IBM System z
Introduction
October 2009

z/VM Version 5 Release 4
Frequently Asked Questions

Worldwide

IBM

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z/VM Positioning

Question:

What is IBM System z® virtualization technology?

Answer:

System z virtualization technology allows customers to create virtual processors, communications, memory, 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 is composed of multiple dimensions. There is a hardware dimension and a software dimension, and both dimensions are considered at the time that the System z servers are designed. System z virtualization is not an afterthought; it is designed in from the bottom up.

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 a dynamic 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 a dynamic infrastructure?

Answer:

A dynamic infrastructure can be characterized by several attributes, one of them is virtualization. z/VM is the virtualization technology on System z servers and is a critical component of the Linux® on System z environment. For Linux on System z to embrace on demand business, the new z/VM release contains significant virtualization support for Linux virtual servers, including exploitation of the new System z platforms, nondisruptive dynamic addition of memory and processors, improved systems management, ease of use enhancements, performance improvements for Linux guests, and enhanced networking for guests. The virtualized Linux environment on System z can help you in building a dynamic infrastructure

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, 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. z/VM growth within an enterprise may be accomplished with enhancements that have been made to improve scalability and relief of storage constraints.

With support for the System z dynamic reconfiguration capabilities, z/VM V5.4 helps enable resources, such as processors and memory, to be added to an active LPAR running z/VM nondisruptively. With z/VM 5.4, customers can now configure their systems to help reduce the need to re-IPL z/VM. They can dynamically add processors, channels, OSA adapters, and now memory to both the z/VM system itself and to individual guests.

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).

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 z10 Business Class™ (z10 BC™), IBM System z9® Enterprise Class (z9® EC), 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 later support the z10 EC™ and z10 BC.

Question:

When was z/VM V5.4 announced and made generally available to customers?

Answer:

z/VM V5.4 was announced on August 5, 2008 and has been generally available for customers since September 12, 2008.

Question:

As an overview, what is z/VM 5.4 designed to offer customers?

Answer:

z/VM V5.4 is designed to offer:

- Increased flexibility with support for new z/VM-mode logical partitions
- Dynamic addition of memory and processors to an active z/VM LPAR by exploiting System z dynamic reconfiguration capabilities
- Enhanced physical connectivity by exploiting all OSA-Express3 ports
- Capability to install Linux on System z from the HMC without requiring a network connection
- Enhancements for scalability and constraint relief
- Operation of the z/VM SSL server in a CMS environment with PTFs
- Systems management enhancements for Linux and other virtual images
- Port isolation security that provides the ability to restrict guest-to-guest communications within a Virtual Switch (VSWITCH) by exploiting OSA-Express2 (System z9) and OSA-Express2/3 (System z10) QDIO data connection isolation with PTFs and required minimum MCLs

Question:

How is z/VM 5.4 marketed?

Answer:

The same marketing channels will be used for z/VM V5.4 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
- IBM Business Partners (BPs)

Question:

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

Answer:

z/VM V5.3 and V5.4.

Question:

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

Answer:

z/VM V5.3 and V5.4 with applicable PTFs.

Question:

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

Answer:

Unless otherwise stated, z/VM V5.1, V5.2, V5.3, and V5.4 provide exploitation support for the following z10 EC, z10 BC, z9 EC, z9 BC, z990, and z890 servers without requiring any additional PTFs:

z/VM V5.1, V5.2, V5.3, V5.4

- Four LCSSs (Logical Channel SubSystems), two on the z10 BC, z9 BC, and z890
- Spanned internal and external channels
- Dynamic I/O configuration across all LCSSs
- 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. Additional information can be found at: **ibm.com**/vm/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 later). This is integrated on the z10, z9 EC, and z9 BC. The z990 and z890 servers require MCL updates for this new assist. MCL112 (or later) in the z9 J13484 stream must be installed prior to IPLing z/VM V5.2 and later to avoid system outages.
- Up to 30 LPARs on the z10 BC, 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 (OSA-ICC), Includes four-port exploitation on the 1000BASE-T Ethernet feature, planned to be available in the first quarter 2010.
- Support for up to 24 CPs in a single z/VM image; up to 32 CPs on V5.3 and later
- System use of SCSI FCP disks, including IPLing, paging, spooling, etc.
- FCP-attached SCSI disks QDIO efficiency improvements
- PCICA support for guests (Supported on z/VM V5 only and not supported on z10 EC, z9 EC, and z9 BC)
- PCIXCC support for (z/VM V5 only and not supported on z10 EC, z9 EC, and z9 BC)
- Crypto Express2/3 support (coprocessor) for guests
- Crypto Express2/3 supported as an accelerator card for SSL acceleration for guests
- Crypto Express3 support for guests on a System z10 with the PTF for APAR VM64656, planned to be available in November, 2009 (V5.3 and later)
- z/VM installation from a DVD using the Hardware Management Console (HMC)
- Virtual switch (VSWITCH) exploitation of OSA-Express, OSA-Express2, and OSA-Express3 Ethernet features with the Layer 2
- 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
- OSA-Express feature support for 160 TCP/IP stacks
- 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))
- FICON Express8 on System 10 servers (V5.3 and later)
- OSA-Express2/3 – Open Systems Adapter for NCP (OSN) support
- N_Port identifier virtualization (NPIV) for FCP channels (V5.2 requires the PTF for APAR VM63952 to allow guest operating systems and z/VM users to query hardware-defined virtual port names. z/VM can be installed from DVD to SCSI disks when NPIV is enabled (V5.2 and later)
- Dynamic addition/deletion of a Logical Partition name (V5.2 and later)
- 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 and z10 BC including:
  - Dynamic I/O configuration to define, modify, and delete a Coupling using InfiniBand® link, CHPID type CIB, when z/VM V5.3 or later is the controlling LPAR for dynamic I/O
  - Processors dynamically added to or removed from a z/VM LPAR in reserve without preplanning. (V5.3 requires the PTFs for APARs VM64249, VM64323, and VM64389, V5.4)
  - TCP/IP and VSWITCH gaining the performance benefit of OSA-Express3 10 GbE, GbE, and 10000BASE-T
  - Guest support for specialty processors to allow all processor types (CPs, IFLs, zIIPs, zAAPs, and ICFs) on a System z10 to be defined in the same z/VM LPAR (V5.4)

- – Recognizing all four ports on a System z10 OSA-Express3 Gigabit Ethernet (GbE) and 1000BASE-T Ethernet features and two ports on the z10 BC OSA-Express3 GbE SX 2P and 1000BASE-T 2P features. This provides more physical connectivity to service the network and reduces the number of required resources, such as I/O slots, I/O cages, and fewer CHPIDs to be defined and managed. (V5.2 and V5.3 require the PTFs for APARs VM64277 and PK50120, V5.4)
- – OSA-Express3 OSA-Integrated Console Controller (OSA-ICC) on the 1000BASE-T Ethernet feature including four-port support, planned to be available in the first quarter 2010 (V5.2, V5.3, V5.4)
- – OSA-Express3 Open Systems Adapter for NCP (OSN) (V5.2, V5.3, V5.4)
- – QDIO data connection isolation (V5.3 and V5.4 require the PTFs for APARs VM64463 and PK67610 with required minimum MCLs (V5.3, V5.4)
- – Hardware Configuration Definition (HCD) support for the World-Wide Port Name (WWPN) prediction tool with the PTF for APAR VM64579 (V5.3, V5.4)
- – Additional PTFs must be applied to support the z10 EC:
  - ▪ EREP support requires the PTF for APAR VM64367 (V5.2, V5.3)
  - ▪ CMS IOCP support requires the PTFs for APARs VM64302 (V5.2, V5.3) and VM64474 (V5.2, V5.3, V5.4)
  - ▪ HCD support requires the PTFs for APARs VM64020 (V5.2, V5.3) and VM64410 (V5.2, V5.3, V5.4)
  - ▪ OSA/SF support requires the PTFs for APARs OA23824 (V5.2, V5.3) and OA26286 (V5.2, V5.3, V5.4)
- – Additional PTFs must be applied to support the z10 BC:
  - ▪ EREP support requires the PTFs for APARs VM64367 (V5.2, V5.3) and VM64475 (V5.2, V5.3, V5.4)
  - ▪ CMS IOCP support requires the PTFs for APARs VM64302 (V5.2, V5.3) and VM64474 (V5.2, V5.3, V5.4)
  - ▪ HCD support requires the PTFs for APARs VM64020 (V5.2, V5.3) and VM64410 (V5.2, V5.3, V5.4)
  - ▪ OSA/SF support requires the PTFs for APARs OA23824 (V5.2, V5.3) and OA26286 (V5.2, V5.3, V5.4)
- ▪ 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 (V5.2 requires the PTF for APAR VM63952)
- ▪ 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 the z10 EC, z10 BC, z9 EC, and z9 BC servers for required updates. To avoid system outages, required minimum MCL levels must be applied prior to IPLing z/VM V5.3 (and later) 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 (V5.3 requires the PTF for APAR VM64349, V5.4)
- ▪ z/VM systems management functions to be performed from the Hardware Management Console (HMC)
- ▪ Correct display of the z10 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, V5.3 and later)

- IBM System Storage DS8000® series supported in native control unit mode as a 2107 (V5.2 requires the PTF for APAR VM63952, V5.3 and later)
- Parallel Access Volumes (PAVs) as minidisks for guest operating systems (V5.2 requires the PTF for APAR VM63952, V5.3 and later)
- Hyper Parallel Access Volume (HyperPAV) support for IBM System Storage DS8000 series (V5.3, V5.4)
- 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 (V5.2 requires the PTFs for APARs VM64305 and VM64354, V5.3 and later)
- Support for the IBM System Storage SAN Volume Controller (SVC) Storage Engine 2145 is designed to allow 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 the IBM System Storage disk subsystems, including the DS8000, DS6000, DS4000® series, IBM XIV® Storage System, 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 (V5.2 requires the PTF for APAR VM64128, V5.3 and later). The PTF for APAR VM64525 should also be applied. (V5.3, V5.4)
- Support for the IBM FlashCopy® SE feature on the IBM DS8000 which provides a space-efficient snapshot capability that can greatly reduce the storage capacity needed for point-in-time copies with the PTFs for APARs VM64449, VM64605, and VM64684. (V5.4)
- IBM Extended Address Volumes (EAV) function of the IBM DS8000 for guests to support volumes that can scale up to approximately 223 GB (262,668 cylinders) with the PTF for APAR VM64709. The PTF for APAR VM64711 doubles the number of cylinders, up to 65,520, available for CMS use. Both PTFs are, planned to be available by year-end 2009. (V5.4 and later)
- Encryption Re-Key support provides the capability to update a previously encrypted tape cartridge with a new set of Key Encryption information (V5.3 requires the PTF for APAR VM64260, V5.4)
- Support for the IBM System Storage Enterprise 3592 Tape Controller Model C06 and 3592 Tape Drive Model E06, including DFSMS/VM™ (z/VM V5.2 and later require the PTFs for APARs VM64458 and VM64459)

Question:

Where can I find any additional service that may be required for z/VM V5.4?

