DVD to SCSI disks when NPIV is enabled.
- Dynamic addition/deletion of a Logical Partition name (V5.2 and V5.3 only)
- Guest exploitation of the System z10 EC at the level of System z9 functionality with the PTFs for APARs VM64180 and VM64242 (V5.2, V5.3)
- Exploitation of selected functions of the System z10 EC including:
 - Dynamic I/O configuration to define, modify, and delete a Coupling using InfiniBand® link, CHPID type CIB, when z/VM V5.3 is the controlling LPAR for dynamic I/O (V5.3)
 - Processors dynamically added to or removed from a z/VM LPAR in reserve without preplanning with the PTFs for APARs VM64249, VM64323, and VM64389 (V5.3)

- TCP/IP and VSWITCH gaining the performance benefit of OSA-Express3 10 GbE on the z10 EC
- Minimum support for the z9 EC and z9 BC (V5.1 requires the PTFs for APARs VM63646, VM63784, PK08444, VM63721, VM63869, VM63743, VM63946, VM63744, VM63722, VM63921, and OA15170, V5.2)
- HiperSockets using IPv6 protocol by TCP/IP and guest LAN (V5.2 requires the PTF for APAR VM63952)
- Simplified VLAN management with support for GVRP (V5.1 requires the PTFs for APARs VM63784 and PK08444. V5.2 requires the PTF for APAR VM63952)
- New port isolation security mechanism provides the ability to restrict guest-to-guest communications within a VSWITCH with PTF for APAR VM64281 (V5.2, V5.3)
- Support for the Collaborative Memory Management Assist (CMMA) to allow both host and guest to optimize their use and management of memory. Refer to the Preventive Service Planning (PSP) bucket for your z10 EC, z9 EC, or z9 BC server for required updates. To avoid system outages, required minimum MCL levels must be applied prior to IPLing z/VM V5.3 and exploiting new functions. (Refer to the z/VM V5.3 Performance Report for CMMA usage.)
- Enhanced memory utilization using Virtual Machine Resource Manager (VMRM) between z/VM and Linux guests
- Improved memory management algorithms to help benefit paging workloads with large memory environments with the PTF for APAR VM64349 (V5.3)
- z/VM systems management functions to be performed from the Hardware Management Console (HMC)
- Correct display of the z10 EC and z9 processor models by the Performance Toolkit for VM with the PTF for APAR VM64369 (V5.2, V5.3)
- IBM System Storage DS6000™ series supported in native control unit mode as a 1750 (V5.2 requires the PTF for APAR VM63952)
- IBM System Storage DS8000™ series supported in native control unit mode as a 2107 (V5.2 requires the PTF for APAR VM63952)
- Parallel Access Volumes (PAVs) as minidisks for guest operating systems (V5.2 requires the PTF for APAR VM63952)
- Hyper Parallel Access Volume (HyperPAV) support for IBM System Storage DS8000 series
- Support for Dynamic Volume Expansion simplifying disk management by allowing for the dynamic increase of a DS8000 volume size in order to accommodate application data growth with the PTFs for APARs VM64305 and VM64354 (V5.2, V5.3)
- Support for the IBM System Storage SAN Volume Controller (SVC) Storage Engine 2145 is designed to allow Linux on System z guests of z/VM V5 (all releases) to access the IBM System Storage disk subsystems, including the DS4000™ series and OEM SCSI disk devices supported by the SVC.
 - The SVC can be used to provide SCSI devices as emulated FBA devices for use by CP and guest operating systems (V5.3, V5.2 with the PTF for APAR VM64128)

- Encryption Re-Key support provides the capability to update a previously encrypted tape cartridge with a new set of Key Encryption information with the PTF for APAR VM64260 (V5.3)
-

Question:

What cryptography support is provided by z/VM for the z10 EC, z9 EC, z9 BC, z990, and z890?

Answer:

z/VM software support for the PCIX Cryptographic Coprocessor (PCIXCC), the CP Assist for Cryptographic Function (CPACF), and the PCI Cryptographic Accelerator (PCICA) features are as the follows:

PCICA:	z/VM V5.1 for guest exploitation
CPACF:	z/VM V5.1 and later for guest exploitation
PCIXCC:	z/VM V5.1 and later for guest exploitation
Crypto Express2:	z/VM V5.1 and later for guest exploitation

PCICA and PCIXCC are not supported on the z10 EC, z9 EC, and z9 BC.

Question:

Will z/VM V5 run on my S/390 Parallel Enterprise Server™ G5, G6 or S/390® Multiprise® 3000 machines that are in ESA/390 mode?

Answer:

No. z/VM V5 will not run in ESA/390 mode. z/VM V5 requires z/Architecture® machines including the z10 EC, z9 EC, z9 BC, z990, z890, z900 and z800.

Question:

What architecture mode is supported for guests operating on z/VM V5, running in 64-bit mode?

Answer:

z/VM V5 exploits and supports the z/Architecture, enabling you to run 64-bit capable operating systems (Linux on System z, z/OS, z/OS.e, z/VSE V4, z/TPF) as guests of z/VM V5 when z/VM V5 is running on a System z platform in 64-bit mode. A z/VM V5 also supports guest operating systems running in ESA/390 mode such as z/VSE V3, VSE/ESA™, TPF, OS/390®, Linux on S/390, or VM/ESA® when z/VM V5 is operating in 64-bit mode. In order for z/OS or z/OS.e to operate as a guest of z/VM on the System z platform, both z/VM V5 and z/OS and z/OS.e must be operating in 64-bit mode.

Question:

What operating systems can z/VM host?

Answer:

z/VM V5 is a System z operating system designed to host guest operating systems including Linux, z/OS, OS/390, VSE/ESA, z/VSE, TPF, z/TPF, VM/ESA, z/VM hypervisor, and z/OS.e with the z890 and z800. When z/VM V5 is installed on Integrated Facility for Linux (IFL) processors, only Linux and z/VM V4 and V5 itself can be hosted as guest operating systems. Also, you may not run z/OS or OS/390 as a guest of a z/VM system in which z/OS.e is also a guest.

Question:

Can VSE/ESA or z/VSE run as a guest of z/VM V5?

Answer:

Yes. z/VM V5 supports VSE/ESA V2 and z/VSE V3 in ESA/390 (31-bit) mode only, and z/VSE V4 in z/Architecture (64-bit) mode only.

In order to qualify for sub-capacity pricing on an IBM System z9 server with the MWLC price metric, a z/VSE V4 guest must be running on z/VM V5.2 or later.

Question:

Does z/VM V5 support HiperSockets?

Answer:

Yes. z/VM has supported HiperSockets since V4.2. In addition, V4.2 and later support virtual HiperSockets, that is, HiperSockets on a guest LAN.

The HiperSockets function uses an adaptation of the Queued-Direct I/O (QDIO) high-speed I/O protocol previously introduced with zSeries OSA-Express Gigabit-Ethernet support. The HiperSockets function allows virtual machines and/or logical partitions to communicate internally over the memory bus using the internal-queued-direct (IQD) channel type in the System z environment.

Up to sixteen IQD channels can be configured within a z10 EC, z9 EC, z9 BC, z990, and z890 and up to four on a z900 and z800. Each IQD channel represents the ability to isolate communications among the logical partitions and virtual machines using a given channel. That is, it is designed so that there is no communication between different IQD channels, thereby providing additional communication-security features among separate groups of logical partitions and virtual machines connected to different IQD channels. Each guest LAN represents the ability to isolate communications among the virtual machines using a given guest LAN.

z/VM supports HiperSockets for use by guest operating systems and by the TCP/IP for z/VM server virtual machine. Thus, VM programs using TCP/IP can communicate via HiperSockets with each other and guest operating systems and other logical partitions using TCP/IP.

Question:

How does z/VM V5 provide support for HiperSockets on "guest LANs?"

Answer:

z/VM V4.3 and later releases simulated the HiperSockets function for communication among virtual machines without the need for IQD channels, much as VM simulates channel-to-channel adapters for communication among virtual machines without the need for ESCON®, FICON®, or other channel-to-channel connections. With the guest LAN capability, customers with S/390 servers can gain the benefits of HiperSockets communication among the virtual machines within a VM image, since no real IQD channels are required.

Guest LAN support enhances the HiperSockets function by providing an essentially unlimited number of isolated guest LANs (rather than the limit of four IQD channels). Each such guest LAN can be used by a group of virtual machines to communicate among themselves,

independent of other groups of virtual machines on other guest LANs. "System" guest LANs can be defined to which individual users can be linked. In addition, guest LANs can be defined to be associated with a specific user and with other users allowed access as required. The number of virtual devices that can be "connected" to a guest LAN is limited only by the number of virtual devices that can be created in the available memory. The guest connecting to a guest LAN must have HiperSockets support which could be z/OS V1.2 or later releases, z/VM V4.3 or later releases, or Linux on System z.

This guest LAN implementation is extended in z/VM V4.3 to support multicast transmission across HiperSockets guest LANs. Guest LANs can now be defined to function as either HiperSockets or OSA-Express QDIO transport media to allow the virtualization of a QDIO LAN environment and to provide support for the broadcast capability that is part of QDIO architecture.

Question:

Does z/VM provide support of HiperSockets using IPv6 protocol?

Answer:

Yes. z/VM V5.3 and V5.2 with the PTF for APAR VM63952 support IPv6 HiperSockets for TCP/IP and virtualizes the IPv6 HiperSockets in a guest LAN environment. This satisfies the statement of direction made in Software Announcement 205-168, dated July 27, 2005.

Question:

Does z/VM V5 support shared tape devices?

Answer:

Yes. Starting with z/VM V4.3, multiple VM guests can share a tape device by allowing the CP ATTACH command to be issued for the same tape device on different guests without intervening CP DETACH commands. This support removes the need to manage dedication of a tape device from one VM guest to another since the tape device can now remain attached to several guests concurrently. This support is specifically targeted for z/OS, z/OS.e, and OS/390 guests that use automatic tape switching with ATS Star or IEFAUTOS. In principle, however, it will work for any guest that manages its own assignment of tape devices. Supported tape devices are 3424, 3480, 3490, and 3590. Third-party assignment and multisystem assignment (Control Access CCW) are not supported.

With the PTF for APAR VM63746, the Removable Media Services (RMS) component of DFSMS/VM™ also supports sharing of tape devices.

Question:

Is tape support for 3592 included in z/VM V5?

Answer:

Yes. In addition, DFSMS/VM with PTF for APAR VM63353 supports 3592 tape drives and volumes when installed within a 3494 Automated Tape Library. With the PTFs for APARs VM63461 and VM63460 (integrated in V5.1, and later), Write Once Read Many (WORM) data cartridges are supported.

Question:

Does DFSMS/VM provide support for tape data encryption?

Answer:

Yes. DFSMS/VM FL221 with the PTF for APAR VM64062 supports locating encryption-capable 3592 tape drives in an Enterprise Automated Tape Library. This DFSMS/VM support provides tape-encryption capabilities for a z/VSE guest running on z/VM.

Question:

Does z/VM V5 support FCP for Small Computer System Interface (SCSI) devices?

Answer:

Yes. z/VM V4.3 and later releases provided guest support for the new Fibre Channel Protocol (FCP) channel. This channel allows the System z servers to connect to a fibre-channel fabric. The z/VM support allows guest operating systems to access selected devices on SCSI controllers connected to the fabric. The programs operating in guest virtual machines under z/VM V4 are responsible for providing the appropriate support to use and control the devices connected through the FCP channel. Your system administrator is responsible for ensuring the necessary level of access control and concurrent-access data integrity for the devices.

z/VM V5.1, and later support SCSI FCP disk logical units (SCSI disks) for both system and guest use. SCSI disks supported are those within the IBM System Storage DS8000 series, DS6000 series, and the IBM TotalStorage® Enterprise Storage Server® (ESS) when it is connected to a fibre-channel (FC) fabric via zSeries FCP channels.