Answer:

Refer to the PSP buckets on Resource Link at:
https://techsupport.services.**ibm.com**/server/390.psp390

In the "Upgrade Name" box, type "ZVM540".

Question:

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

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 V5.2 and later for guest exploitation
CPACF: z/VM V5.2 and later for guest exploitation
PCIXCC: z/VM V5.2 and later for guest exploitation
Crypto Express2:   z/VM V5.2 and later for guest exploitation
Crypto Express3   z/VM V5.3 and later for guest exploitation with the PTF for APAR VM64656,
                    planned to be available in November, 2009

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

PCICA, PCICC, PCIXCC, and CMOS Cryptographic Coprocessor Facility (CCF) features are not supported on the z10 EC and z10 BC.

Question:

Will z/VM V5 run on my S/390 Parallel Enterprise Server™ G5, G6 or S/390® Multiprise® 3000 servers 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, z10 BC, z9 EC, z9 BC, z990, z890, z900 and z800 servers.

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/VSE™ V4, and 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, 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 to operate as a guest of z/VM on the System z platform, both z/VM V5 and z/OS 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 on System z, z/OS, OS/390, z/VSE, TPF, z/TPF, VM/ESA, and the z/VM hypervisor, When z/VM V5 is installed on Integrated Facility for Linux (IFL) processors, only Linux on System z and z/VM V4 and V5 itself can be hosted as guest operating systems.

Question:

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

Answer:

Yes. z/VM V5 supports 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 IBM System z9 and z10 servers 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, z10 BC, 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 V5.4 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 satisfied 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 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. z/VM V5.2, and later, support Write Once Read Many (WORM) data cartridges. z/VM V5.2 and later, including DFSMS/VM provides support for the IBM System Storage Enterprise 3592 Tape Controller Model C06 and 3592 Tape Drive Model E06 with the PTFs for APARs VM64458 and VM64459.

Question:

Does DFSMS/VM provide support for tape data encryption?

Answer:

Yes. DFSMS/VM FL221 with the PTF for APAR VM64062 (and PTF for APAR VM64458 for 3592 model E06 drives) 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 V5.4 provide support for features of the IBM System Storage TS7700 Virtualization Engine™ tape?

Answer:

Yes. z/VM supports a disk-only tape configuration provided by the TS7720 and is well-suited for disaster recovery and data consolidation, protection, and sharing. Also, DFSMS/VM provides services that enable a z/VSE guest to manage resources of the IBM Virtualization Engine for the TS7720 configured without a physical tape library with the PTF for APAR VM64657.

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 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, 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 provided 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

z/VM V5.4 provides additional enhancements for SCSI disk support for Linux users, including:

- Capability to dump Linux on System z guests to FCP-attached SCSI disks
- More guest virtual memory can be dumped because SCSI disks can be larger than ECKD disks
- Dumping on SCSI disks avoids the need to convert a VMDUMP into a Linux tool format.
- Allows the same SCSI dump mechanisms to be used when running Linux in an LPAR and in a z/VM virtual machine

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 guests in z/VM V5.

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

PCICA, PCICC, PCIXCC, and CMOS Cryptographic Coprocessor Facility (CCF) features are not supported on the z10 EC and z10 BC.

Question:

What changes were made to the support media for z/VM installation?

Answer:

Starting with z/VM V5, the following changes have been made:

- 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 with V5.2 and later
- Installation from 3480 tape media or 3480 tape subsystems are not supported with V5.4

Question:

Does z/VM provide any new device support?

Answer:

Yes. z/VM V5.2 and later, 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 later provide 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 and later support 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.

With the PTFs for APARs VM64449, VM64605, and VM64684, z/VM V5.4 supports the IBM FlashCopy SE feature on the IBM DS8000 which provides a space-efficient snapshot capability that can greatly reduce the storage capacity needed for point-in-time copies.

With the PTF for APAR VM64709, z/VM V5.4 provides guest support for the IBM Extended Address Volumes (EAV) function of the IBM DS8000 that allows for volumes that can scale up to approximately 223 GB (262,668 cylinders) With the PTF for APAR VM64711, CMS support has been doubled, up to 65,520 cylinders, for its own use. Both PTFs are planned to be available by year-end 2009.

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**/vm/vendor/

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 IBM software is available for z/VM?

Answer:

A list of IBM Licensed Programs available for z/VM can be found at: **ibm.com**/vm/related/

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 Enhancements Announced on October 20, 2009

Question:

What enhancements did IBM announce for z/VM V5.4 on October 20, 2009?

Answer:

The following additional function was announced to be shipped in the service stream by year-end, 2009:

- Guest support for Crypto Express3 on the System z10 with the PTF for APAR VM64656 for z/VM V5.3 and later, planned to be available in November, 2009
- Guest support for IBM Extended Address Volumes (EAV) function of the IBM DS8000 that provides for volumes that can scale up to approximately 223 GB (262,668 cylinders) with the PTF for APAR VM64709. With the PTF for APAR VM64711, CMS doubles the number of cylinders, up to 65,520, available for its own use. Both PTFs are planned to be available by year-end 2009.

Question:

What is the Crypto Express3 support being provided by z/VM?

Answer:

With the PTF for APAR VM64656 for z/VM V5.3 and later, z/VM plans to provide:

- The ability to dedicate any available domain to a guest for clear-key and secure-key cryptographic functions
- The ability for guests to share available, non-dedicated domains for clear-key cryptographic functions
- Enhancements to the **CP QUERY CRYPTO APQS** command to display user information about both shared and dedicated cryptographic domains. Prior to this enhancement, the command displayed user information for only dedicated domains

Each Crypto Express2 and Crypto Express3 feature contains 2 cryptographic coprocessors using 2 PCI-Express (PCI-E) adapters, each with 16 cryptographic domains and up to 256 domains can be configured for use within a single z/VM system. An option of 1 PCI-E per feature is also offered for the z10 BC server and up to 128 domains can be configured for use with this option.

This z/VM support is planned to be available in November, 2009.

The Crypto Express3 feature is exclusive to IBM z10 EC and z10 BC servers. For additional information on Crypto Express3, refer to Hardware Announcement 109-678, dated October 20, 2009.

Question:

What support is provided by z/VM for EAV?

Answer:

The EAV function of the IBM System Storage DS8000 is designed to support volumes that can scale up to approximately 223 GB (262,668 cylinders). This capability can help relieve address constraints to support large storage capacity needs in System z environments. Larger devices can help simplify storage management as it fosters management of fewer, large volumes as opposed to many small volumes. With the PTF for APAR VM64709 for z/VM V5.4 and later, z/VM plans to provide guest support for up to 262,668 cylinders for:

- Devices dedicated to a guest

  - Linux on System z
    IBM is working with its Linux distribution partners to include support for this function in future Linux on System z distributions.

  - z/OS V1.10 and later
- Full-pack minidisks for guests which support EAV volumes
- DDR
- FlashCopy/SE

With the PTF for APAR VM64711, CMS support has been doubled, up to 65,520 cylinders, for its own use. The z/VM Control Program (CP) continues to support 65,520 cylinders for its own use.

Both PTFs are planned to be available by year-end 2009.

z/VM Enhancements Announced on July 7, 2009

Question:

What support was made available in the service stream after the general availability of z/VM V5.4 and announced on July 7, 2009?

Answer:

The following function was shipped in the service stream after September 12, 2008:

- An SSL server that operates in a CMS environment instead of requiring a Linux distribution with the PTFs for APARs PK65850, PK73085, PK75268, VM64540, VM64519, and VM64570 for V5.4.
- Additional support for Linux on System z guests using Dynamic Storage Reconfiguration (DSR) with the PTF for APAR VM64524 for V5.4. Requires SLES11 distribution.
- QDIO data connection isolation support with the PTFs for APARs VM64463 and PK67610 for V5.3 and V5.4. Minimum MCLs are required.
- Splitting a single dump into multiple files with the PTF for APAR VM64495 for V5.3 and V5.4.
- Hardware Configuration Definition (HCD) support for the World-Wide Port Name (WWPN) prediction tool with the PTF for APAR VM64579 for V5.3 and V5.4.
- IBM FlashCopy SE feature support on the IBM DS8000 which provides a space-efficient snapshot capability that can greatly reduce the storage capacity needed for point-in-time copies with the PTFs for APARs VM64449, VM64605, and VM64684 for V5.4.
- IBM System Storage Enterprise 3592 Tape Drive Model E06 support with the PTFs for APARs VM64458 and VM64459 for V5.2 and later.

This table describes the enhancements available in the service stream for supported releases:

Function	APAR Number	Releases Supported
QDIO Data Connection Isolation	VM64463 and PK67610	V5.3. V5.4
Dynamic Storage Reconfiguration (DSR)	VM64524	V5.4
z/VM SSL server	PK65850, PK73085, PK75268, VM64540, VM64569, and VM64570	V5.4
World-Wide Port Name (WWPN) prediction tool	VM64579	V5.3. V5.4
IBM FlashCopy SE	VM64449. VM64605, VM64684	V5.4 V5.4, V6.1
Multiple File Dumps	VM64495	V5.3. V5.4
IBM System Storage Enterprise 3592 Tape Drive Model E06	VM64459 (CP) and VM64458 (DFSMS/VM)	V5.2, V5.3, V5.4
DFSMS™/VM disk-only tape environment	VM64657	V5.3. V5.4
IBM Full Disk Encryption feature	VM64650	V5.4
Crypto Express3 [1]	VM64656	V5.3, V5.4, V6.1
IBM System Storage Extended Address Volumes [2]	VM64709 (CP) VM64711 (CMS)	V5.4, V6.1

Note 1: The PTF for APAR VM64656 is planned to be available in November, 2009.

Note 2: The PTFs for APARs VM64709 and VM64711 are planned to be available by year-end 2009.

Question:

What is FICON Express8 and how does z/VM support it?

Answer:

FICON Express 8 supports a link data rate of 8 gigabits per second (Gbps) and autonegotiation to 2, 4, or 8 Gbps for synergy with existing switches, directors, and storage devices. With support for native FICON, High Performance FICON for System z (zHPF), and Fibre Channel Protocol (FCP), the System z10 servers enable you to position your SAN for even higher performance - helping you to prepare for an end-to-end 8 Gbps infrastructure to meet the increased bandwidth demands of your applications.

FICON Express8 may also allow for the consolidation of existing FICON Express, FICON Express2, or FICON Express4 channels onto fewer FICON Express8 channels while maintaining and enhancing performance. The FICON Express8 features are exclusive to z10 EC and z10 BC servers.

z/VM V5.3 and later support FICON Express8 for:

- Native FICON or Channel-To-Channel (CTC) use
- FCP-attached SCSI devices including z/VM install, IPL, and system usage of SCSI disks and direct attachment to z/VM guests

No additional z/VM support is required.

For additional information on FICON Express8, refer to IBM Hardware Announcement 109-417 dated July 21, 2009.

Question:

Why did IBM make the z/VM SSL server a CMS application?

Answer:

The maintainability and serviceability of the z/VM Linux-based SSL server has always been a challenge to keep the SSL server in synchronization with Linux distributions. In fact, the Linux-based SSL server does not operate with Novell SUSE Linux Enterprise Server (SLES) 10 whatsoever and a major effort would have been required to correct the z/VM SSL server and then we would continue to have the maintainability problem. Having a CMS-based SSL removes the dependencies on a Linux distribution and may enable encryption services to be deployed more quickly. It can also help make installation, service, and release-to-release migration simpler. Other enhancements to the z/VM V5.4 SSL server include:

- Network-free SSL server administration
  The SSL server can be managed without requiring a network connection between the SSL server administrator and the SSL server.

- New encryption and decryption engine
  The SSL server uses z/OS V1.10 System SSL technology for encryption, decryption, and certificate management.

- New certificate-management services
  The System SSL GSKKYMAN utility is now used to manage the SSL server certificate database. New services available for the SSL server include certificate renewal, certificate signing, and certificate export with or without the private key. The GSKKYMAN application also manages certificates for the z/VM LDAP server.

Question:

What PTFs are required for the CMS-based SSL server?

Answer:

The CMS-based SSL server is available with the PTFs for APARs PK65850, PK73085, PK75268, VM64540, VM64519, and VM64570 for V5.4.

Question:

Is the Linux-based SSL server still available?

Answer:

No. It is not available for z/VM V5.4, and later. It is still supported on z/VM V5.3.

Question:

What is the support for Linux on System z guests using DSR?

Answer:

Further enhancements to z/VM storage management allow better cooperation with Linux on System z guests exploiting DSR with the PTF for APAR VM64524 for V5.4. z/VM support:

- Allows operation when running second level on z/VM to be more compatible with operation when running directly on an LPAR
- Displays configured, standby, and reserved values for each virtual storage element via the QUERY VIRTUAL STORAGE command
- Improves z/VM handling of unexpected DSR conditions that may occur

Question:

What is Queued Direct Input/Output (QDIO) data connection isolation?

Answer:

With QDIO data connection isolation you:

- Have the ability to adhere to security and HIPAA-security guidelines and regulations for network isolation between the operating system instances sharing physical network connectivity
- Can establish security zone boundaries that have been defined by your network administrators
- Have a mechanism to isolate a QDIO data connection (on an OSA port), ensuring all internal OSA routing between the isolated QDIO data connections and all other sharing QDIO data connections is disabled. In this state, only external communications to and from the isolated QDIO data connection are allowed. If you choose to deploy an external firewall to control the access between hosts on an isolated virtual switch and sharing LPARs then an external firewall needs to be configured and each individual host and or LPAR must have a route added to their TCP/IP stack to forward local traffic to the firewall.

Question:

What is the z/VM support for QDIO data connection isolation?

Answer:

With the PTFs for APARs VM64463 and PK67610, z/VM V5.3 and V5.4 support port isolation security that provides the ability to restrict guest-to-guest communications within a z/VM Virtual Switch (VSWITCH). Virtual Switch port isolation and QDIO data connection isolation can help you design virtual networks that adhere to strict traffic-separation policies. Traffic isolation on shared OSA-Express adapters is available for OSA-Express2 and OSA-Express3 features on a System z10 EC server and a z10 BC server and is exclusive to CHPID type OSD. z/VM provided this support in December, 2008.

Question:

What hardware supports QDIO data connection isolation?

Answer:

QDIO data connection isolation is available for OSA-Express2 and OSA-Express3 features on a System z10 EC and z10 BC and OSA-Express2 features on a System z9 EC and z9 BC with the following minimum MCLs with Driver 67 for the System z9 and with Driver 76 for the System z10:

- OSA-Express2 on z9 requires G40946.008
- OSA-Express2 on z10 requires N10953.002
- OSA-Express3 on z10 requires N10959.004 and N10967.055

Refer to the Preventive Service Planning (PSP) buckets on Resource Link for the minimum MCL levels for your server for any required updates for the IBM System z10 EC and z10 BC servers. The PSP buckets can be found on Resource Link at:

https://techsupport.services.**ibm.com**/server/390.psp390

For the z10 EC server, select:
       Use **2097DEVICE** for Upgrade Name
       Use **2097/ZVM** for Subset Name
For the z10 BC server, select:
       Use **2098DEVICE** for Upgrade Name
       Use **2098/ZVM** for Subset Name
For the z9 EC server, select:
       Use **2094DEVICE** for Upgrade Name
       Use **2094/ZVM** for Subset Name
For the z9 BC server, select:
       Use **2096DEVICE** for Upgrade Name
       Use **2096/ZVM** for Subset Name

Question:

Why would I want a single dump split into multiple files?

Answer:

Dumps which have been split into many smaller files can be stored across multiple DASD devices instead of requiring a single, larger disk. Segmenting a large dump into multiple files allows for easier handling of the dump by the support teams.

VMDUMPTL has also been enhanced to work with dumps that have been loaded to multiple files. All files must be available to view the entire dump, but may span multiple file modes.

This support is available for V5.3 and V5.4 with the PTF for APAR VM64495.

Question:
What is the purpose of the WWPN prediction tool?

Answer:
The WWPN prediction tool is available from IBM Resource Link to assist you with preplanning of your Storage Area Network (SAN) environment prior to the installation of your System z10 server. This standalone tool is designed to allow you to set up your SAN in advance, so that you can be up and running much faster once the server is installed. The tool assigns WWPNs to each virtual Fibre Channel Protocol (FCP) channel/port using the same WWPN assignment algorithms a system uses when assigning WWPNs for channels utilizing N_Port Identifier Virtualization (NPIV).

The Hardware Configuration Definition (HCD) component of z/VM provides I/O device information from the input/output definition file (IODF) for the WWPN prediction tool with the PTF for APAR VM64578 for V5.3 and V5.4.

Question:
Where can I get more information on the WWPN prediction tool?

Answer:
For more information on setting up a SAN using the WWPN prediction tool, refer to the IBM System z enhancements Hardware Announcement 109-230, dated April 28, 2009.

Question:
What is the z/VM support for FlashCopy SE?

Answer:
z/VM is designed to provide support for the IBM FlashCopy SE feature on the IBM DS8000 providing an instantaneous space-efficient snapshot capability that can greatly reduce the storage capacity needed for point-in-time copies. With a FlashCopy SE relationship, disk space will only be consumed for the target copy when data is written to the source volume or when a write is directed to the target. For a source volume without much write activity, the target volume can consume significantly less physical space than the source. In addition to the benefit of more efficient storage utilization, less capacity can mean fewer disk drives and lower power and cooling requirements. FlashCopy SE may be especially useful in the creation of temporary copies for tape backup, online application checkpoints, or copies for pre-production or disaster recovery testing.

This support is available for z/VM V5.4 with the PTFs for APARs VM64449, VM64605, and VM64684.

Question:

What will be the effect of the new z/VM V6 version on support for z/VM 5.4?

Answer:

Because z/VM 5.4 is the last release to support the IBM System z9, IBM eServer zSeries 990 (z990), 900 (z900), 890 (z890), and 800 (z800) servers, its Withdrawal from Marketing date has not been announced.

IBM announced its intention to discontinue service support for z/VM V5.4 to be effective September 30, 2011, in Software Announcement 208-249, dated August 5, 2008. In IBM Software Announcement 209-207, dated July 7, 2009, IBM extended the new date for discontinuing service support for z/VM V5.4 to September 30, 2013.

Question:

Can I still order z/VM V5.4?

Answer:

Yes. z/VM V5.4 is available for ordering and will continue to be orderable after the availability of z/VM V6.1. IBM will provide at least three months notification prior to any planned withdrawal date.

z/VM Enhancements Announced on October 21, 2008

Question:

What did IBM announce related to z/VM on October 21, 2008?

Answer:

IBM announced additional enhancements to the IBM System z10 EC and a new model of the System z10 family, the IBM System z10 BC. Also announced were additional z/VM enhancements to the currently supported z/VM releases including:

- Support for the IBM System z10 BC
- Additional systems management enhancements are provided by the HMC and Support Element (SE) 2.10.1 exploiting the z/VM V5.4 Systems Management APIs to allow selected virtual resources to be both defined and managed
- Port isolation security that provides the ability to restrict guest-to-guest communications within a Virtual Switch (VSWITCH) by exploiting OSA-Express QDIO data connection isolation on V5.3 and later with the PTFs for APARs VM64463 and PK67610.
    - Exclusive to OSA-Express2 and OSA-Express3 on the z10 and OSA-Express2 on z9
- OSA-Express3 enhancements provide support for:
    - Four ports on the 1000BASE-T Ethernet feature
    - Two ports on the GbE and 1000BASE-T 2P features on the z10 BC
    - OSA-Integrated Console Controller (OSC) on the 1000BASE-T Ethernet feature
    - Open Systems Adapter for NCP (OSN)
- Support for the IBM System Storage Enterprise 3592 Tape Controller Model C06 and 3592 Tape Drive Model E06 with the PTFs for APARs VM64458 and VM64459 for z/VM V5.2 and later, including DFSMS/VM.