SCSI disks can be used directly by a guest operating system when an FCP subchannel is dedicated to a guest. Such a guest must provide its own SCSI device support. Linux for System z is designed to be one such guest. SCSI disks can also be used as emulated 9336 Model 20 fixed-block-architecture (FBA) disks. z/VM CP and CMS rely almost exclusively on this emulated-FBA support for their SCSI use. Specifically, this use includes system paging, spooling, directory services, minidisks, and all other system functions and programming services that can use FBA disks. Guests that support FBA disks (such as CMS, GCS, Linux, VSE/ESA, and z/VSE) also can use SCSI disks through the emulated FBA support, without requiring their own SCSI support.

VM SCSI support allows a Linux server farm to be deployed on z/VM in a configuration that includes only SCSI disks. ECKD™ disks are no longer required. Installation of z/VM from DVD to a SCSI disk, IPL from a SCSI disk using Stand-Alone Program Loader (SAPL), and VM system dumps to a SCSI disk are supported. DASD Dump/Restore (DDR) services using SCSI disks are supported when DDR is running under CMS.

z/VM V5.1 and later support an individual emulated Fixed Block Architecture (FBA) to define and operate FCP-attached SCSI disks with capacities of approximately 1 TB (2,147,483,640 512-byte blocks) for CP volumes and 381 GB for CMS and GCS volumes (requires CMS, DirMaint, and DFSMS/VM PTFs for APARs VM63653, VM63700, and VM63664, respectively). However, directory, paging, and spooling allocations must reside within the first 64 GB of a CP-formatted volume. Other kinds of CP allocations may be defined beyond the first 64 GB.

z/VM V5.2 provided performance enhancements for SCSI disk I/O including:

- QDIO efficiency improvements
- Paging and spooling optimization
- Improved FBA emulation efficiency

z/VM V5.3 provides additional enhancements for SCSI disk support for Linux users, including:

- Point-to-Point Fibre Channel links
 - Dynamically-determined preferred paths for emulated FBA devices (EDEVICEs) on SCSI disks in an IBM System Storage DS6000
 - Faster formatting of EDEVICEs on SCSI disks
 - Display of additional SCSI device characteristics
 - SAN Volume Controller (SVC) Storage Engine 2145 support
-

Question:

Does z/VM V5 support clear-key RSA functions of the IBM PCI Cryptographic Coprocessor (PCICC), the IBM PCI Cryptographic Accelerator (PCICA), and the IBM PCIX Cryptographic Coprocessor (PCIXCC)?

Answer:

Yes. z/VM V5 provides support for clear-key RSA functions of PCICC (z800 and z900 only), PCICA, and PCIXCC with corresponding function in Linux on System z. Clear-key RSA functions are also available for z/OS guests in z/VM V5. PCICA and PCIXCC are not supported on the z10 EC, z9 EC, and z9 BC.

Question:

What changes have recently been made to the supported media for z/VM installation?

Answer:

Starting with z/VM 5, the following changes have been made to ease installation:

- z/VM V5 can be installed from DVD to an IBM System Storage disk emulated as an FBA device and to a 3390 DASD. This capability requires the Hardware Management Console (HMC) Version 1.8 or later.
 - z/VM can be installed to emulate 3390-3 and 3990-9 DASD, or DASD that is defined to emulate these specific models. Note: For performance reasons, IBM does not recommend using the original IBM 3390 Model 9. This recommendation does not apply to 3390 Model 9 DASD defined on RAID technology subsystems such as IBM System Storage DASD.
 - Paging and spooling space are moved off the system packs and can now be specified as any appropriate DASD packs. They do not need to match the other system installation packs.
 - Installation to 3390-1 and 3390-2 DASD is no longer supported
 - Installation from CD-ROM is not supported on V5.2 or V5.3.
-

Question:

Does z/VM provide any new device support?

Answer:

Yes. z/VM V5.2 and V5.3 support the DS6000 and DS8000 series. The DS6000 is designed to deliver enterprise-class storage capabilities in a space-efficient, modular design at a low price. The DS8000 series is designed to provide unmatched functionality, flexibility, and performance for enterprise disk storage systems at new levels of cost effectiveness. The DS6000 series and

the DS8000 series are also supported by z/VM V5.1 with the PTFs for APARs VM63653 and VM63535 and VM63534, respectively. In addition, PTFs for DirMaint APAR VM63700 and DFSMS/VM APAR VM63664 are required to support approximately 1 TB CP SCSI disks on z/VM 5.1.

z/VM V5.2 and V5.3 provides the support to automatically switch between multiple channel paths to help improve overall performance on the DS6000, preferred paths are used for I/O operations to devices attached to a 1750 control unit. The PTF for APAR VM63952 on z/VM V5.2 can allow the DS6000 and DS8000 series to operate in their native control unit modes. That is, the DS6000 is supported as a 1750 control unit and the DS8000 as a 2107 control unit.

The PTF for APAR VM63952 also supports Parallel Access Volumes (PAVs) as minidisks for guest operating systems such as z/OS that exploit the PAV architecture. In addition, the APAR provides the potential benefit of PAVs for I/O issued to minidisks owned or shared by guests that do not support native exploitation of PAVs, such as CMS. PAVs enable a single System z server and applicable storage controller to simultaneously process multiple I/O operations to the same logical volume, which can help to significantly improve I/O response times by reducing device queuing delays.

z/VM V5.3 supports the Hyper Parallel Access Volume (HyperPAV) function optionally provided by the IBM System Storage DS8000 disk storage systems. HyperPAV support complements the existing basic PAV support in z/VM V5.2, for applicable supporting disk storage systems. Also, z/VM V5.3 support for the FlashCopy® V2 feature of IBM System Storage disk storage devices has been enhanced to simplify the tasks required to automate backups.

Question:

Does z/VM V5 continue to provide support for SPTAPE?

Answer:

No. z/VM V5 does not support spool file backup and recovery function SPTAPE. z/VM V5 does support the improved spool file backup and recovery function provided by SPXTAPE.

Question:

What software is available for z/VM from other Independent Software Vendors (ISVs)?

Answer:

IBM maintains a list of software vendor products that can be found at the following link:

ibm.com/eserver/zseries/zvm/vendor/.

This Web site has been updated for z/VM V5.3. Please note: This vendor product information is provided by the ISVs without independent evaluation or validation by IBM. IBM makes no claim as to the completeness of the information provided.

Question:

What software is available for z/VM from IBM?

Answer:

A list of IBM Licensed Programs available for z/VM can be found at the following link:

ibm.com/eserver/zseries/zvm/related/.

This Web site has been updated for z/VM V5.3.

Question:

I am a System z customer and would be interested in sharing my story with IBM or other customers. What types of programs are open to me?

Answer:

If you would like to become a reference account in some manner, contact your IBM Representative or IBM Business Partner. You might also consider presenting at a user group or regional user group, or perhaps submitting an article for publication in some of the new mainframe magazines, such as IBM Systems Magazine – Mainframe Edition or the z/Journal.

z/VM V5.3 Enhancements Announced on February 6, 2007

Question:

What did IBM announce on February 6, 2007?

Answer:

IBM continued the evolution of its premier and world-class System z virtualization by announcing a new release of z/VM, Version 5 Release 3 (V5.3) with enhancements for scalability, security, and virtualization technology to help support increased workloads on System z servers and enhance its security characteristics.

For more information on z/VM 5.3, see software announcement 207-019 (US) dated February 6, 2007 or **ibm.com/eserver/zseries/zvm/**.

Question:

Whom should the new z/VM V5.3 be marketed to?

Answer:

z/VM V5.3 and the IBM Integrated Facility for Linux (IFL) should be marketed to clients who want to run multiple Linux server images on System z servers. This includes clients who want to:

- Run multiple Linux server images hosted by z/VM V5.3 on IFL processors without necessarily increasing the IBM software charges for z/OS, z/OS.e, TPF, z/TPF, VSE/ESA, z/VSE, or other IBM applications running on System z standard processors (CPs).
- Run Linux applications on current or new System z servers within an enterprise. The optional RACF feature can help provide additional security in a Linux environment.
- Access other System z data and applications from Linux applications running as guests of z/VM on the same server.
- Run more Linux logical servers than can be currently provided by LPARs (up to 60 on z10 EC, z9 EC, up to 30 on z9 BC, z990, and z890, and up to 15 on z900 and z800 servers) or take advantage of the resource-sharing capabilities that z/VM provides for multiple Linux server images.
- Use additional System z hardware that is not supported by Linux on System z, but is supported by z/VM, such as:
 - Exploitation of large real multiprocessor configurations (for example, 32-way) for Linux application workloads that "scale out" on multiple, relatively small n-way virtual machines
 - Exploitation of large real storage for 31-bit Linux systems
 - Exploitation of expanded storage across a set of Linux server images
- Dynamically configure I/O

Question:

z/VM V5.3 includes enhancements in scalability, security, and virtualization technology. Please explain these enhancements.

Answer:**Scalability and constraint relief enhancements include:**

- Support for larger Logical Partitions (LPARs) with up to 256 GB of real memory
- More than 1 TB¹ of total virtual memory in use by guests
- Up to real 32 processors in a single z/VM image
- Support for the Collaborative Memory Management Assist (CMMA) by which host and guest exchange information to optimize their use and management of memory. (Refer to the z/VM V5.3 Performance Report for CMMA usage.)
- Enhanced memory utilization using Virtual Machine Resource Manager (VMRM) between z/VM and Linux guests
- Support for the Hyper Parallel Access Volume (HyperPAV) function of IBM System Storage devices
- Improved FlashCopy support allows:
 - Specification of up to 12 target minidisks
 - Determine the status of FlashCopy requests
 - Exploit hardware asynchronous cache destage and discard
- Support for the IBM System Storage SAN Volume Controller (SVC) Storage Engine 2145 is designed to allow Linux on System z guests of z/VM V5 (all releases) to access IBM System Storage disk subsystems, including the DS4000 series, and OEM SCSI disk devices supported by the SVC

Note: ¹ The actual amount of usable real and virtual memory is dependent on the amount of real memory in the z/VM logical partition, the hardware server model, firmware level, and configuration, and the number of guests and their workload characteristics.

Virtualization technology and Linux enablement include:

- New guest support for IBM System z Application Assist Processors (zAAPs) and System z9 Integrated Information Processors and System z10 Integrated Information Processors (zIIPs) including:
 - Simulation support - z/VM guest virtual machines can create virtual specialty processors on processor models that support the same types of specialty processors but don't necessarily have them installed. Virtual specialty processors are dispatched on real Central Processors (CPs) allowing users to assess the operational and CPU-utilization implications of configuring a z/OS system with zIIP or zAAP processors without requiring the real specialty processor hardware. zIIPs can be simulated only on System z10 EC, System z9 (z9 EC and z9 BC) servers. zAAPs can be simulated only on z10 EC, z9 EC, z9 BC, z990, and z890 servers.
 - Virtualization support - z/VM can create virtual specialty processors for virtual machines by dispatching the virtual processors on corresponding real specialty processors of the same type and may help improve your total cost of ownership by allowing available zAAP and zIIP capacity not being used by z/OS LPARs to be allocated to a z/VM LPAR hosting z/OS guests running Java™ and DB2® workloads.