Question:

Where can I find out more information on the IBM System z10 EC and z10 BC servers?

Answer:

For additional information on the z10 EC server, refer to:

- IBM Hardware Announcement 109-678 dated October 20, 2009
- IBM Hardware Announcement 109-417 dated July 21, 2009
- IBM Hardware Announcement 109-230 dated April 28, 2009
- IBM Hardware Announcement 108-794, dated October 21, 2008
- IBM Hardware Announcement 108-296, dated May 6, 2008
- IBM Hardware Announcement108-154, dated February 26, 2008

For additional information on the z10 BC server, refer to:

- IBM Hardware Announcement 109-678 dated October 20, 2009
- IBM Hardware Announcement 109-417 dated July 21, 2009
- IBM Hardware Announcement 109-230 dated April 28, 2009
- IBM Hardware Announcement 108-754, dated October 21, 2008

FAQs are also available for the z10 EC and z10 BC servers at:
http://**ibm.com**/systems/z/resources/faq/index.html

Question:

What releases of z/VM support the System z10?

Answer:

z/VM V5.2, and later, support the System z10. For some functions, PTFs are required:

- PTFs must be applied to support the z10 EC:
  - EREP support requires the PTF for APAR VM64367 (V5.2, V5.3)
  - CMS IOCP support requires the PTFs for APARs VM64302 (V5.2, V5.3) and VM64474 (V5.2, V5.3, V5.4)
  - HCD support requires the PTFs for APARs VM64020 (V5.2, V5.3) and VM64410 (V5.2, V5.3, V5.4)
  - HCD support for the WWPN requires the PTF for APAR VM64579 (V5.3, V5.4)
  - OSA/SF support requires the PTFs for APARs OA23824 (V5.2, V5.3) and OA26286 (V5.2, V5.3, V5.4)
- PTFs must be applied to support the z10 BC:
  - EREP support requires the PTFs for APARs VM64367 (V5.2, V5.3) and VM64475 (V5.2, V5.3, V5.4)
  - CMS IOCP support requires the PTFs for APARs VM64302 (V5.2, V5.3) and VM64474 (V5.2, V5.3, V5.4)
  - HCD support requires the PTFs for APARs VM64020 (V5.2, V5.3) and VM64410 (V5.2, V5.3, V5.4)
  - HCD support for the WWPN requires the PTF for APAR VM64579 (V5.3, V5.4)
  - OSA/SF support requires the PTFs for APARs OA23824 (V5.2, V5.3) and OA26286 (V5.2, V5.3, V5.4)
- Recognizing all four ports on a System z10 OSA-Express3 Gigabit Ethernet (GbE) and 1000BASE-T Ethernet features (including OSA-ICC four-port exploitation on the 1000BASE-T Ethernet feature planned to be available in the first quarter 2010) and two ports on the z10 BC OSA-Express3 GbE SX 2P and 1000BASE-T 2P features. This provides more physical connectivity to service the network and reduces the number of required resources, such as I/O slots, I/O cages, and fewer CHPIDs to be defined and managed. (V5.2 and V5.3 require the PTFs for APARs VM64277 and PK50120, V5.4)
- QDIO data connection isolation (V5.3 and V5.4 require the PTFs for APARs VM64463 and PK67610.
- Processors dynamically added to or removed from a z/VM LPAR in reserve without preplanning. (V5.3 requires the PTFs for APARs VM64249, VM64323, and VM64389
- Guest exploitation of the System z10 EC and z10 BC at the level of System z9 functionality with the PTFs for APARs VM64180 and VM64242 (V5.2, V5.3)
- Improved memory management algorithms to help benefit paging workloads with large memory environments (V5.3 requires the PTF for APAR VM64349, V5.4)
- Correct display of the z10 and z9 processor models by the Performance Toolkit for VM with the PTF for APAR VM64369 (V5.2, V5.3)
- N_Port identifier virtualization (NPIV) for FCP channels (V5.2 requires the PTF for APAR VM63952 to allow guest operating systems and z/VM users to query hardware-defined virtual port names. z/VM V5.2 and later can be installed from DVD to SCSI disks when NPIV is enabled

Question:

Can you tell me more about the systems management enhancements being made available for the HMC?

Answer:

Yes. With the availability of the HMC and SE 2.10.1 for the z10 EC and z10 BC on October 28, 2008 as well as the z9 EC and z9 BC, Additional systems management enhancements are provided that exploit the z/VM Systems Management APIs to allow selected virtual resources to be defined and managed:

- Define and maintain
  - z/VM profiles
  - z/VM prototypes
  - z/VM virtual machines
  - z/VM volume space
- View the VMRM measurement data
- Edit the VMRM active configuration file
  - Edit the VMRM active configuration file and maintain z/VM profile functions require z/VM V5.4. The remaining functions will operate with the z/VM V5.3.

This satisfies the Statement of General Direction made in Hardware Announcement 108-154, dated February 26, 2008.

Question:

What are the OSA-Express3 GbE and 1000BASE-T 2P features on the z10 BC and are they supported by z/VM?

Answer:

- The OSA-Express3-2P Gigabit Ethernet (GbE) short wavelength (SX) feature has two ports that reside on a single PCIe adapter and share one channel path identifier (CHPID). Each port supports attachment to a one Gigabit per second (Gbps) Ethernet Local Area Network (LAN). OSA-Express3 GbE SX supports CHPID types OSD and OSN. OSA-Express3 GbE can be defined as a spanned channel and can be shared among LPARs within and across LCSSs.
- The OSA-Express3-2P 1000BASE-T Ethernet feature has two ports which reside on a single PCIe adapter and share one channel path identifier (CHPID). Each port supports attachment to either a 10BASE-T (10 Mbps), 100BASE-TX (100 Mbps), or 1000BASE-T (1000 Mbps or 1 Gbps) Ethernet Local Area Network (LAN). The feature supports auto-negotiation and automatically adjusts to 10, 100, or 1000 Mbps, depending upon the LAN. When the feature is set to autonegotiate, the target device must also be set to autonegotiate. The feature supports the following settings: 10 Mbps half or full duplex, 100 Mbps half or full duplex, 1000 Mbps (1 Gbps) full duplex. OSA-Express3 1000BASE-T Ethernet supports CHPID types OSC, OSD, OSE, and OSN. OSA-ICC support includes four-port exploitation planned to be available in the first quarter 2010. OSA-Express3-2P can be defined as a spanned channel and can be shared among LPARs within and across LCSSs.

z/VM V5.4 recognizes both ports on a System z10 BC OSA-Express3 GbE SX 2P and 1000BASE-T 2P features. z/VM V5.2 and V5.3 require the PTFs for APARs VM64277 and PK50120.

Question:

What is the OSA-Integrated Console Controller (OSA-ICC) on the 1000BASE-T Ethernet feature?

Answer:

The Open Systems Adapter Express Integrated Console Controller (OSA-ICC) function supports TN3270E (RFC 2355) and non-SNA DFT 3270 emulation. 3270 emulation for console session connections is integrated in the System z10 server via a port on the OSA-Express3 1000BASE-T Ethernet feature. This can help eliminate the requirement for external console controllers (2074, 3174), helping to reduce cost and complexity. Each port can support up to 120 console session connections. OSA-Express3 1000BASE-T Ethernet (CHPID types OSC, OSD, OSE) can be defined as a spanned channel and can be shared among LPARs within and across LCSSs.

z/VM supports OSA-ICC 3270 with no additional service required. This includes four-port exploitation planned for the first quarter 2010.

Question:

What is the Open Systems Adapter for NCP (OSN)?

Answer:

OSA-Express for Network Control Program (NCP), channel path identifier (CHPID) type OSN, is now available for use with the OSA-Express3 GbE features as well as the OSA-Express3 1000BASE-T Ethernet feature.

OSA-Express for NCP, supporting the channel data link control (CDLC) protocol, delivers connectivity between System z operating systems and IBM Communication Controller for Linux (CCL). CCL allows you to keep your business data and applications on the mainframe operating systems while moving NCP functions to Linux on System z.

CCL delivers a foundation to help enterprises simplify their network infrastructure while supporting traditional Systems Network Architecture (SNA) functions such as SNA Network Interconnect (SNI).

Communication Controller for Linux on System z (Program Number 5724-J38) is the solution for companies that want to help improve network availability by replacing Token-Ring networks and ESCON channels with an Ethernet network and integrated LAN adapters on System z10, OSA-Express3 or OSA-Express2 GbE, or 1000BASE-T.

Open Systems Adapter for NCP is supported by z/VM V5.2 and later with no PTFs required.

Question:

Does z/VM support the IBM System Storage Enterprise 3592 Tape Controller Model C06 and 3592 Tape Drive Model E06?

Answer:

Yes. z/VM V5.2 and later, including DFSMS/VM require the PTFs for APARs VM64458 and VM64459.

z/VM V5.4 Enhancements Announced on August 5, 2008

Question:

What did IBM announce related to z/VM on August 5, 2008?

Answer:

IBM announced a new release of z/VM, Version 5 Release 4 (V5.4) with enhancements designed to extend its System z virtualization technology leadership by exploiting more capabilities of System z servers including:

- Greater flexibility, with support for the new z/VM-mode logical partitions, allowing all System z processor-types (CPs, IFLs, zIIPs, zAAPs, and ICFs) to be defined in the same z/VM LPAR for use by various guest operating systems
- Capability to install Linux on System z from the HMC that eliminates the need for any external network setup or a physical connection between an LPAR and the HMC
- Enhanced physical connectivity by exploiting all OSA-Express3 ports, helping service the network and reducing the number of required resources
- Dynamic memory upgrade support allows real memory to be added to a running z/VM system. With z/VM V5.4, memory can be added nondisruptively to individual guests that support the dynamic memory reconfiguration architecture. Systems can now be configured to reduce the need to re-IPL z/VM. Processors, channels, I/O devices, and memory can be dynamically added to both the z/VM system itself and to individual guests.
- Plus additional new functional enhancements for networking, security, systems management, and virtualization technology.