- Usability enhancements for the VSWITCH and guest LAN environments including enhanced ease-of-use for Virtual LAN (VLAN) and promiscuous mode configuration changes
- VSWITCH exploitation of IEEE 802.3ad link aggregation and failover support is designed to allow OSA-Express2 features that are associated with a virtual switch to be grouped and used as a single “fat pipe”
- Guest use of Modified Indirect Data Address Words (MIDAWs) to allow more flexibility and performance in certain channel programs, as a higher-performing alternative to data-chained channel-command words (CCWs)
- Guest access to the system ASCII console to facilitate recovery of the guest during an emergency
- Additional enhancements for SCSI disk support for Linux users
- Secure Sockets Layer (SSL) server support for additional Linux distributions

Network virtualization enhancements include:

- Enhanced virtual network management
- Enhanced failover support for IPv4 and IPv6 devices
- Virtual IP Address (VIPA) support for IPv6

Security enhancements include:

- New LDAP server and associated client utilities
 - Enhanced system security with support for longer passwords (password phrases)
 - z/VM SSL server enhancements designed to improve security
 - Tape data protection with support for encryption
-

Question:

What does improved memory management of guests provide for the z10 EC, z9 EC and z9 BC customer?

Answer:

z/VM V5.3 adds support for the Collaborative Memory Management Assist (CMMA) on the z10 EC, z9 EC, and z9 BC. This VM support, in conjunction with CMMA exploitation in guest operating systems such as Linux for System z, allows the z/VM V5.3 Control Program (CP) host and its guests to communicate attributes for specific 4K-byte blocks of guest memory. This exchange of information allows both host and guest to optimize their use and management of memory, in the following ways:

- CP knows when a Linux application releases storage, allowing CP to select those pages for removal at a higher priority, and to reclaim the page frames without the overhead of paging-out their data content to expanded storage or disk.
- CP recognizes clean disk cache pages, the contents of which Linux is able to reconstruct, allowing CP to bypass paging-out the data contents when reclaiming the backing frames for these pages. If Linux or its application subsequently tries to refer to the discarded page, Linux is notified that the page has been discarded and can reread the contents from disk or otherwise reconstruct them.

- The guest further benefits from the Host Page-Management Assist (HPMA) announced in Hardware Announcement 105-241, dated July 27, 2005. In conjunction with CMMA, HPMA allows the machine to supply fresh backing page frames for guest memory when the guest reuses a previously discarded page, eliminating the need for z/VM hypervisor interception and resolution of these host page faults.

This satisfies the Statement of Direction made in Software Announcement 205-168, (US) dated July 27, 2005.

Refer to the Preventive Service Planning (PSP) bucket for your z10 EC, z9 EC, or z9 BC server for required updates and the minimum MCL level. The PSP buckets can be found on Resource Link™ at: <https://techsupport.services.ibm.com/server/390.psp390>

IBM is working with its Linux distribution partners to provide CMMA exploitation in future Linux on System z distribution releases or service updates.

Question:

What new functions are provided with Systems Management in z/VM V5.3?

Answer:

Systems management improvements include:

- Systems Management API has been enhanced with a sockets-based server and new functions to manage virtual machines
- New function level for Directory Maintenance Facility (DirMaint), FL530
- Enhancements to the Performance Toolkit for VM
- Improved guest configuration with a new COMMAND statement

Question:

Does z/VM provide any other function to managing guests?

Answer:

Yes. z/VM V5.3 provided an interface to allow basic z/VM systems management functions to be performed from the HMC without having to establish additional network connections and reducing complex configuration of the system. This requires the HMC and Support Element (SE) at level 2.9.2 and MCLs, so previous z9 EC and z9 BC servers can be upgraded to this level to obtain this support and the z10 EC requires level 2.10.0. Refer to the z/VM subsets of the 2097DEVICE, 2094DEVICE, and 2096DEVICE Preventive Planning (PSP) buckets prior to installing a z10 EC, z9 EC, and z9 BC because a minimum MCL level is required.

Question:

Can z/VM V5.3 manage guests using the HMC on any other System z servers?

Answer:

Yes. To manage guests with the HMC, the IBM z990, z890, z900, and z800 the HMC must be a level 2.9.2. For these servers, the SE must be at the following levels:

- 2.9.2 for the z990 and z890
- 1.7.3 for the z900 and z800

Refer to the z/VM subsets of the Preventive Planning (PSP) buckets for your particular server because a minimum MCL level is required.

Question:

What cryptographic support is provided in z/VM V5.3?

Answer:

The Crypto Express2 feature, with two PCI-X adapters, can be defined as a Coprocessor or as an Accelerator.

- Crypto Express2 Coprocessor – for secure-key-encrypted transactions (default)
 - Designed to support highly-secure cryptographic functions, use of secure-encrypted key values, and User Defined Extensions (UDX)
 - Designed for Federal Information Processing Standard (FIPS) 140-2 Level 4 certification
- Crypto Express2 Accelerator – for SSL acceleration
 - Designed to support clear-key RSA operations
 - Offloads compute-intensive RSA public-key and private-key cryptographic operations employed in the SSL protocol

The configurable Crypto Express2 feature is exclusive to the z10 EC, z9 EC and z9 BC and is supported by z/VM V5.2 and later, providing guest support for z/OS and Linux on System z that includes:

- Dedicated-queue support for clear-key and secure-key cryptographic functions for z/OS guests
- Shared-queue and dedicated-queue support for clear-key cryptographic functions for Linux on System z guests.

z/VM V5.1 and V5.2 already provided support for the Crypto Express2 Coprocessor. Support for the configurable Crypto Express2 Accelerator is also supported by z/VM V5.1 with the PTF for APAR VM63646.

Question:

What other improvements have been made with the upgraded SSL server in V5.2 and V5.3?

Answer:

The upgraded SSL server for V5.2 included:

- A variety of industry-standard encryption algorithms, including DES, triple-DES, RC2, and RC4, with keys up to 128 bits in length. Hashes are provided by SHA-1 and MD5.
- Certificate activation/removal without server restart
- This capability allows a new certificate to be added or an existing one to be deactivated while existing SSL-secured sessions are active, removing the need to shutdown and restart the SSL server when certificates are added or deleted
- Federal Information Processing Standard (FIPS 140-2) operational mode support
- The SSL server may be operated in FIPS mode, restricting connections to those that employ FIPS-approved cipher suites.

The upgraded SSL server for V5.3 includes:

- Secure Sockets Layer/Transport Layer Security (SSL/TLS) support for industry-standard secure FTP (RFC 4217), Telnet (draft specification #6), and SMTP (RFC 3207) sessions. Data transmission on a connection can now begin in clear text and at some later point be made available in secure text, thus helping to reduce the need to dedicate a separate port for secure connections.
- Enhanced to more easily allow weak cipher suites to be excluded.

- Enhanced to allow a Linux guest to remain active after a critical error is encountered during server operations.
 - SSLADMIN command has been enhanced to:
 - Allow the specification of the number of days that a self-signed certificate is to be valid
 - Improve the management of the SSL server LOG files, by providing the ability to:
 - Maintain log information in a file named other than SSLADMIN LOG
 - Specify a maximum size to be established for the SSL server log
 - Purge log information accumulated by the SSL server
-

Question:

The capability for the dynamic addition/deletion of a Logical Partition name is available on System z servers. Does z/VM support this capability?

Answer:

Yes. The ability to add meaningful Logical Partition (LPAR) names to your configuration without a Power-On Reset was made available on the z890 and z990 servers on May 28, 2004. Prior to this support, extra LPARs were defined by adding reserved names in the Input/Output Configuration Data Set (IOCDs), but predicting meaningful names in advance of the need for extra LPARs was difficult.

z/VM V5.2 and V5.3 exploit this hardware capability on z10 EC, z9 EC, z9 BC, z890 and z990 servers by providing the capability to define dynamically and delete logical partitions using CP's Dynamic I/O command interface and z/VM HCD/HCM support.

It is recommended that if one is using the Performance Toolkit for VM that they restart the Toolkit after making the LPAR name changes.

Question:

Do z/VM V5.2 and V5.3 support the increase of up to 60 LPARs?

Answer:

Yes. The use of up to 60 LPARs is exclusive to the z10 EC and z9 EC environment and is supported by z/VM V5.1, and later, satisfying the statement of direction in Software Announcement 203-128, dated May 13, 2003.

Question:

Does z/VM V5.3 support the IBM DS6000 and DS8000?

Answer:

Yes. The DS6000 is designed to deliver enterprise-class storage capabilities in a space-efficient, modular design at a low price. The DS8000 series is designed to provide unmatched functionality, flexibility, and performance for enterprise disk storage systems at new levels of cost effectiveness. Also supported is the capability to define and operate FCP-attached SCSI disks with capacities of approximately 1 TB (2,147,483,640 512-byte blocks) for CP volumes and 381 GB for CMS and GCS volumes.

The DS6000 series and the DS8000 series are also supported by z/VM V5.1 with the PTFs for APARs VM63653 and VM63535 and VM63534, respectively. In addition, PTFs for DirMaint APAR VM63700 and DFSMS/VM APAR VM63664 are required to support the approximately 1 TB CP SCSI disks on z/VM 5.1.

Support for Dynamic Volume Expansion simplifying disk management by allowing for the dynamic increase of a DS8000 volume size in order to accommodate application data growth with the PTFs for APARs VM64305 and VM64354.

Question:

What does the enhancement to coordination of DirMaint and RACF changes do for me?

Answer:

In z/VM V5.2 and later, the directory management functions of DirMaint can be integrated with the security management functions of RACF. DirMaint can be configured to notify RACF whenever important changes are made to user definitions and the resources they own. This configuration is designed to reduce the administrative effort and skills needed to deploy and manage users and their resources when DirMaint and RACF are used together. By eliminating the need to define manually and manage z/VM resources in RACF, the possibility of incomplete or incorrect RACF configuration is reduced. Functions that are coordinated by this new DirMaint support include:

- User creation, deletion, and changes
 - Password management
 - POSIX segment management
 - Access Control Interface (ACI) group management
 - Profile creation and deletion for selected VM functions
-

Question:

What functions became obsolete with the announcement of z/VM 5.3?

Answer:

The ROUTED and BOOTP servers have been removed from z/VM V5.3. This satisfies the Statement of General Direction made in Software Announcement 205-168, (US) dated July 27, 2005.

Question:

Have there been any installation, service, and packaging improvements in z/VM V5.3?

Answer:

Yes. Additional DVD installation options

- z/VM V5.3 provides some additional capabilities for installing z/VM from DVD. The second-level DVD installation process now supports moving the contents to an FTP server directory or a second-level CMS minidisk and then installing from the server or minidisk. This provides more options for customer environments and can facilitate electronic delivery of z/VM.
- Enhanced status information - The automated service command, SERVICE, has been enhanced to display the service and production levels for preventive service (RSU) and displays an applied, built, and production status for corrective service. This can provide a quicker and easier way to determine service status.
- RSCS repackaged as an optional feature - Remote Spooling Communications Subsystem (RSCS) V3.2.0 (5684-096) has been repackaged and is now available for licensing under International Program License Agreement (IPLA) terms and conditions. RSCS Function

Level 530 (FL530) is available as a priced, optional preinstalled feature of z/VM V5.3. Pricing is based on Engine-based Value Units and is available for both IFL and standard processor configurations. RSCS FL530 provides dynamic command authorization support through a new server, RSCSAUTH, that runs as a disconnected z/VM server and is authorized for all RSCS commands. This can eliminate the need to re-cycle RSCS when changing system and link authorizations.

Question:

What is RSCS?

Answer:

Remote Spooling Communications Subsystem (RSCS) is a z/VM networking program. It provides data file transfer and print services to, from, and through the z/VM system on which it runs using both its own and TCP/IP networks. It extends the scope of a single system to an entire network of computers and devices. RSCS transfers data (as spool files) between its local system and remote devices and printers or other systems. It also acts as a print server for remote printers attached to other VM systems or a TCP/IP network. Through RSCS, users can send and receive messages, files, commands, and print and system jobs within their network.

With the availability of the RSCS FL530 feature, the stand-alone RSCS V3.2.0 (5684-096) product was planned to be withdrawn from marketing effective September 30, 2007. This withdrawal from marketing was extended to September 30, 2008 in Software Announcement letter 207-135 (US), dated June 12, 2007. In the Withdrawal Announcement letter 907-245 (US), dated December 4, 2007, this date for the withdrawal from marketing of RSCS 3.2 has changed to May 26, 2008.

Additional z/VM V5.3 Enhancements Announced on April 18, 2007

Question:

Did IBM make any additional announcements for z/VM on April 18, 2007?

Answer:

Yes. On April 18, 2007, and also in the IBM V5.3 Software Announcement 207-135 (US), dated June 12, 2007, IBM announced the following enhancements for z/VM V5.3:

- Support more real storage (memory) up to 256 GB, twice the size supported by z/VM V5.2, with the potential of having more than 1 TB of total virtual memory in use by guests. The actual amount of usable real and virtual memory is dependent on the amount of real memory in the z/VM logical partition, the hardware server model, firmware level, and configuration, and the number of guests and their workload characteristics.
- Support for the IBM System Storage SAN Volume Controller (SVC) Storage Engine 2145 is designed to allow Linux on System z guests of z/VM V5 (all releases) to access IBM System Storage disk subsystems, including the DS8000, DS6000, DS4000, and ESS series, as well as disk subsystems from other manufacturers that are supported by the SVC.
- Virtual Switch (VSWITCH) support for IEEE 802.3ad link aggregation and failover support is designed to allow all the OSA-Express2 features that are associated with a virtual switch to be grouped and used as a single "fat pipe"
- z/VM systems management functions to be performed from the Hardware Management Console (HMC) to manage guests without having to establish additional network connections and reducing complex configuration of the system

Question:

What is the support for the IBM System Storage SAN Volume Controller (SVC) Storage Engine 2145?

Answer:

z/VM and its guest operating systems are designed to access SCSI FCP storage capacity from multiple vendors as a single reservoir of capacity that can be managed from a central point. z/VM supports the SVC through z/VM's generic SCSI device driver. The SVC handles the device-specific requirements for whatever collection of different storage devices a customer has attached to the SVC.

z/VM support for the SVC allows the z/VM control program (CP) and guest operating systems that use SCSI devices (such as Linux on System z and z/VSE, as well as z/VM itself) to access IBM disk subsystems, including the DS8000, DS6000, DS4000, and ESS series, as well as disk subsystems from other manufacturers that are supported by the SVC.

The SVC support adds "2145" as a parameter of the EDEVICE configuration statement, as well as the SET EDEVICE and QUERY EDEVICE commands.

The SVC can be used to provide SCSI devices as emulated FBA devices for use by CP and guest operating systems. This support is available in z/VM V5.3 and in V5.2 with the PTF for APAR VM64128.

Use of SCSI devices accessed through the SVC by dedicated FCP subchannels is available to guest operating systems in any release of z/VM V5, without the application of any PTFs.

Supported hardware list, device driver and firmware levels for the SAN Volume Controller can be found at: <http://ibm.com/support/docview.wss?rs=591&uid=ssg1S1002864>

Question:

What is provided by z/VM V5.3 to support OSA-Express2 link aggregation on the z10 EC, z9 EC, and z9 BC?

Answer:

Link aggregation (trunking) support is designed to allow you to combine multiple physical OSA-Express2 or OSA-Express3 ports into a single logical link designed for increased throughput and for nondisruptive failover in the event that a port becomes unavailable. Based on network topology, the increased bandwidth available to the virtual switch in a link-aggregated configuration may yield improved performance over existing single-OSA configurations. OSA-Express2 and OSA-Express3 in support of z/VM Virtual Switch-controlled (VSWITCH-controlled) link aggregation (IEEE 802.3ad) provides the ability to dedicate an OSA port to the z/VM operating system when the port is targeted to participate in an aggregated group.

The OSA-Express adapters that comprise the link aggregation group must be connected to the same physical switch and LAN segment. If there is a connectivity problem with any of the OSA-Express devices within the group, the virtual switch can detect the failure and packet transmission will continue over another device within the group. Thus, this support provides the capability for a quicker failover for devices within the group. A failover OSA-Express adapter can be specified and will be used in the event of a failure in which the entire link aggregation group becomes unavailable. Similar to the existing failover support in z/VM V5.2, failover devices can be specified when the virtual switch is defined. Only a single failover device will be deployed at a time although multiple devices can be specified for the failover capability. For optimum connectivity, the failover devices should be connected to separate physical switches.

This support satisfies the statement of direction made in the z/VM V5.3 Software Announcement on February 6, 2007.

Question:

What is the value of managing guests from the HMC?

Answer:

z/VM integrated systems management for the System z10 EC, z9 EC, and z9 BC HMC provides out-of-the-box integrated GUI-based basic management of z/VM guests. The HMC can automatically detect z/VM images. The z/VM integrated systems management capability supports the following image management functions: activate, deactivate, and display guest status.

The z/VM integrated systems management function requires a z10 EC, z9 EC, z9 BC, IBM eServer zSeries 990 (z990), 890 (z890), 900 (z900), or 800 (z800). The HMC must be at level 2.9.2, and the Support Element (SE) must be at the following levels:

- 2.10.0 for the z10 EC
- 2.9.2 for the z9 EC and z9 BC
- 1.8.2 for the z990 and z890
- 1.7.3 for the z900 and z800

In order to use the integrated systems management support, MCLs G40965.74 (SE) and G40969.050 (HMC) and the PTFs for APARs VM64233 and VM64234 are required.

Additional z/VM V5.3 Enhancements Announced on February 26, 2008

Question:

Did IBM make any additional announcements related to z/VM on February 26, 2008?

Answer:

Yes. On February 26, 2008, IBM announced the following enhancements for z/VM V5.2 and V5.3 (unless specified otherwise):

- Guest exploitation of the System z10 EC at the level of System z9 functionality with the PTFs for APARs VM64180 and VM64242,
- Exploitation of selected functions of the System z10 EC including:
 - Dynamic I/O configuration to define, modify, and delete a Coupling using InfiniBand, CHPID type CIB, when z/VM V5.3 is the controlling LPAR for dynamic I/O (V5.3 only)
 - Processors dynamically added to or removed from a z/VM LPAR in reserve without preplanning with the PTFs for APARs VM64249, VM64323, and VM64389 (V5.3 only)
 - TCP/IP and VSWITCH gaining the performance benefit of OSA-Express3 10 GbE on the z10 EC.
 - Additional PTFs must be applied to support the z10 EC:
 - EREP support requires the PTF for APAR VM64367
 - CMS IOCP support requires the PTF for APAR VM64302
 - HCD support requires the PTF for APAR VM64020
- Improved memory management algorithms to help benefit paging workloads with large memory environments with the PTF for APAR VM64349.
- Support for Dynamic Volume Expansion simplifying disk management by allowing for the dynamic increase of a DS8000 volume size in order to accommodate application data growth with the PTFs for APARs VM64305 and VM64354.
- New port isolation security mechanism provides the ability to restrict guest-to-guest communications within a VSWITCH with PTF for APAR VM64281.
- Encryption Re-Key support provides the capability to update a previously encrypted tape cartridge with a new set of Key Encryption information allowing for a continuous protection of tape cartridge data with the PTF for APAR VM64260 (V5.3 only).
- Correct display of the z10 EC and z9 processor models by the Performance Toolkit for VM with the PTF for APAR VM64369 for V5.2 and V5.3

Question:

Were any statements of direction announced on February 26, 2008 that are related to z/VM?

Answer:

Yes, two new statements of direction were announced:

- IBM intends to further enhance z/VM in a future release to exploit the new System z10 EC support for a new logical partition (LPAR) mode "VM", exclusively for running z/VM LPARs. This new LPAR mode allows z/VM to utilize a wider variety of specialty processors in a single LPAR. For instance, in a VM mode LPAR, z/VM can manage Linux on System z guests running on IFL processors while also managing z/OS guests running on central processors (CPs) and zIIPs and zAAPs.
- IBM intends to further enhance z/VM in a future release to exploit the new Hardware Management Console (HMC) interface that allows the installation of Linux on System z into a z/VM virtual machine. Additionally, future support is planned for z/VM and the HMC to provide z/VM hypervisor-configuration tasks.

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

z/VM V5.2 Enhancements Made Available May 26, 2006

Question:

How were these enhancements made available?

Answer:

These enhancements were delivered in the service stream with the PTF for APAR VM63952.

Question:

What was availability date for z/VM V5.2 to exploit the z9 EC and the z9 BC?

Answer:

The availability was May 26, 2006.

Question:

Are these functions also supported on the System z10 EC?

Answer:

Yes.

Question:

What additional features were announced for z/VM V5.2?

Answer:

The additional features added to z/VM V5.2 to exploit the z9 EC and new z9 BC plus other enhancements included:

- Exploitation of selected features of the z9 EC and the new z9 BC, including:
 - Support for new instructions
 - Support for FICON Express4 (4 Gbps FICON)
 - Support of HiperSockets using IPv6 protocol by TCP/IP and guest LAN
 - Simplified VLAN management with support for GVRP
 - Enhancements for FCP N_Port ID Virtualization
 - Additional exploitation of the IBM DS6000 and DS8000 series
 - Support for Parallel Access Volumes (PAVs) as minidisks
 - Ease-of-use enhancement for the Performance Toolkit for VM
-

Question:

What additional function assists the existing z9 EC and the z9 BC customer?

Answer:

With the PTF for APAR VM63952, z/VM V5.2 exploits selected features for the z9 EC and z9 BC:

- Selected instructions of the z9 EC and z9 BC, including:
 - Guest support for the Signal Processor (SIGP) instruction
Conditional-Emergency-Signal and Sense-Running-Status orders and for
Program-Event-Recording 3

- CP exploitation of Program-Event-Recording 3, providing access to the guest breaking-event-address register to aid in debugging wild branches during virtual machine execution and the Store-Clock-Fast Facility to reduce the overhead of Store Clock instructions and CP program tracing
 - CP TRACE support for new instructions available with the z9 EC and z9 BC
 - The EREP PTF for APAR VM63946 is also required to support the z9 BC.
- Support for FICON Express4
The FICON Express4 features, introduced on the z9 EC and z9 BC, provide improved capacity and performance of up to 4 Gigabits per second (Gbps). Also included with the FICON Express4 features:
 - Reduced cost of storage operations and shorter backup windows with a higher link data rate
 - Investment protection for storage infrastructure with manageable migration to higher performance provided by 1/2/4 Gbps auto-negotiating links
 - Enable channel and link consolidation to help simplify management and reduce the cost of the storage infrastructure
 - Cost-effective FICON exploitation for midrange and small enterprises with additional price granularity with 2-port or 4-port cards for the z9 BC

Exclusive to the z10 EC, z9 EC, and z9 BC, the FICON Express4 features are supported by z/VM V5.1 with PTF for APAR VM63744 (for z/VM SCSI disk use), and V5.2.