For more information on z/VM 5.4, see Software Announcement 208-249 (US) dated August 5, 2008 or **ibm.com**/vm

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Question:

What is the purpose of z/VM-mode partition support?

Answer:

This support provides increased flexibility. The IBM System z10 introduced z/VM-mode logical partitions (LPARs), which allow multiple types of System z processors to be defined in the same z/VM LPAR, including:

- Central Processors (CPs)
- Integrated Facility for Linux Processors (IFLs)
- IBM System z10 Integrated Information Processors (zIIPs)
- IBM System z10 Application Assist Processors (zAAPs)
- Internal Coupling Facility Processors (ICFs)

z/VM V5.4 expands its guest support for specialty processors to allow these processor types to be defined as virtual CPUs. This new capability increases flexibility and simplifies systems management by allowing a single z/VM V5.4 system to:

- Operate z/TPF, z/VSE, and z/OS guests on CPs
- Operate Linux on System z as guests on IFLs and optionally on CPs
- Offload z/OS system software process requirements, such as DB2® workloads, on zIIPs
- Provide an economical Java™ execution environment under z/OS on zAAPs
- Operate coupling facility virtual machines in support of a Parallel Sysplex® test environment on ICFs and optionally on CPs

This support is exclusive to z/VM V5.4, and later, and the IBM System z10 and satisfies the statement of direction made in Hardware Announcement 108-154, (US) dated February 26, 2008.

Question:

How does the dynamic virtual processor management or share redistribution function work?

Answer:

z/VM V5.4 removes one of the consequences of stopped virtual processors for virtual processor prioritization. Prior to z/VM V5.4, a guest's CPU share was distributed equally among its virtual processors by dividing its share value by the number of non-dedicated virtual processors in the configuration, regardless of whether the virtual processors were in a stopped or started state. z/VM V5.4 performs share redistribution whenever a virtual processor is started or stopped and no longer includes stopped virtual processors in the calculation of how much share to distribute to each virtual processor. The share redistribution also continues to occur in z/VM V5.4, as in previous releases, at the time a SET SHARE command is issued or when the number of defined virtual processors is altered.

Linux on System z provides a daemon (cpuplugd) that automatically starts and stops virtual processors based on virtual processor utilization and workload characteristics, exploiting z/VM V5.4 dynamic virtual processor management. The cpuplugd daemon is available with SUSE Linux Enterprise Server (SLES) 10 SP2.

IBM is working with its Linux distributor partners to provide this function in other Linux on System z distributions.

Question:

What other changes can help me when running Linux as a guest of z/VM?

Answer:

z/VM V5.4 provides the capability to dump Linux on System z guests to FCP-attached Small Computer System Interface (SCSI) disks. Compared to other methods like VMDUMP or dump to ECKD disks, this new capability may provide the following advantages:

- More guest virtual memory can be dumped because SCSI disks can be larger than ECKD disks.
- Dumping on SCSI disks avoids the need to convert a VMDUMP into a Linux tool format.
- The same SCSI dump mechanism now can be used when running Linux in a logical partition and in a z/VM virtual machine.

This new function works cooperatively with the SCSI Linux system dumper and can be used to generate system dumps that can be viewed by the Linux dump analysis tools **crash** or **lcrash**.

Question:

What additional enhancements have been provided for scalability and constraint relief in V5.4?

Answer:

- **Virtual memory performance enhancements**
  Moving specific CP data structures above the first 2 GB of main storage reduces contiguous-frame allocation searches for requests in the first 2 GB. This may help improve performance and scalability for systems with more than 2 GB of storage, particularly for large virtual storage environments.

- **Expanded shared memory addressability**
  The constraint has been removed that restricted a Discontiguous Saved Segment (DCSS) to being defined below 2047 MB of virtual storage. DCSSs can now reside anywhere within the first 512 GB of guest storage. While any one segment still cannot exceed 2047 MB in size, a guest system may use multiple DCSSs to access shared memory greater than 2047 MB in total. For example, this helps to allow many DCSSs to be used together to provide larger sizes needed for Linux filesystems and block devices.
- **Dynamic memory upgrade**
  System z servers provide a dynamic reconfiguration capability to change the amount of main storage available for use in a logical partition (LPAR) while the partition is active. The configuration of storage for an LPAR includes an initial amount of main storage, plus an additional reserved amount, defined in fixed-size increments. The reserved storage can be assigned and accessed when the operating system in the LPAR decides to use it, using the dynamic storage-reconfiguration function.
- The new z/VM dynamic memory-upgrade capability exploits this system architecture for its own use and also virtualizes it for guest use.
  Storage can be added to a z/VM configuration when:
  – Another LPAR is deactivated
  – Storage exists that is not currently assigned to any active LPAR
  – Another LPAR releases storage
  – Additional main storage is installed

z/VM can increase the size of its main storage dynamically by bringing online designated amounts of standby storage. In addition, z/VM guests that support dynamic storage reconfiguration can increase and decrease their amounts of main storage dynamically.

z/VM does not support the release of real storage. Once storage has been added to a running z/VM configuration, it cannot be removed without a z/VM system shutdown, LPAR deactivation and reactivation, and z/VM system IPL.

Further enhancements to z/VM storage management allow better cooperation with Linux on System z guests exploiting DSR. z/VM support:

- Allows operation when running second level on z/VM to be more compatible with operation when running directly on an LPAR
- Displays configured, standby, and reserved values for each virtual storage element via the QUERY VIRTUAL STORAGE command
- Improves z/VM handling of unexpected DSR conditions that may occur

Question:
What networking enhancements are available with V5.4?

Answer:
- **More efficient transmission of network data**
  TCP/IP for z/VM V5.4 dynamically discovers the Maximum Transmission Unit (MTU) size of a given IPv4 or IPv6 Internet/intranet path. This helps to reduce fragmentation along the path, thus minimizing wasted network resources and helping to improve throughput by sending datagrams at the path MTU size. This function is automatically enabled for all IPv6 links and optionally can be enabled for IPv4 links.
- **Enhanced physical connectivity by exploiting all OSA-Express3 ports**
  z/VM V5.4 recognizes all four ports on an OSA-Express3 Gigabit Ethernet (GbE) and 1000BASE-T Ethernet features. There are two PCI Express (PCI-E) adapters per feature, with two ports per adapter, for a total of four ports per feature. This capability was announced in

Hardware Announcement 108-296, (US) dated May 6, 2008. z/VM V5.4 also recognizes two ports on an OSA-Express3 2P GbE SX and 1000BASE-T 2P Ethernet features n the z10 BC. These features also have two ports per adapter. The OSA-Express3 2P features were announced in Hardware Announcement 108-754, (US) dated October 21, 2008.

Activating all four ports on OSA-Express3 or two ports on the OSA-Express3 2P features provide more physical connectivity to service the network and reduces the number of required resources (I/O slots, I/O cages, and fewer CHPIDs to define and manage). With double the port density, reduced latency, and improved throughput, OSA-Express3 GbE is designed to satisfy the demands of bandwidth-hungry applications.

Four-port and two-port exploitation is supported by z/VM V5.4 and with the PTFs for APARs VM64277 and PK50120 for z/VM V5.2 and V5.3. These PTFs were made available in July 2008. If the PTFs are not applied, only two of the four ports on the four-port feature and only one of the two ports on the two-port feature will be "visible" to z/VM V5.2 and V5.3.

- **Enhanced connectivity with TCP/IP Layer 2 support**
  The Queued Direct Input/Output (QDIO) device driver of the TCP/IP stack can now operate in Layer 2 (of the Open Systems Interface (OSI) reference model) mode. The stack now deploys its own unique locally defined Media Access Control (MAC) addresses instead of sharing the OSA MAC address. It sends and receives Ethernet frames when transferring data through the OSA feature. Layer 2 support can be employed with an OSA-Express, OSA-Express2, or OSA-Express3 feature when configured in Queued Direct I/O (QDIO) mode (CHPID type OSD).

  This support allows connecting a z/VM TCP/IP stack to an IPv4 or IPv6 Layer 2 Virtual Switch (VSWITCH). You can also connect a z/VM TCP/IP stack to a Layer 2 guest LAN or connect a z/VM TCP/IP stack (via a real OSA-Express) to a physical LAN segment in Layer 2 mode. A z/VM TCP/IP stack connected to a VSWITCH operating in Layer 2 mode is now supported in Link Aggregation configurations. VSWITCH Link Aggregation is designed to provide both increased bandwidth and more continuous network connectivity.

  By default, TCP/IP now automatically restarts OSD and HiperSockets devices without requiring operator, network, or system-programmer intervention. This can help provide faster recovery of connectivity in the system.

- **Enhanced ease of use in network management**
  The usability of managing virtual networks, including the z/VM virtual switch, has been enhanced. Specifically,
  - The QUERY LAN command has a new USERID option that provides a subset of the output of the QUERY LAN DETAILS command for the specified user.
  - The QUERY VSWITCH command has two new options, USERID and RDEV, which display a subset of the output of the QUERY VSWITCH DETAILS command for the specified user or device.
  - The QUERY VSWITCH command response includes the status of the VLAN_COUNTERS option in force for the specified VLAN-aware VSWITCH.
  - Detailed transmission counters can be turned on for a VLAN-aware VSWITCH with the SET VSWITCH command and the MODIFY VSWITCH configuration statement.
  In addition, a new SNMPTRAP utility can be used to generate SNMP TRAP messages, providing unsolicited data messages that are sent by an SNMP agent to its SNMP managing system. These messages are usually used to inform the managing station about a special condition that has occurred either in an agent system or in the network.

- **TELNET server and client IPv6 support**
  The TCP/IP stack in z/VM V5.4 provides an IPv6-capable TELNET server and client. Because TELNET is written in Pascal, IPv6-capable Pascal APIs are also provided.

Question:

Have there been any enhancements for security in V5.4?

Answer:

Yes. The following changes have been made:

- **Enhanced z/VM SSL server now CMS-based**
  Instead of having an SSL server that requires a Linux distribution, a CMS-based SSL server may enable encryption services to be deployed more quickly and can help make installation, service, and release-to-release migration simpler. Other enhancements to the z/VM V5.4 SSL server include:
  – Network-free SSL server administration
    The SSL server can be managed without requiring a network connection between the SSL server administrator and the SSL server.
  – New encryption and decryption engine
    The SSL server uses z/OS V1.10 System SSL technology for encryption, decryption, and certificate management.
  – New certificate-management services
    The System SSL GSKKYMAN utility is now used to manage the SSL server certificate database. New services available for the SSL server include certificate renewal, certificate signing, and certificate export with or without the private key. The GSKKYMAN application also manages certificates for the z/VM LDAP server.