For additional information on the new FICON Express4 features, refer to Hardware Announcement for the z9 EC, dated April 27, 2006 or Hardware Announcement for the z9 BC, dated April 27, 2006

- HiperSockets supports IPv6
Internet Protocol Version 6 (IPv6) support is offered for HiperSockets (CHPID type IQD) and is exclusive to the z10 EC, z9 EC and z9 BC. IPv6 is the protocol designed by the Internet Engineering Task Force (IETF) to replace IPv4 to help satisfy the demand for additional IP addresses.
 - With the PTF for APAR VM63952, z/VM V5.2 supports IPv6 HiperSockets for TCP/IP and virtualizes the IPv6 HiperSockets in a guest LAN environment. This satisfies the statement of direction made in Software Announcement 205-168, dated July 27, 2005.
- VLAN management enhancement includes support of GVRP for ease of use and simplified management
Generic Attribute Registration Protocol (GARP) Virtual Local Area Network (VLAN) Registration Protocol, also referred to as GARP VLAN Registration Protocol (GVRP), is defined in the IEEE 802.1p standard and allows for the control of IEEE 802.1q VLANs. OSA communicates with GVRP-capable (IEEE 802.1p) switches, registering the active VLANs on behalf of the z/VM TCP/IP stack and the z/VM Virtual Switch if so configured. This provides dynamic creation and management of VLANs, including pruning of unnecessary broadcasts and unicasts on switches connected through 802.1q trunk ports.
 - With the PTF for APAR VM63952, z/VM enables the virtual switch (VSWITCH) to support GVRP in a guest LAN environment to help reduce LAN traffic between the physical LAN and the z/VM guest. Support of GVRP is exclusive to the z10 EC, z9 EC, and z9 BC and z/VM V5, and is applicable to all OSA-Express2 features when operating in QDIO

mode. This satisfies the statement of direction made in Software Announcement 205-168, dated July 27, 2005. The PTFs for APARs VM63784 and PK08444 are required for z/VM V5.1 to support this function.

- Enhancements for NPIV support
 - N_Port Identifier virtualization (NPIV) for FCP channels is designed to allow the sharing of a single physical FCP channel among multiple operating-system images, whether in LPARs or as z/VM guests in virtual machines. Previously announced in Software Announcement 205-168, dated July 27, 2005, z/VM exploits this hardware capability to define multiple virtual FCP channels, each with its own worldwide-unique Fibre Channel port name (WWPN). By assigning different hardware-defined virtual port names to different guests, the guests can use the virtual FCP channels as if they were dedicated physical FCP channels. In particular, access controls based on the virtual port names may be applied in the fabric using standard mechanisms like zoning in the switches and logical unit number (LUN) masking in the storage controllers.
 - NPIV is exclusive to the z10 EC, z9 EC, and z9 BC, and is applicable to all of the FICON features supported on z10 EC, z9 EC, and z9 BC when configured as CHPID type FCP.
 - When NPIV is enabled, z/VM V5.2 can be installed from DVD to SCSI disks. With the PTF for APAR VM63952, you have the capability to allow guest operating systems and z/VM users to query the hardware-defined virtual port names when using NPIV. This satisfies the statement of direction made in Software Announcement 205-168, dated July 27, 2005.

The PTFs for the following APARs are required for the z10 EC, z9 EC and z9 BC to be supported by V5.2:

- VM63856 - CPVM63946 - EREP (V5.2)
 - VM63921 - CMS IOCP (V5.2)
 - VM63952 - CP, CMS IOCP, TCP/IP, DirMaint, Performance Toolkit, HCD/HCM, and OSA/SF (V5.2)
-

Question

What other technology enhancements for z/VM V5.2 were announced on April 27, 2006?

Answer

- Additional support for IBM DS6000 series and DS8000 series
 - The following support is provided for z/VM V5.2:
 - DS6000 and DS8000 series operate in their native control unit modes with the PTF for APAR VM63952. That is, the DS6000 is supported as a 1750 control unit and the DS8000 as a 2107 control unit.
 - To automatically switch between multiple channel paths to help improve overall performance on the DS6000, preferred paths are used for I/O operations to devices attached to a 1750 control unit.
 - Support is provided for 65,520-cylinder (55.7 GB) 3390 volumes to help relieve addressing constraints, improve disk resource utilization, and improve storage-administrator productivity by providing the ability to consolidate multiple disk volumes into a single logical volume.
- With the PTF for APAR VM63952, z/VM V5.2 supports Parallel Access Volumes (PAVs) as minidisks for guest operating systems such as z/OS that exploit the PAV architecture. In

addition, the APAR provides the potential benefit of PAVs for I/O issued to minidisks owned or shared by guests that do not support native exploitation of PAVs, such as CMS. PAVs enable a single System z server and applicable storage controller to simultaneously process multiple I/O operations to the same logical volume, which can help to significantly improve I/O response times by reducing device queuing delays.

- The native controller enhancements, support for the 65,520-cylinder 3390, and PAV minidisk support also apply to the IBM TotalStorage Enterprise Storage Server. For the native controller support, the ESS will be supported as a 2105 control unit.
-

Question:

Were any additional z/VM V5.2 systems management improvements announced?

Answer:

Yes, an ease-of-use enhancement was announced for the Performance Toolkit. When using the Performance Toolkit for data retrieval, all VM systems that are to be authorized for performance-data retrieval must be identified to the Performance Toolkit. When adding new VM systems within the enterprise for performance-data retrieval, the Performance Toolkit server had to be shutdown and restarted. With the PTF for APAR VM63952, this shutdown and restart of the Performance Toolkit is no longer required. Also with this PTF, the Performance Toolkit supports the Open Systems Adapter for NCP (OSN), CHPID type OSN.

z/VM & Linux

Question:

What IBM tools are available to help manage multiple images of Linux, analyze performance, and act upon results?

Answer:

The following tools are designed to assist the system programmer with managing images, analyzing performance and adjusting the system for optimal resource utilization:

- GbE – Open System Adapter-Express (OSA-Express) Gigabit Ethernet. OSA-Express and OSA-Express2 offer high-speed TCP/IP connections through a Gigabit Ethernet (GbE) and 10 GbE (OSA-Express2 and OSA-Express3) adapter. This capability is a natural evolution of Ethernet and Fast Ethernet support that is needed to support data intensive TCP/IP applications and to help relieve traffic bottlenecks. z/VM enables guests, including z/OS and Linux, to use the OSA-Express, OSA-Express2, and OSA-Express3 GbE adapter.
- Virtual IP Addressing (VIPA) – VIPA increases the reliability and stability of TCP/IP in the event of a network or interface failure. With VIPA, hardware link fault tolerance is supplied for both inbound and outbound TCP/IP communications on z/VM, which can provide automatic recovery of hard link failures and network traffic splitting.
- DirMaint – IBM Directory Maintenance (DirMaint) Facility provides efficient and security-rich interactive facilities for maintenance of your VM system directory. Performance Toolkit for VM – The Performance Toolkit for VM provides enhanced capabilities for a z/VM systems programmer, operator or analyst to monitor and report performance data. VMRM – The Virtual Machine Resource Manager is a new service virtual machine that accepts workload definitions, goal specifications, and associations between them and then adjusts virtual machine CPU and I/O performance controls based on actual performance to attempt to achieve the goals associated with each workload. z/VM V5.2 and V5.3 also include enhanced memory management functions.

Question:

What features for z/VM enhance the Linux guest environment?

Answer:

z/VM V4.3 and later releases provided additional capability to account for the use of system resources by virtual machines, including those running Linux. An accounting record is produced that tracks a virtual machine's use of virtual network resources, including virtual channel-to-channel adapters (CTCAs), inter-user communication vehicle (IUCV) or advanced program-to-program (APPC) connections, and virtual (Guest LAN) network interface cards (NICs).

Also, in z/VM V4.2, there were a number of important enhancements designed to support Linux guest systems. These include VM Guest RSA-Assist Support for Linux, Fast Channel Command Word (CCW) Translation Extensions, Enhanced Page Fault Handling, new commands designed to make Linux Image Management easier, and Observer support.

Question:

What new function did VM Guest RSA-Assist Support for Linux provide?

Answer:

With corresponding RSA-Assist Support function available from Linux on System z, the VM Guest RSA-Assist support in V4.2 and later releases enables Linux guest virtual machines to exploit the IBM PCI Cryptographic Coprocessor (PCICC) and the IBM PCI Cryptographic Accelerator (PCICA). This support provides clear-key RSA support for a large number of Linux guests enabling hardware Secure Socket Layer (SSL) acceleration on the z10 EC, z9 EC, z9 BC, z990, z890 (PCICA only), z900, z800, and S/390 servers. This support for Linux virtual servers does not change VM's current guest support of the IBM CMOS Cryptographic Coprocessor. The CMOS Cryptographic support is intended for use with OS/390 or z/OS guests and limits the number of guests using cryptography to 16. A z/VM system may include Linux guests using the RSA-Assist support simultaneously with other VM guests using the CMOS Cryptographic support. z/VM V5 extends support for Linux guests to the PCIXCC.

Question:

How do Fast Channel Command Word Translation Extensions benefit my Linux environment?

Answer:

Fast Channel Command Word (CCW) Translation Extensions help improve the performance of traditional I/O (Start Subchannel (SSCH)) to network and DASD devices. In z/VM V4.1 the Control Program (CP) provided a fast CCW translator to translate a wide range of channel programs that perform I/O to network adapters. This fast translator for network devices included support for 64-bit indirect data address words (IDAWs), which allows guest machines to read and write data above the 2 GB limit using 64-bit I/O addressing. In z/VM V4.2, 64-bit IDAW support was further extended to the existing DASD fast CCW translator. This enhancement is also designed to include 64-bit IDAW support for DASD channel programs that are simulated via the minidisk cache (MDC). Although the fast CCW translation extensions are based on analysis of Linux guest channel programs, any VM guest that does qualifying I/Os can benefit from this new function.

Question:

How is page fault handling enhanced in the z/VM?

Answer:

The current page fault handling support within CP for z/VM V4.2 and later releases is designed to allow Linux on System z guests to take full advantage of page fault notifications. With corresponding function available with Linux on System z, the Linux guest continues to process while the page fault is handled by CP.

Question:

What new ease-of-use tools are provided with z/VM V5?

Answer:

V5.1 provided numerous tools that are available to help manage z/VM systems:

Systems Management API – The Systems Management API provide a basic set of functions that may be called by applications to allocate and manage resources for guests running in

z/VM virtual machines (virtual images). Use of the API through an application provided by a customer or solution provider are designed so that such applications can allow administrators who lack in-depth VM knowledge to manage large numbers of virtual images running in a single z/VM system.

HCM/HCD – The HCM and HCD components, introduced with z/VM V4.4, are designed to reduce the amount of system administration input required to complete a z/VM installation and provide a comprehensive, easy-to-use I/O-configuration-management environment similar to that available with the z/OS operating system. The HCM and HCD programs work together to help you easily create and manage the hardware and software aspects of your z/VM system I/O configuration.

Performance Toolkit for VM – The Performance Toolkit for VM provides enhanced capabilities for a z/VM systems programmer, operator or analyst to monitor and report performance data.

Virtual Machine Resource Manager (VMRM) – The Virtual Machine Resource Manager is a service that dynamically tunes the VM system. Virtual machines can be grouped into workloads by specifying workload and goal definitions and associations between them, and then adjusts virtual machine CPU and I/O and memory (Linux guests only) performance controls based on actual performance data to attempt to achieve the goals associated with each workload.

Question:

What is the Integrated Facility for Linux (IFL)?

Answer:

The Integrated Facility for Linux is a dedicated Linux on System z processor. It is an optional feature, designed to add additional processing capacity, exclusively for Linux workload, with no effect on the existing model designation.

Question:

What benefits does z/VM provide for my Linux guest environment?