- **LDAP upgrade and RACF password change logging**
  In order to help maintain cross-platform consistency, the z/VM LDAP server introduced in z/VM V5.3 has been upgraded to the function level of the z/OS V1.10 IBM Tivoli Directory Server for z/OS. The z/VM RACF Security Server feature has been enhanced to create LDAP change log entries in response to updates to RACF group and user profiles, including changes to user passwords and password phrases. This update enables password changes made on z/VM to be more securely propagated to other systems, including z/OS, using applications such as the IBM Tivoli Directory Integrator

- **QDIO data connection isolation**
  With the PTFs for APARs VM64463 and PK67610, z/VM V5.3 and V5.4 support port isolation security that provides the ability to restrict guest-to-guest communications within a z/VM Virtual Switch (VSWITCH). In addition, by using the System z OSA-Express Queued Direct Input/Output (QDIO) data connection isolation feature, an isolated VSWITCH will be unable to communicate directly with other partitions sharing the OSA port. The QDIO data connection isolation function is designed to adhere to security guidelines, such as the Health Insurance Portability and Accountability Act (HIPAA), by providing the ability to isolate QDIO data connection communications on a shared OSA port in support of multi-tier security zones.

Question:

Has z/VM V5.4 been certified for Common Criteria Certification?

Answer:

No. IBM received certification on July 28, 2008 from the German Federal Office of Information Security (Bundesamt für Sicherheit in der Informationstechnik, (BSI) for 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, augmented by flaw remediation procedures (EAL4+). This satisfies the statement of direction made in Software Announcement 207-019, (US) dated February 6, 2007.

z/VM V5.4 has not been evaluated for conformance, but is designed to meet the same standards.

Question:

How do I get the certified level of z/VM V5.3?

Answer:

This certified level of z/VM 5.3 is available as a no-charge offering from IBM Resource Link™ at: http://www.**ibm.com/**servers/resourcelink

If you are not registered with Resource Link, you will be required to register for a user ID and password. You must also be licensed for z/VM V5.3 or V5.4, or have a previous release of z/VM V4 or V5 with a current S&S for that release to be entitled to the certified level. After your entitlement is verified, you will receive the z/VM V5.3 3390 DDR SDO on a 3590 tape and the z/VM V5.3 RSU 2 on a 3590 tape.

You will also need to request the required PTFs for APARs VM64310 and VM64365.

Question:

Have there been any enhancements made to the systems management API?

Answer:

Yes. The multitasking-capable sockets-based servers have been updated to communicate among themselves via shared queues. This helps to improve the speed of request processing, enhance error recovery, and increase the scalability of the Systems Management API. Communication with the HMC has also been improved.

In addition to the updated servers, enhancements provided in z/VM V5.4 include:

- New APIs to:
  - Grant users access to a virtual network LAN, and to determine which users have been authorized
  - Add, delete, and query virtual processors in an active virtual image's configuration or directory
  - Manage profile directory entries
  - Accept and validate password phrases
  - Query the level of the Systems Management API to determine what functions are available
  - Allow a sort ordinal to be defined for local tags in directory entries
- Enhancements to existing functions:
  - Allow creation and deletion of virtual network LANs to be either persistent or temporary
  - Increase the length of a virtual image's local tag to 1024 characters

In z/VM V5.3, the sockets-based server replaced the Remote Procedure Call (RPC) server and CSL routines that were used to call the Virtual Systems Management API in previous releases of z/VM. The RPC server is still available in z/VM V5.3 and V5.4, with all of the functions that were available in z/VM V5.2. However, the enhancements provided in z/VM V5.3 and V5.4 are not available through the RPC server, for which no further enhancements are planned. Documentation on the use of the API with the RPC server and CSL routines was not updated and is not included in the V5.3 or V5.4 bookshelf.

As stated previously in Software Announcement 207-019, (US) dated February 6, 2007, IBM intends to remove the RPC server from a future z/VM release. With z/VM V6.1, IBM has withdrawn support for the RPC-based systems management APIs. This satisfies the statement of direction. The sockets-based systems management APIs continue to be supported.

Question:

Are there any changes to the Directory Maintenance Facility (DirMaint) in V5.4?

Answer:

Yes. DirMaint has been upgraded to a new function level (FL540) in z/VM V5.4. This new function level of DirMaint includes support for:

- End-user authentication using the end-user's password phrase, if one is defined in an external security manager (ESM)
- An end-user to use DirMaint to set a password phrase in the ESM
- Simplified DirMaint configuration, to enable the coordinated user and resource management in the RACF Security Server

Question:

What changes have been made to the Performance Toolkit for VM?

Answer:

The Performance Toolkit for VM feature has been upgraded to a new function level (FL540) for z/VM V5.4 and has been enhanced to:

- Display an optional "Banner" page that can be customized and is presented prior to displaying the Performance Toolkit logon page that provides access to the Web interface
- Provide updated displays and reports to support new monitor data for the dynamic memory upgrade enhancement
- Enable the SYSTEM (FCX102) and PRIVOPS (FCX104) reports to be generated using monitor data, allowing them to be produced in BATCH and MONSCAN modes

Question:

Can I use the Hardware Management Console for installation?

Answer:

Yes. Using z/VM V5.4 and the Hardware Management Console (HMC) 2.10.0, and later in conjunction with the Support Element (SE) 2.10.0, and later on the IBM System z10, z/VM can be installed in an LPAR and both z/VM and Linux on System z can be installed in a virtual machine from the HMC DVD drive. This can eliminate requiring any external network setup and a physical connection between an LPAR and the HMC, instead using the existing communication path between the HMC and the SE and thus may make configuration easier and more secure because the HMC does not have to reside on the intranet.

This support is exclusive to z/VM V5.4, and later, and the IBM System z10.

Question:

Are there any performance considerations when installing Linux from the HMC?

Answer:

Yes. This support is intended for customers who have no alternative, such as a LAN-based server, for serving the DVD contents for Linux installations. The elapsed time for installation using the HMC DVD drive can be an order of magnitude, or more, longer than the elapsed time for LAN-based alternatives.

Question:

Have there been any other installation changes in V5.4?

Answer:

Yes. The installation process for z/VM V5.4 has been changed to provide more information to determine the installation status, including:

- Saving consoles at the end of each installation EXEC
- Copying console files from the first-level user IDs to the installed-system's minidisks

An alternative process was added that installs a second-level z/VM image by uploading the contents of the installation DVDs to minidisk, thus allowing such an installation without the use of a server. Because this process is slower than using an FTP server, it should be used only when the FTP capability is not available.

Question:

Have there been any changes to the ordering process for V5.4 since the last release of z/VM?

Answer:

Yes. The z/VM base operating system is available for Internet delivery from ShopzSeries at: **ibm.com/**software/ShopzSeries

Also, z/VM V5.4 is not available on 3480 tape medium, satisfying the Statement of General Direction made in Software Announcement 207-019, dated February 6, 2007. Simultaneous with this withdrawal, 3490 Tape Subsystems are also not supported for installation by z/VM. z/VM continues to be distributed on 3590 and 3592 tape media, on DVDs, and via Internet delivery through ShopzSeries.

Question:

What changes to the service process, if any, have been made with V5.4?

Answer:

- Effective November 5, 2008, service on 3480 and 3490E tape media for all z/VM releases is planned to be discontinued from ShopzSeries.
- Distribution of the Recommended Service Update (RSU) on CD-ROM in Optical Media Attachment/2 (OMA/2) format has been discontinued for all currently supported and future z/VM releases. SERVLINK files (virtual tape images) will continue to be delivered on the RSU CD-ROM.
- IBM is discontinuing service support for the Network Database (NDB) system, Trivial File Transfer Protocol (TFTP) server, X25 interface (including the X25IPI server), and SNALINK server and interface on z/VM V5.4. This satisfies the Statement of General Direction made in Software Announcement 207-019, (US) dated February 6, 2007.

Question:

What packaging changes have been made to the z/VM V5.4 System Delivery Option (SDO)

Answer:

With the general availability of z/VM V5.4, the following changes have been made to the z/VM V5.4 SDO:

- Removing the shipment of the SDO Enabling Aid with the product order. The Enabling Aid is available as of September 12, 2008 at: ibm.com/vm/sdo/sdozvm54.html
- Removing Host Management Facility (HMF) V1.1 (5684-157) from the V5.4 SDO. HMF was announced to be withdrawn from marketing effective September 8, 2008 in Withdrawal announcement 908-114 (US), dated June 3, 2008. Discontinuance of service for HMF is planned to be effective April 5, 2010 as announced in Withdrawal and service discontinuance announcement 909-011 (US), dated February 3, 2009. HMF is replaced by IBM Operations Manager for z/VM V1.2.0, or later (5697-J10), or later.
- Removing VisualAge® Generator Server for MVS™, VM, and VSE V1.2 (5648-B02) from the V5.4 SDO. VisualAge Generator Server for MVS, VM, and VSE V1.2 was withdrawn from marketing effective June 3, 2008 in Withdrawal Announcement 908-114, (US) dated June 3, 2008.
- Removing RSCS V3.2 (5684-096) from the V5.4 SDO. RSCS V3.2 was withdrawn from marketing effective May 26, 2008 in Withdrawal Announcement 907-245, (US) dated December 4, 2007. Discontinuance of service is planned to be effective October 30, 2009 as announced in Withdrawal and service discontinuance announcement 908-180 (US), dated August 5, 2008.

Question:

Have there been any changes to the publications with V5.4?

Answer:

Yes. The distribution of the *IBM Online Library: z/VM Collection* on CD-ROM as a no-charge deliverable has been discontinued with z/VM V5.4. The *IBM Online Library: z/VM Collection* continues to be distributed on DVD with each z/VM V5.4 order. Both the *IBM Online Library: z/VM Collection* CD-ROM and the *IBM Online Library: z/VM Collection* on DVD are available (for a fee) from the Publications Center Web site at: ibm.com/shop/publications/order/

Also, z/VM publications are now available from the z/VM V5.4 Information Center.