Answer:

z/VM enables you to run a large number of Linux server images on a single System z platform. It is ideal for integrating applications and data and consolidating select UNIX®, Microsoft® Windows®, and Linux workloads deployed on multiple servers onto a single physical zSeries server, while maintaining the same number of distinct server images. These Linux images can be deployed on standard processor or IFL processors. Server consolidation may result in cost savings realized by managing large server farms deployed on virtual servers instead of multiple hardware servers.

Question:

Does z/VM V5 work with all distributions of Linux?

Answer:

z/VM V5 is designed to run any distribution of Linux that conforms to the requirements of z/Architecture or the ESA/390 architecture. IBM has tested z/VM V5.2 with these commercial Linux distributions:

- SUSE SLES8 Service Pack 3 (31-bit)
- SUSE SLES9 Service Pack 2 (31-bit)
- SUSE SLES9 Service Pack 2 (64-bit)
- Red Hat Enterprise Linux AS V3 (31-bit)
- Red Hat Enterprise Linux AS V3 (64-bit)

IBM has tested z/VM V5.3 with these commercial Linux distributions:

- Novell SUSE Linux Enterprise Server (SLES) 9 Service Pack 3 (64-bit)
 - Novell SUSE Linux Enterprise Server (SLES) 9 Service Pack 3 (31-bit)
 - Red Hat Enterprise Linux (RHEL) AS 4 Update 4 (64-bit)
 - Red Hat Enterprise Linux (RHEL) AS 4 Update 4 (31-bit)
-

Question:

What are the specific value propositions of the IBM System z virtual Linux server environments for On Demand Business environments?

Answer:

On Demand Business requires a streamlined infrastructure, and Linux on System z is all about removing complexity from your IT infrastructure by helping to:

- Reduce server sprawl
 - Keep a lid on software licensing fees
 - Minimize the need for human intervention in managing and maintaining your servers
 - Reduce the time between inspiration and implementation
-

Question:

What support is provided for Linux on System z running on z/VM?

Answer:

Support for Linux is provided by each distributor and through support providers such as your local zSeries Business Partner and IBM Global Services. Please contact the distributors, your Business Partner or IBM Global Services for specific support information.

Question:

Can I buy a server that has IFL processors without including a standard processor?

Answer:

Yes. You can order/configure IFL-only processor models with the z9 EC, z9 BC, z990, and z890. For all other servers, there must be at least one standard processor on the server.

Question:

Can I run z/VM V5 in an LPAR which has a mix of standard and IFL processors?

Answer:

No. System z hardware does not allow LPARs to be created with a mix of standard and IFL processors. However, on February 26, 2008, IBM made this statement of direction:

IBM intends to further enhance z/VM in a future release to exploit the new System z10 EC support for a new logical partition (LPAR) mode "VM", exclusively for running z/VM LPARs. This new LPAR mode allows z/VM to utilize a wider variety of specialty processors in a single LPAR. For instance, in a VM mode LPAR, z/VM can manage Linux on System z guests running on IFL

processors while also managing z/OS guests running on central processors (CPs) and zIIPs and zAAPs.

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

Question:

Can I install z/VM from a CD?

Answer:

Yes. z/VM is shipped on CDs on all currently supported releases of z/VM except V5.2. z/VM V4.4 and later releases are distributed on 3480 and 3590 tape media. z/VM V5.1 and V5.2 are also distributed on DVDs and z/VM V5.3 is now available on 3592 distribution medium.

Question:

Can I control access to my Linux guests with RACF/VM?

Answer:

Yes. When RACF is ordered as a feature of z/VM V5.1 and later, it is licensed under IPLA and is supported on both standard and IFL processors. The RACF feature has been replaced with the RACF Security Server feature in z/VM V5.3. It is licensed under IPLA and is supported on both standard and IFL processors and can operate only on z/VM V5.3.

Question:

Can I run High Level Assembler (HLASM) to reassemble CP or CMS source modules?

Answer:

Yes. HLASM is available for licensing on standard processors. The High Level Assembler (5696-234) is also available on a special bid basis for licensing on IFL processors. The High Level Assembler is required for z/VM to:

- Apply corrective service to RACF associated CP parts
- Change exit routines or perform local modifications for any IBM VM product or vendor product

In z/VM V5.2, HLASM is no longer required to build the Standalone Dump routine

Question:

Can I license HLASM on IFL processors?

Answer:

No. However, HLASM is available on a special bid basis for licensing on IFL processors.

For pricing, terms and conditions, and special bid requests, contact your IBM representative or your IBM Business Partner.

Question:

Can I license ISPF/VM on IFL processors?

Answer:

No. However, ISPF/VM is available on a special bid basis for licensing on IFL processors.

For pricing, terms and conditions, and special bid requests, contact your IBM representative or your IBM Business Partner.

Question:

How does Linux perform under VM?

Answer:

System performance depends on the hardware resources allocated to z/VM V5 and on the level of activity within each Linux image. For assistance in understanding the performance implications for a particular situation, contact your IBM representative or your IBM Business Partner.

Question:

How many Linux servers can I consolidate to run under VM?

Answer:

Once again, it depends on the hardware resources and the level of activity within each Linux image. Customers can get sizings done through their IBM representative or a Business Partner. Both channels have access to SIZE390 which is used for this purpose. More detailed performance information is available at:

ibm.com/servers/eserver/zseries/zvm/perf/tips/linuxper.html.

Question:

Will IBM maintain a list of Independent Software Vendor (ISV) products that are being offered for Linux?

Answer:

Yes. IBM maintains a list of Independent Software Developer products available for Linux on System z at the following URL:

ibm.com/servers/eserver/zseries/os/linux/apps/all.html

You can also access a list of the IBM products available for Linux at the following URL:

ibm.com/software/os/linux/software.

*Note: This information is provided by the ISVs without independent evaluation or validation by IBM. IBM makes no claim as to the completeness of the information provided.

Question:

Where can I find more information about running Linux in a VM environment?

Answer:

You can visit z/VM and Linux on System z Resources at:

ibm.com/servers/eserver/zseries/zvm/linux/

or the Linux on System z Web page at:

ibm.com/servers/eserver/zseries/os/linux/

In addition, there is a wealth of information including white papers, Redbooks® and Redpapers and porting information, and as well as Linux customer stories located on the Linux on System z – Library and Technical support/documentation pages and at URL:

ibm.com/servers/eserver/zseries/os/linux/support_resources.html

Question:

Does IBM have Common Criteria certification of z/VM V5.1?

Answer:

Yes. On October 26, 2005, the German Federal Office of Information Security (Bundesamt für Sicherheit in der Informationstechnik, BSI) issued its certification that z/VM V5.1 conforms to the requirements of the Controlled Access Protection Profile (CAPP) and the Labeled Security Protection Profile (LSPP), both at Evaluation Assurance Level 3+.

The Common Criteria (CC) is an internationally recognized ISO standard (ISO/IEC 15408) used by governments and other organizations to assess security and assurance of technology products. The CC provides a standardized way of expressing security requirements and defines the respective set of rigorous criteria by which the product will be evaluated. It is widely recognized among IT professionals, government agencies, and customers as a seal of approval for mission-critical software.

Under Common Criteria, products are evaluated against strict standards for various features, such as the development environment, security functionality, the handling of security vulnerabilities, security-related documentation and product testing.

z/VM V5.1 was withdrawn from marketing on June 15, 2007.

Question:

Does IBM have Common Criteria certification of z/VM V5.2 or V5.3?

Answer:

No, not yet. IBM is currently in evaluation for Common Criteria *Certification of z/VM V5.3 with the RACF Security Server* optional feature for conformance to the Controlled Access Protection Profile (CAPP) and Labeled Security Protection Profile (LSPP) of the Common Criteria standard for IT security, ISO/IEC 15408, at Evaluation Assurance Level 4 (EAL4).

IBM does not intend to evaluate z/VM V5.2.

Pricing, Licensing, & Ordering

Question:

What is IPLA?

Answer:

IPLA stands for IBM International Program License Agreement. There is a one-time license charge for use of the program, which includes defect support via e-mail, fax or postal service and no-charge upgrades for new releases and versions when a current S&S license is in effect. A separate Subscription and Support offering is available with an ongoing recurring charge (4-year OTC in AP - China) for enhanced support, which includes telephone support.

Question:

Will z/VM V5 continue to be offered only with IPLA pricing or will model group pricing also be offered?

Answer:

Only IPLA pricing will be offered. IPLA pricing provides our customers with a lower price point for z/VM and virtualization technology, intended to be more attractive in the Linux environment. IPLA pricing also enables pricing on IBM Integrated Facility for Linux (IFL) processors.

Question:

How is the tiered value unit concept different than a flat price per processor and what is the new price per processor?

Answer:

With the release of z/VM V5.1, IBM introduced Engine-based Value unit pricing. Unlike z/VM V4, which requires you to pay the same per-processor price for each licensed processor, z/VM V5 has a declining per-processor price, on a tiered basis, as more processors are licensed across the enterprise. Tiered value unit pricing will provide a lower price per processor, on a tiered basis, as the number of standard and IFL processors licensed are increased within the enterprise. This will provide the software price performance that System z customers expect. Engine-based Value Unit pricing of z/VM V5 is different than MSU-based Value Unit pricing, which is available on other IBM software products.

Processors	Value Units Per Processor	Processors	Value Units Per Processor
1-3	10	13-16	6
4-6	9	17-20	5
7-9	8	21-25	4
10-12	7	26 or more	3

The current price per value unit is \$2,250*. As such, the entry OTC price per processor will be \$22,500 for z/VM V5 base function. If a customer were, for example, to license z/VM V5 for 10 processors, the total OTC price would be \$198,000:

$$\{3*(2,250*10)\}+\{3*(2,250*9)\}+\{3*(2,250*8)\}+\{1*(2,250*7)\}$$

*Price quoted in US currency and is subject to change

Question:

How can a customer benefit from enterprise aggregation with Engine-based Value Unit pricing?

Answer:

Engine-based Value Unit pricing may give customers a price benefit as they grow their capacity across their businesses. Customers may aggregate the capacity for all the processors that the product is operated on to achieve a more economic price. In other words, additional capacity will not be priced starting at the base with a higher price per unit, but on the capacity (processors) where z/VM V5 has already been installed.

Question:

z/VM V5 is priced per processor. Do I have to license it on each processor on the system, both standard and the IFL?

Answer:

When ordering z/VM V5.3 or the optional features to operate on standard processors (CPs) for a single server within the enterprise, you must specify Value Units equal to the Value Units to cover the number of standard processors (CPs) on your z10 EC, z9 EC, z9 BC, z990, z900, z890, or z800 server.

For a single server in an enterprise, the number of Value Units ordered for any optional feature to operate on standard processors must be equal to the number of Value Units ordered for the base z/VM V5 product operating on standard processors.

When ordering z/VM V5.3 or the optional features to operate on IFL processors for a single server within the enterprise, you must specify Value Units equal to the Value Units to cover the number of IFL processors on your z10 EC, z9 EC, z9 BC, z990, z900, z890, or z800 server.

For a single server in an enterprise, the number of Value Units ordered for any optional feature to operate on IFL processors must be equal to the number of Value Units ordered for the base z/VM V5 product operating on IFL processors.

Within the scope of an enterprise aggregation, the number of Value Units ordered for the S&S license must equal the number of Value Units ordered for the OTC license(s).

Question:

What is the cost of migrating from VM/ESA or z/VM V3.1 to z/VM V5?

Answer:

The z/VM V5 base product is priced at a one time charge of \$22,500* per processor for the first three processors with a decreasing price for additional processor as outlined in the Engine-based Value Unit schedule above. Optional features and support charges are priced separately.

*Price quoted in US currency and is subject to change

Question:

What is the cost of migrating from z/VM V4?

Answer:

There will be no cost to migrate from z/VM Version 4 to z/VM Version 5 if the customer has a current Subscription and Support (S&S) license for V4 and is not increasing the number of processors licensed. Customers without current S&S licenses will pay \$2,250* per Value Unit for the number of Value Units required per processor for the base. Optional features and S&S are priced separately. Customers can increase the numbers of processors for the same charges or lower if they qualify for the higher tier price based on the number of processors in their enterprise.

*Price quoted in US currency and is subject to change

Question:

Do I get any credit for the MLC I have paid on prior VM or z/VM products?

Answer:

No. z/VM V5 is a new product, and charged as such.

Question:

Will IBM continue with model group pricing for other IBM VM related products when running on standard processors or will they be offered under IPLA?

Answer:

IBM currently plans to offer certain software products that enhance the Linux environment under the International Program License Agreement (IPLA) with one-time charge (OTC) pricing. In addition to z/VM V5, the products currently being offered as features of z/VM V5 under the IPLA are:

- Directory Maintenance Facility (DirMaint)
- Performance Toolkit for VM
- RSCS (V5.3 only)
- RACF

These features will also be priced using the processor-based tiered value unit pricing metric. Licensing and pricing for all other IBM VM related software remains unchanged.

Question:

Can I transfer a z/VM V5 license?

Answer:

Yes, however with Software Announcement 205-274 (US), dated November 1, 2005 and effective with the availability of z/VM V5.2, the terms and conditions regarding program transfer have been revised. IBM introduced the Limited Transfer term which states:

“You may only transfer z/VM V5.2 and V5.3 to another party, in connection with Your transfer of the machine on which You are entitled to operate z/VM V5.2 and V5.3 (referred to as a "Limited Transfer"), provided that any such Limited Transfer of z/VM V5.2 and V5.3 requires You to transfer Your rights and obligations under the Agreement to the transferee and therefore

terminates Your authorization to continue to use z/VM V5.2 and V5.3. When the machine and z/VM V5.2 and V5.3 are transferred, You must either provide a printed copy of the Agreement or, if electronic licensing is used for z/VM V5.2 and V5.3, take the necessary actions that will require electronic acceptance of the Agreement by the transferee prior to the transferee's first use of z/VM V5.2 and V5.3.”

Question:

Is a license required in order to use the Internet print features of the RSCS product?

Answer:

Use of RSCS support for LPR, LPD, TN3270E and UFT protocols does not require a license. However, a license is required in order to use any other functions of the RSCS product. In z/VM V5.3, RSCS FL530 is offered as a optional, priced IPLA feature.

Question:

What will happen if I have an Enterprise License Agreement (ELA)?

Answer:

Existing ELAs may be impacted when migrating from Monthly License Charge to IPLA charging. Please contact your IBM representative to discuss how this may impact your contract. Licensing and pricing for all other IBM VM related software is not impacted by a migration from Monthly License Charge to IPLA.

Question:

When ordering z/VM, do I get a money-back guarantee?

Answer:

Yes. Any new licenses generated for z/VM will have a 30-day money-back guarantee. This is for programs licensed under the IPLA and the IBM International License Agreement for Non-Warranted Programs. For the latest information please refer to the following agreements:

- IBM International Program License Agreement (z125-3301) — applies to warranted software
- IBM International License Agreement for Non-Warranted Programs (z125-5589) — applies to non-warranted (“as-is”) software
- IBM International License Agreement for Evaluation of Programs (z125-5543) — applies to evaluation (try and buy) software
- IBM International License Agreement for Early Release of Programs (z125-5544) — applies to early release (beta) software

The latest versions of these agreements can be found at the IPLA License Agreements and License Information (LI) Documents Repository Web site at: ibm.com/software/sla.

Question:

Can customers finance (or obtain financing for) their purchase of a z/VM software license?

Answer:

Yes, IBM Global Financing offers competitive financing to credit-qualified customers to assist them in acquiring IT solutions. Offerings include financing for IT acquisition, including hardware, software, and services, from both IBM and other manufacturers or vendors.

Offerings (for all customer segments: small, medium, and large enterprise), rates, terms, and availability can vary by country. Contact your local IBM Global Financing organization or visit <http://www.ibm.com/financing>

IBM Global Financing offerings are provided through IBM Credit LLC in the United States, and other IBM subsidiaries and divisions worldwide to qualified commercial and government customers. Rates are based on a customer's credit rating, financing terms, offering type, equipment type, and options, and may vary by country. Other restrictions may apply. Rates and offerings are subject to change, extension, or withdrawal without notice.

Question:

Is the education allowance available for z/VM V5?

Answer:

Yes. The 15% Education Allowance (EA) applies toward both the IPLA purchase price and the Software Subscription and Support license for z/VM V5.

Question:

I am running VSE/ESA or z/VSE and VM on the same machine. If I install z/VM Version 5 will I continue to qualify for Multiple Operating System PR/SM™ (MOSP) pricing on my VSE software?

Answer:

Yes, in some cases. Specifically on a z10 EC, z9 EC, z990, and z900 Model Group 80 or below AND where VSE/ESA V2 or z/VSE V3 is licensed using Graduated Monthly License Charge (GMLC). If z/VM Version 5 runs only on one or more IFL processors, VSE and z/VSE does not qualify for MOSP pricing. As a reminder, MOSP Pricing does not apply to z/VM V5 itself.

In addition, the z800 offers zSeries Entry License Charge™ (zELC) pricing. There is no MOSP option for zELC or for z/VSE V4. z/VSE V4 has a new licensing option, Midrange Workload License Charges (MWLC).

Question:

Are older versions of VM eligible for Single Version Charging (SVC) when I migrate to z/VM V5?

Answer:

SVC provides for monthly, annual or processor- group upgrade charges being waived for a period of 12 months for the predecessor program only while in the process of migrating to the replacement program. SVC applicability will be on a like-for-like feature/functional basis only. Therefore, SVC only applies if you are running a previous version of VM (excluding z/VM V4 because it is OTC-priced) on a standard processor and migrate to z/VM V5 on a standard processor whether z/VM is installed on the IFL processor feature or not. Also, if you are on z/VM V3.1 or prior releases and you are licensed for the following products, you are eligible for SVC when you license z/VM V5.3:

C/370(TM) Library (5688-039)

DFSMS/VM (5706-116)

DirMaint (5748-XE4)

Language Environment®/370 (5688-198)

OS PL/I Resident Library (5734-LM4)

OS PL/I V2 Library (5668-911)

OS PL/I Transient Library (5734-LM5)
OS/VS COBOL Library Only (5740-LM1)
RACF (5740-XXH)
RealTime Monitor VM/ESA (5798-DWD)
RSCS V2 (5664-188)
RSCS V3 (5684-096)
TCP/IP Version 1 (5798-FAL)
TCP/IP Version 2 (5735-FAL)
VMPRF (5684-073)
VMMAP (5664-191)
VM Realtime Monitor (5796-PNA)
VS COBOL II Library Only (5688-022)
VS COBOL II Library Only (5668-940)

Please note: Older versions of VM and licensed products are eligible for SVC-based on the SVC guidelines within your geography or country.

Question:

Do the EWLC Tiered price structure or the MWLC price structure affect how z/VM V5 is priced?

Answer:

No. EWLC Tiered Price Structure is a new pricing structure that is exclusively available on the z890. It is designed to enhance IBM's Entry Workload License Charge to help provide greater granularity and price/performance for IBM operating systems and middleware through the utilization of a tiered price structure based upon the defined hardware capacity, measured in MSUs. EWLC Tiered Price Structure does not apply to z/VM V5.

MWLC is a new pricing structure which only applies to z/VSE V4, not to z/VM V5.

z/VM V5 is IPLA (OTC-priced per processor) utilizing an processor-based tiered value unit structure. Total charges are based on the number of processors in the logical or physical hardware model where z/VM is running.

Question:

How do I go about ordering z/VM?

Answer:

Please refer to Software Announcement 207-019 (US) dated February 6, 2007 on ordering z/VM V5.3. In the US and Canada, you can call 800-IBM-Call (800-426-2255), contact your IBM Business Partner representative or go to the ShopzSeries Web site at:

ibm.com/software/ShopzSeries.

Question:

Does z/VM V5 have any software prerequisites?

Answer:

Yes. Starting with z/VM 4.1, several products were automatically pre-installed on the base product DDRs. Since then subsequent releases have integrated additional products in the base of z/VM. The prerequisite no-charge products EREP VM V3.5.0 (5654-260) and ICKDSF VM V1.17.0 (5684-042) are required. Both of these products are no-charge and are pre-installed on the base product System DDRs. If you are not already licensed for these products you will need to place a separate order for both products to establish a license.

Question:

Can I order z/VM V5.3 on ShopzSeries?

Answer:

Yes. You can use ShopzSeries, to order the operating system and software products for z/VM operating environments. Using ShopzSeries, customers can quickly generate orders for the base operating system and software products with the z/VM SDO electronically. Beginning January 14, 2008, the z/VM base operating system can now be ordered using Internet delivery of ShopzSeries. In the case of fully-entitled upgrades, it offers a fully-automated process so no IBM intervention required. Additionally, ShopzSeries will help to determine if your order is technically correct (i.e. to determine any co-req or pre-req or incompatibility conditions are resolved for timely order placement and processing). ShopzSeries is available in all countries.

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

Question:

What additional information is available on generating and receiving software products for z/VM electronically?

Answer:

z/VM SDO Internet Delivery is available for generating and receiving software products.

- Customers can specify Internet as a delivery option for the program products contained in the z/VM SDO. Internet delivery of the z/VM operating system began on January 14, 2008.
- Customers place orders via ShopzSeries specifying Internet as a delivery option.
- Customers can track the status of their orders in ShopzSeries
- Customers will receive an e-mail notification when their order is ready to download.
- Customers then download the order to their workstation.

z/VM customers can order preventive service by RSU and corrective service (by PTF number, APAR number or ESO) through ShopzSeries. z/VM Version 5 customers can also use the new installed inventory report generated by the VMFBTMAP command to tailor your ShopzSeries service order and avoid receiving service you already have installed. If Internet delivery is supported in your geography, ShopzSeries displays "Internet" as a delivery option.

Question:

When can I place an order for z/VM V5.3?

Answer:

Orders for z/VM V5.3 began on June 15, 2007.

Question:

Is V5.1 or V5.2 available for ordering after the availability of V5.3?

Answer:

No, V5.1 and V5.2 have been withdrawn from marketing effective June 15, 2007.

Question:

Has the ordering process for z/VM V5 changed?

Answer:

No. z/VM V5.3 can only be ordered using the System Delivery Offering (SDO) which includes a single deliverable containing z/VM V5.3 and a group of fully-serviced IBM Licensed Program Products. The z/VM SDO package contains:

- z/VM V5.3 System DDR (DASD Dump Restore) or a binary system image (DVD)
 - z/VM SDO Optional Products Enabling Aid
 - z/VM SDO licensed products
-
-

Question:

What benefits does the z/VM SDO provide me?

Answer:

The key benefit of the z/VM SDO is the ability to update dynamically the SDO with new program products (versions and releases), to apply service when available, or to delete withdrawn products. This capability makes the SDO a more effective solution for the z/VM V5.3 customer.

For additional information on the z/VM Version 5.3 SDO, refer to the z/VM SDO Web site at:

ibm.com/serves/eserver/zseries/zvm/sdo/.

Question:

Is DFSMS/VM provided as standard with z/VM V5?

Answer:

DFSMS/VM, previously provided automatically with z/VM V4, is not automatically shipped. It is orderable as a no-charge feature with z/VM System Delivery Option (SDO).