Question:

What is the z/VM V5.4 Information Center?

Answer:

IBM now publishes the z/VM documentation (information for the z/VM base and optional features) in an information center using the IBM Eclipse Help System framework. Publishing in an information center is in addition to z/VM product documentation published in BookManager® and Adobe PDF format and available through the z/VM Collection, the z/VM Internet Library, and the IBM Publications Center. The content of the z/VM V5.4 Information Center is identical to that in the traditional BookManager and Adobe PDF formats; however, the presentation might differ to some degree.

Advantages of information centers are:

- Content is indexed by Google and other Internet search engines to help locate information more easily.

- Custom searches can be created that include only the information you need for a particular task or job role.

The z/VM V5.4 Information Center has been available since September 12, 2008:

- On an IBM Web site at: http://publib.boulder.ibm.com/infocenter/zvm/v5r4/index.jsp
- On a DVD, which allows you to install the z/VM V5.4 Information Center on a workstation or make available on an intranet. The DVD can be ordered (for a fee) from the IBM Publications Center using form number SK5T-7098-00.

Question:

Have there been any statements of direction announced with z/VM V5.4?

Answer:

Yes. The following statements of direction were announced on August 5, 2008:

- TCP/IP functions: IBM intends to withdraw support in a future z/VM release for the Kerberos Authentication System.
- MMC (Mainframe to Micro Channel) card: IBM intends to withdraw support in a future z/VM release for the MMC card, which enabled communication between the PS/2 (PWSCS) and VM (PWSCF or ISFC).
- z/VM Flashcopy enhancements: IBM intends to enhance z/VM FlashCopy capabilities to support the FlashCopy SE function of the IBM DS8000 with the PTF for APAR VM64449 in fourth quarter, 2008. FlashCopy SE offers a space-efficient snapshot capability that reduces the storage capacity needed for point-in-time copies. This function is especially useful for short-lived testing or backups, such as flash to intermediate volume for backup to tape. This statement of direction has been satisfied with the delivery of the PTFs for APARs VM64449, VM64605, and VM64684.

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

Question:

Whom should the new z/VM V5.4 be marketed to?

Answer:

z/VM V5.4 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 V5.4 on IFL processors without necessarily increasing the IBM software charges for z/OS, TPF, z/TPF, 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, z10 BC, 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.

- Running Linux on System z images as z/VM guests allows better usage of available hardware facilities, 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 memory for 32-bit Linux systems
  - Exploitation of expanded storage across a set of Linux server images
  - Dynamic I/O configuration

z/VM Enhancements Announced on May 6, 2008

Question:

What z/VM enhancements were announced?

Answer:

In the IBM System z10 EC announcement 108- 296 (US) on May 6, 2008, IBM announced z/VM support for four-port exploitation of the OSA-Express3 GbE feature with the PTFs for APARs VM64277 and PK50120 for z/VM V5.2 and V5.3. These PTFs were made available in July, 2008. If the PTFs are not applied, only two of the four ports will be "visible" to z/VM V5.2 and V5.3.

Activating all four ports on an OSA-Express3 feature provides more physical connectivity to service the network and reduces the number of required resources (I/O slots, I/O cages, and fewer CHPIDs to define and manage). With double the port density, reduced latency, and improved throughput, OSA-Express3 GbE is designed to satisfy the demands of bandwidth-hungry applications.

z/VM 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
    - OSA/SF support requires the PTF for APAR OA23824 (V5.2, V5.3)
    - OSA/SF support requires the PTF for APAR OA26286 (V5.2, V5.3, V5.4)
- 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.
- 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 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 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 "z/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 z/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. This statement of direction has been satisfied with the availability of z/VM V5.4.

- 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. This statement of direction has been satisfied with the availability of z/VM 5.4 on September 12, 2008 and the z10 EC and z10 BC on October 28, 2008.
- 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 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 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 the 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 the z/VM 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, IBM XIV Storage System, 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. The PTF for APAR VM64525 should also be applied to z/VM 5.3 and 5.4.

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, z10 BC, 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 207-019 (US) 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, z10 BC, 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, z10 BC, 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). See the PSP bucket for current information and the PTFs for APARs VM64233 and VM64234 are required.

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**/vm

Question:

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

Answer:

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

Question:

Is z/VM V5.3 still available for ordering?

Answer:

No. z/VM V5.3 was withdrawn from marketing at the availability of z/VM V5.4 on September 8.

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 has received 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. This statement of direction has been satisfied with certification on July 28, 2008.
- 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. This statement of direction has been satisfied with the availability z/VM V5.4.
- 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. This statement of direction has been satisfied with the availability z/VM V5.4.

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

Question:

What improvements did 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 memory[1] 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**/vm

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:
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 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.
- 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
- 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, z10 BC, System z9 (z9 EC and z9 BC) servers. zAAPs can be simulated only on z10 EC, z10 BC, 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, z10 BC, z9 EC, and z9 BC customer?

Answer:

z/VM V5.3 adds support for the Collaborative Memory Management Assist (CMMA) on the z10 EC, z10 BC, 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, z10 BC, 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, 2098DEVICE, 2094DEVICE, and 2096DEVICE Preventive Planning (PSP) buckets prior to installing a z10 EC, z10 BC, 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, z10 BC, 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.

With the PTF for APAR VM64656 for z/VM V5.3 and later, targeted for November, 2009, z/VM plans to support for Crypto Express4 by providing:

- The ability to dedicate any available domain to a guest for clear-key and secure-key cryptographic functions
- The ability for guests to share available, non-dedicated domains for clear-key cryptographic functions
- Enhancements to the CP QUERY CRYPTO APQS command to display user information about both shared and dedicated cryptographic domains. Prior to this enhancement, the command displayed user information for only dedicated domains.

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, z10 BC, z9 EC, z9 BC, z890 and z990 servers by providing the capability to dynamically define 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 (US), 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, which 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 send 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 RSCS V3.2.0 was withdrawn from marketing of RSCS 3.2 on May 26, 2008 as announced in the Withdrawal Announcement letter 907-245 (US), dated December 4, 2007. Discontinuance of service support is effective October 30, 2009.

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:

- **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.
- **HMC and SE 2.10.1 for the z10 EC and z10 BC servers** – Exploit the z/VM Systems Management APIs for z/VM V5.4 and V6.1 to allow selected virtual resources to be defined and managed
- **IBM Systems Director** – Delivers a simplified platform management solution that streamlines the way physical and virtual systems are managed across a multisystem environment. Leveraging industry standards, IBM Systems Director supports multiple operating systems and virtualization technologies across IBM and non-IBM platforms. Through an easy-to-use, point-and-click, single user interface, IBM Systems Director provides consistent views for visualizing managed systems and determining how these systems relate to one another while identifying their individual status, thus helping to correlate technical resources with business needs. An additional agent is provided for z/VM to communicate with SMAPI. The agent allows IBM Systems Director server to obtain information about the guest virtual machines running within the z/VM system and resources associated with the servers. This agent runs in a Linux on System z guest on z/VM.
- **IBM Systems Director VMControl Image Manager for Linux on System z** – IBM Systems Director VMControl Image Manager for Linux on System z, V2.1 is designed to simplify the management of virtual environments across multiple virtualization technologies and physical platforms to support the growing requirements of a dynamic infrastructure. IBM Systems Director VMControl Image Manager V2.1 is a plug-in to IBM Systems Director V6.1, providing support to manage and automate the deployment of virtual appliances (images) from a centralized location. For additional information on IBM Systems Director VMControl Image Manager for Linux on System z refer to IBM Software Announcement 209-095 (US), dated July 21, 2009.
- **HCM/HCD** – The HCM and HCD components 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.

- **Tivoli OMEGAMON XE on z/VM and Linux** – Provides a wide range of information about the z/VM and Linux on System z operating systems, including information about your Linux instances running as z/VM guests and the Linux workloads, revealing how they are performing and affecting z/VM and each other.
- **Virtual Machine Resource Manager (VMRM)** – The Virtual Machine Resource Manager is a service that dynamically tunes the z/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.
- **Gigabit Ethernet OSA-Express2 and OSA-Express3** – Offer high-speed TCP/IP connections through Gigabit Ethernet (GbE) and 10 GbE (OSA-Express2 and OSA-Express3) adapters. 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-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 z/VM system directory.

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 is the support for Linux on System z guests using DSR?

Answer:

Further enhancements to z/VM storage management allow better cooperation with Linux on System z guests exploiting DSR. z/VM support is available for V5.3 and V5.4 with the PTF for APAR VM64495:

- Allows operation when running second level on z/VM to be more compatible with operation when running directly on an LPAR
- Displays configured, standby, and reserved values for each virtual storage element via the QUERY VIRTUAL STORAGE command
- Improves z/VM handling of unexpected DSR conditions that may occur

Question:

What 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 enables Linux guest virtual machines to exploit the IBM Crypto Express2 and Crypto Express3. 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 and z10 BC servers.

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 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® and Linux workloads deployed on multiple servers onto a single physical System z 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 the z/VM V5.3 SSL server 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 a dynamic infrastructure?

Answer:

A dynamic infrastructure will allows for improved service, reduced costs, and reduced risk.

These aspects are very well supported by the IBM System z virtual Linux server environments:

- Improved service is not only provided by the high availability of the environment. Major elements are likewise the high flexibility, the dynamic access to resources and services, and the very fast provisioning.
- Cost reduction can be achieved through the outstanding virtualization capabilities, allowing for higher resource utilization, less energy consumption, and less management effort.
- Risk reduction can be provided through the manifold security and resiliency features, that address today's and new risks that may come with a more connected and collaborative world.

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 IBM Business Partner and/or 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 z10 EC, z10 BC, z9 EC, z9 BC, z990, and z890 servers. 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:

Yes. The IBM System z10 server introduced z/VM-mode logical partitions (LPARs), which allow multiple types of System z processors to be defined in the same z/VM LPAR, including:

- Central Processors (CPs)
- Integrated Facility for Linux Processors (IFLs)
- IBM System z10 Integrated Information Processors (zIIPs)
- IBM System z10 Application Assist Processors (zAAPs)
- Internal Coupling Facility Processors (ICFs)

z/VM V5.4, and later, exploits this capability by expanding its guest support for specialty processors to allow these processor types to be defined as virtual CPUs. This new capability increases flexibility and simplifies systems management by allowing a single z/VM V5.4 system to:

- Operate z/TPF, z/VSE, and z/OS guests on CPs
- Operate Linux on System z as guests on IFLs and optionally on CPs
- Offload z/OS system software process requirements, such as DB2 workloads, on zIIPs
- Provide an economical Java execution environment under z/OS on zAAPs
- Operate coupling facility virtual machines in support of a Parallel Sysplex test environment on ICFs and optionally on CPs

This support is exclusive to z/VM V5.4, and later, and the IBM System z10 and satisfies the statement of direction made in Hardware Announcement 108-154, (US) dated February 26, 2008.