Question:

Were there any new products added to the z/VM V5 SDO?

Answer:

Yes, on September 21, 2004, a new product, the IBM Debug Tool for z/VM V4.1 (5654-A23) can be ordered with the z/VM V5.1 SDO. Please refer to IBM Software Announcement 204-212 dated September 21, 2004 for additional information on this new z/VM product.

On April 29, 2005, two additional products were added to the z/VM V4.4 and V5.1 SDOs. They are the IBM Backup and Restore Manager for z/VM V1.1 (5697-J06) and the IBM Tape Manager for z/VM V1.1. Please refer to IBM Software Announcements 205-039 dated February 22, 2005 for additional information on Backup and Restore Manager for z/VM and 205-036 dated February 22, 2005 for additional information on Tape Manager for z/VM.

Also, since April 29, 2005 additional products have been added to the z/VM V5.2 and V5.3 SDO including:

- IBM Archive Manager for z/VM (5697-J05). Refer to Software Announcement 205-196 (US), dated August 23, 2005.
- IBM Operations Manager for z/VM (5697-J10). Refer to Software Announcement 206-034 (US), dated February 21, 2006.
- IBM Virtualization Engine™ and Infrastructure Services for Linux on System z9 and zSeries, V2.1 (5648-F08). Refer to Software Announcement 205-283 (US), dated November 8, 2005.
- IBM Director for Linux on System z, V5.20 (5648-DR1). Refer to Software Announcement 206-294 (US), dated November 14, 2006.
- IBM Tivoli® OMEGAMON® XE on z/VM and Linux V4.1.0 (5698-A36). Refer to Software Announcement 206-251 (US), dated October 10, 2006.

On January 1, 2006, VSE/VSAM V6.1 (5686-081) was removed from the z/VM V5.2 SDO because it was withdrawn from marketing on September 30, 2005. Refer to Withdrawal Announcement 905-121 (US), dated June 7, 2005.

Question:

Are there any plans to add additional products to the z/VM V5.3 SDO?

Answer:

No. However, IBM continues to evaluate additional products for inclusion into the z/VM V5.3 SDO. The IBM Tivoli zSecure Manager for RACF z/VM V1.8.1 (5655-T13) was added recently. Refer to Software Announcement 207-151 (US), dated July 3, 2007. Also, on December 14, 2007, DB2 for VSE & VM V7.5 (5697-F42) was added. Refer to Software Announcement 207-304 (US), dated November 13, 2007

Service & Support

Question:

What type of support is provided for z/VM V5?

Answer:

Defect support provided under the terms of the IPLA license is provided only via e-mail, fax or postal service. Optional Subscription and Support (S&S) is available for z/VM V5 for an annual fee. This optional support includes telephone assistance (voice support for defects during normal business hours) and access to updates, releases, and new versions of the program for as long as support is in effect. Please reference the IPLA Terms and Conditions for more information on the defect support provided with the basic license.

Question:

Is this also true for DirMaint, RSCS, RACF and Performance Toolkit for VM?

Answer:

Yes. If you would like enhanced S&S for these priced optional features, you must purchase the S&S for each feature.

Please note: Within the scope of an enterprise aggregation, the number of Value Units ordered for the S&S license must equal the number of Value Units ordered for the OTC license(s).

Question:

Is the S&S optional?

Answer:

Yes, however it is automatically added when you order z/VM V5 or any of the optional features of z/VM V5. If you do not desire S&S, you must decline this support when the order is placed.

Please note: S&S for z/VM not only provides defect support but also provides you with access to updates, releases and new versions of the program for as long as the support is in effect.

Question:

Is the z/VM S&S agreement separate from my Linux S&S agreement?

Answer:

Yes.

Question:

What type of support will be provided for z/VM V5 if I don't order the S&S feature?

Answer:

Without ordering the S&S feature, you are limited to central service provided by e-mail, fax or postal service.

Question:

When I buy S&S, how will I be billed?

Answer:

You will be invoiced for one year (12 months) of support in advance. It will be automatically renewed at the end of the support period unless IBM is notified in writing to terminate the support charges.

Question:

What will I be charged if I do not buy S&S when I originally license z/VM V5, but decide to purchase support later?

Answer:

You will be charged a payment equal to the total of all S&S charges that you would have paid during the lapsed interval had you not declined Support at the time it was offered to you, or terminated and subsequently resumed Support, plus one year of support charges.

Question:

Do I receive any credit if I terminate the S&S during the contract period?

Answer:

No.

Question:

Whom can I contact for installation support?

Answer:

Installation and technical support is provided by your IBM System z Business Partner, local Field Technical Support Specialists (FTSS) and Advanced Technical Support (ATS) zSeries and S/390 Systems Support, Gaithersburg, Maryland. Support Line also provides installation support on a fee basis.

Question:

What if I need additional services for z/VM?

Answer:

IBM Global Services (IGS) and IBM System z Business Partners can provide additional on-site services and support. IGS offers a comprehensive selection of services to address your individual service and support requirements. For more information call the IBM Information Center at 1-800-IBM-4YOU (1-800-426-4968) or reference the Internet at the following URL:

ibm.com/services/.

Question:

What service offerings are available to assist me with the installation and implementation of Linux?

Answer:

Contact IBM Global Services (IGS) for assistance with the planning, installation and implementation of Linux on your System z platforms. IGS provides a full range of services in support of Linux for System z, for example: "Linux Rapid Deployment Service" which will install z/VM, Linux for System z and either Apache or Samba; "Linux Solution for e-business" which can be customized to build quickly an e-business environment on your Linux for zSeries system; "IBM Migration Services – Consolidates file/print and Web Serving Workloads to Linux for System z9 and Linux for zSeries" to help consolidate workloads from distributed server farms by providing an assessment of which workloads can be consolidated onto Linux on System z, and then completing the consolidation for them; "IBM Installation Services for DB2 Universal Database™ Enterprise Extended Edition" to install DB2 Universal Database (UDB) on your Linux for System z and migrate data from existing database servers. For more information, call the IBM Information Center at 1-800-IBM-4YOU (1-800-426-4968) or reference the Internet at the following URL: ibm.com/services/its/us/.

Education

Question:

What public education courses does IBM provide for VM and Linux?

Answer:

IBM IT Education Services currently offers the following courses:

- The z/VM and Linux course catalog includes:
 - ZV02 - z/VM Introduction and Concepts (3 days)
 - ZV10 - z/VM and Linux Connectivity and Management (3.5 days)
 - ZV06 - Installing, Configuring and Servicing z/VM for Linux Guests (5 days)
 - ZV20 - z/VM RACF and DirMaint Implementation (4.5 days)
- The Linux course catalog includes:
 - ZL12 - Linux Basics - A zSeries Perspective (2 days)
 - ZL10 - Linux Implementation for zSeries (3 days)
 - ZL15 - Advanced Solutions for Linux on zSeries (4 days)

Private offerings of these classes and customized education may also be requested from IBM. For more information on educational opportunities, contact your local IBM IT Education Services (ITES) or call IBM Training at 800-IBM-TEACH (426-8322) for catalogs, schedules, and enrollments or visit the IBM Training Web site at: ibm.com/training/.

*These class numbers refer to education available in the US. Please check with your local office to learn about offerings for your country.

Question:

Do IBM technical conferences offer tracks for z/VM and Linux on System z?

Answer:

IBM Training offers public and private z/VM classes and annual Technical Conferences in Europe (in the first half of the year) and in the United States (in the second half of the year).

The following remaining System z technical conferences featuring z/OS, z/VM, z/VSE and Linux on System z are scheduled for 2008:

- IBM System z Technical Conference May 5 - 9, in Dresden, Germany
- IBM System z Expo, October 13 - 17, in Las Vegas, Nevada

For more information about IBM Technical Conferences, visit:

ibm.com/services/learning/conf/

Additional z/VM Educational resources can be found on the z/VM Web site at:

ibm.com/eserver/zseries/zvm/education/

Related Information

Question:

Where can I go for more detailed information about z/VM V5 and Linux and System z technology?

Answer:

See the following links for additional information:

General z/VM information:

- z/VM V5.2 resources: ibm.com/eserver/zseries/zvm/zvm520
- z/VM V5.3 resources: ibm.com/eserver/zseries/zvm/zvm530

VM education:

- ibm.com/eserver/zseries/zvm/education

VM publications:

- Five basic z/VM publications are shipped in printed format automatically when you order the base product including the License Information Document. Publications are also available as Adobe PDF or BookManager® files and are provided on the IBM Online Library: z/VM Collection on CD and DVD (supplied with z/VM V5 at no additional charge) and on the IBM z/VM Web site at:
 - ibm.com/eserver/zseries/zvm/pubsor from the Publication Center at:
 - ibm.com/shop/publications/order

FAQs:

- System z
 - ibm.com/systems/z/faq/
- z/VM 5.2
 - ibm.com/servers/eserver/zseries/faq/pdf/zvm5_2_faq.pdf
- z/VM 5.3
 - ibm.com/servers/eserver/zseries/faq/pdf/zvm5_3_faq.pdf

Programs and Products for z/VM:

- IBM Licensed Programs available for z/VM:
 - ibm.com/eserver/zseries/zvm/related
- Independent Software Vendor products available for z/VM:
 - ibm.com/eserver/zseries/zvm/vendor/

Programs and products for Linux:

- Linux program requirements:
 - ibm.com/eserver/zseries/os/linux/dist.html
- Independent Software Developer Products for Linux on System z:
 - ibm.com/servers/eserver/zseries/os/linux/apps/all.html

Redbook/Redpapers:

- IBM Redbooks/Redpapers are developed and published by the IBM International Technical Support Organization (ITSO). They are intended to develop and deliver skills, technical know-how, and materials to technical professionals of IBM, Business Partners, and customers. For access to the latest Redbooks and Redpapers see the following URLs:

- redbooks.**ibm.com**/
- publib-b.boulder.**ibm.com**/redbooks.nsf/portals/LinuxRedbooks

Linux Distributions:

- Novell SUSE LINUX:
 - suse.com/us/business/products/server/sles/s390.html
- Red Hat:
 - www.redhat.com

IBM Global Services Solutions:

- IGS Linux Solutions:
 - **ibm.com**/services/e-business/linux_2.html

Other:

- VM Fee Service Offering:
 - can.**ibm.com**/services/its/
- Financing:
 - **ibm.com**/financing/
- IBM Software Pricing:
 - **ibm.com**/zseries/swprice/
- Software Pricing Reference Guide:
 - **ibm.com**/zseries/library/refguides/sw_pricing.html



© Copyright IBM Corporation 2008

IBM Corporation
New Orchard Rd.
Armonk, NY 10504
U.S.A

Printed in the United States of America,
02/08
All Rights Reserved

IBM, the IBM logo, IBM eServer, BookManager, DB2, DB2 Universal Database, DFSMS/VM, DirMaint, DS4000, DS6000, DS 8000, ECKD, Enterprise Storage Server, ESCON, FICON, FlashCopy, GDPS, Geographically Dispersed Parallel Sysplex, HiperSockets, Language Environment, Multiprise, OMEGAMON, OS/390, Performance Toolkit for VM, PR/SM, RACF, Redbooks, Resource Link, S/390, S/390 Parallel Enterprise Server, System Storage, System z, System z9, Tivoli, TotalStorage, Virtualization Engine, VM/ESA, VSE/ESA, z9, z/Architecture, z/OS, z/VM, z/VSE, zSeries, and zSeries Entry License Charges are trademarks or registered trademarks of the International Business Machines Corporation.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

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

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

ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.

IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency, which is now part of the Office of Government Commerce.

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

ZSQ03012-USEN-03