Question:

Can I install z/VM from a CD?

Answer:

No. Beginning with V5.2, z/VM is no longer shipped on CDs. z/VM V4.4 and later releases are distributed on 3480 and 3590 tape media. z/VM V5.1 began distribution on DVDs and z/VM V5.3 and later are now available on 3592 distribution medium. V5.4 discontinued distribution of z/VM on 3480 tapes media.

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. The RACF Security Server feature in z/VM V5.4 is designed to operate with z/VM V5.4.

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 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

Question:

Can I license HLASM on IFL processors?

Answer:

No. The High Level Assembler is available for use with Linux on System z on IFL processors as a Programming Request for Price Quote (PRPQ). A PRPQ must be submitted to purchase the High Level Assembler for Linux on System z (5799-TCQ) and for its annual Subscription & Support (5799-TCR).

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 z/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. You can also refer to the z/VM Performance Reports on the z/VM Web site at:
http://www.**ibm.com**/vm/perf/docs/

Question:

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

Answer:

Our experience with server consolidations show that the number of servers depends on the types of the workload, the technology level of consolidated servers, the utilization factor, and other implementation requirements. Therefore the answer varies by client and workloads.

IBM has a great experience with consolidation projects and customers can get sizings done through their IBM representative or an IBM Business Partner. Both channels have access to SIZE390 which is used for this purpose. More detailed performance information is available at: **ibm.com**/vm/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/systems/z/solutions/isv/linuxproduct.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 z/VM environment?

Answer:

You can visit z/VM and Linux on System z resources at:
ibm.com/vm/linux

or the Linux on System z Web page at:
ibm.com/systems/z/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/os/linux/support_resources.html

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. Enterprise aggregation is only available within the same country.

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:

- Your entitlement is for only the quantity of engine-based Value Units licensed. These engine-based Value Units can be for either standard or IFL processors.
- z/VM may run on IFL processors only if, on the IFL processors, z/VM is being used exclusively to run (1) Linux or OpenSolaris workloads and, (2) if required, z/VM applications in support of those Linux or OpenSolaris workloads.
- When ordering z/VM V5.4 to operate on any of the standard processors (CPs), Licensee must specify Value Units equal to the Value Units to cover the number of standard processors (CPs) on Licensee's z10 EC, z10 BC, z9 EC, z9 BC, z990, z890, z900, and 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 V5.4 to operate on IFL processors, Licensee must specify Value Units equal to the Value Units to cover the number of IFL processors on Licensee 's z10 EC, z10 BC, z9 EC, z9 BC, z990, z890, z900, 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.
- If Licensee is running z/VM V5.4 on a System z10 server in an LPAR specified as "z/VM-mode" that is configured with both IFL processors and standard processors (CPs) and Licensee intends to run software licensed under the IBM Customer Agreement (ICA) in a virtual machine in that LPAR, that virtual machine must be configured to execute only on standard processors (CPs).
- 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 were the memory pricing actions or announcements made as part of the July 21, 2009 System z10 announcement?

Answer:

IBM announced a 62% reduction in memory prices for all new workloads running on System z10 servers when purchased with a new System z10 IFL, zIIP or zAAP. The price of $2250 / GB USD. There is a 16 GB limit per engine. The above prices are stated in US currency and may vary in other countries. New workloads defined consistent with zNALC terms and conditions and also include all Linux workloads. Limited to 16 GB per qualifying processor.

Question:

What were the IFL pricing actions or announcements made for the z10 EC as part of the July 21, 2009 System z10 EC announcement?

Answer:

On July 21, 2009, IBM announced a pricing action on z10 EC IFLs, to $75,000 USD per engine. The price per IFL on the System z9 is still $125,000 USD per engine. On a price performance basis this represents a 60% total price performance improvement from System z9 to System z10 EC for IFLs.

Question:

What IFL and memory pricing was previously announced for the z10 BC?

Answer:

On October 21, 2008, IBM made the following pricing announcements related to the z10 BC:

- 50% price reduction on IFL, IBM System z Application Assist Processors (zAAP) and IBM System z Integrated Information Processors (zIIP) Specialty Engines for System z10 BC, now $47,500. Prices are stated in USD currency for the US and may vary by country.
- 62% price reduction on memory for System z10 BC or z10 EC when purchased after October 21, 2008 and with an IFL, zAAP or zIIP Specialty Engine for new workloads, now $2,250 per GB, limited to 16 GB per Specialty Engine. (Note: prices in USD and may vary by country)

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 offers 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 and later)
- 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 to another party, in connection with Your transfer of the machine on which You are entitled to operate z/VM V5.2 (referred to as a "Limited Transfer"), provided that any such Limited Transfer of z/VM V5.2 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. When the machine and z/VM V5.2 are transferred, You must either provide a printed copy of the Agreement or, if electronic licensing is used for z/VM V5.2, 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."

These terms and conditions are also applicable to z/VM V5.3, V5.4, and V6.

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 and later, RSCS is offered as an 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 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 z/VSE software?

Answer:

Yes, in some cases. Specifically on a z10 EC, z10 BC, z9 EC, z990, and z900 Model Group 80 or below AND where z/VSE is licensed using Graduated Monthly License Charge (GMLC). If z/VM Version 5 runs only on one or more IFL processors, 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 and products 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, and later:

- C/370™ 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:

Does 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 a 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:

For ordering z/VM V5.4, please refer to Software Announcement 208-249 (US) dated August 5, 2008. 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 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.

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:

Is V5.1, V5.2, or V5.3 available for ordering?

Answer:

No, V5.1 and V5.2 were withdrawn from marketing effective June 15, 2007. V5.3 was withdrawn from marketing effective September 8, 2008.

Question:

Has the ordering process for z/VM V5 changed?

Answer:

No. z/VM V5.4 can only be ordered using the System Delivery Offering (SDO) which includes a single deliverable containing z/VM V5.4 and a group of fully-serviced IBM Licensed Program Products. The z/VM SDO package contains:

- z/VM V5.4 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 are provided by the z/VM SDO?

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 V5.4 customer.

For additional information on the z/VM Version 5.4 SDO, refer to the z/VM SDO Web site at: **ibm.com**/vm/sdo/.

Question:

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

Answer:

No. DFSMS/VM, previously provided automatically with z/VM V4, is not automatically shipped. It is orderable as a no-charge feature with z/VM V5 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 SDO?

Answer:

No. However, IBM continues to evaluate additional products for inclusion into the z/VM V5 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.

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.

On September 12, 2008, the IBM XL C/C++ for VM compiler was added to the z/VM V5.4 SDO. Refer to Software Announcement 208-245 (US), dated August 5, 2008.

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 support 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:

Have there been any changes for IBM Business Partners to remarket S&S?

Answer:

Yes. Effective with the z/VM V6.1 availability on October 23, 2009, IBM Business Partners can now remarket the z/VM V5.4 and V6.1 S&S (5741-SNS) for up to 3 years if ordered at the same time as the associated IPLA license that is remarketed by that partner. Prior to this announcement, S&S could only be remarketed for 1 year and only by IBM Business Partners in EMEA. This is also applicable to the priced, optional features of z/VM V5.4 and V6.1.

Question:

Have there been any changes for IBM Business Partners to remarket S&S for any other IPLA products associated with z/VM?

Answer:

Yes, Effective October 23, 2009, IBM Business Partners in all geographies will now have the option to remarket the associated S&S for the products listed in the following table for up to 3 years if ordered at the same time as the associated IPLA license that is remarketed by that partner. Previous to this announcement, S&S for these products could only be remarketed for 1 year and only by IBM Business Partners in EMEA.

Program Name	Program Number	S&S Program Number
IBM Tivoli OMEGAMON XE on z/VM and Linux, V4.1	5698-A36	5608-S73
IBM Tivoli zSecure Manager for RACF z/VM	5655-T13	5655-T14
IBM Tape Manager for z/VM	5697-J08	5697-J11
IBM Archive Manager for z/VM	5697-J05	5697-J12
IBM Backup and Restore Manager for z/VM	5697-J06	5697-J13
IBM Operations Manager for z/VM	5697-J10	5697-J15

Question:

Where can I find more details on this announcement?

Answer:

Refer to the IBM Business Partner attachment of the IBM Software Announcement for z/VM V6.1 209-401 (US), dated October 20, 2009.

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 conference featuring z/OS, z/VM, z/VSE and Linux on System z are being planned for 2010:

- IBM System z Technical Conference featuring z/OS, z/VM, z/VSE and Linux on System z – April/May 2010 timeframe in Europe
- IBM System z Expo featuring z/OS, z/VM, z/VSE and Linux on System z – October 4 - 8, 2010 in Boston, Massachusetts

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/vm/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/vm/zvm520
- z/VM V5.3 resources: ibm.com/vm/zvm530
- z/VM V5.4 resources: ibm.com/vm/zvm540

VM education:

ibm.com/vm/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 in the IBM V5.4 Information Center, on the IBM Online Library: z/VM Collection on DVD (supplied with z/VM V5,4 at no additional charge) and on the IBM z/VM Web site at:
  ibm.com/vm/pubs
  or from the Publication Center at:
  ibm.com/shop/publications/order

FAQs:

- System z and z/VM
  ibm.com/systems/z/resources/faq/index.html

Programs and Products for z/VM:

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

Programs and products for Linux:

- Linux program requirements:
  ibm.com/systems/z/os/linux/dist.html

- Independent Software Developer Products for Linux on System z:
  ibm.com/systems/z/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 URL: **ibm.com**/redbooks/

Linux Distributions:

- Novell SUSE Linux:
  novell.com/linux/
- Red Hat:
  redhat.com

IBM Global Services Solutions:

- IGS Linux Solutions:
  ibm.com/services/

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