Overview

IBM continues the evolution of its premier and world-class zSeries® virtualization technology by announcing additional enhancements for z/VM® Version 5 Release 1 (V5.1), planned to be delivered through the service stream. These enhancements support the IBM @server zSeries 890 (z890) and the zSeries 990 (z990) announced October 7, 2004, to help create an infrastructure for on demand business environments.

You may benefit from the lower entry price and the new engine-based Value Unit pricing announced for z/VM V5.1, which replaces the per-engine pricing model applicable to z/VM V4. Engine-based Value Unit pricing is designed to provide a decreasing price curve as hardware capacities and workload grow, which may help improve price/performance.

z/VM V5.1 extends the strength of the zSeries environment as an ideal platform for consolidating select UNIX®, Windows™, and Linux™ workloads on a single physical zSeries server. This can allow you to run tens to hundreds of Linux servers with the potential to support new workloads, achieve productivity gains, and lower IT costs. z/VM supports Linux on the mainframe and can enable Linux servers to share hardware resources and use internal high-speed communication within the zSeries environment.

The Performance Toolkit for VM plans to support the monitor records created by the SUSE LINUX 2.6 kernel. This support is planned to be available on December 3, 2004.

Put the power of zSeries server partitioning and z/VM virtualization technology to work for you to help realize the benefits of workload isolation and resource sharing, including the:

- Reliability, availability, and serviceability of IBM zSeries servers
- Flexibility to logically partition zSeries processors to support up to 30 logical partitions (LPARs)
- Ability to use z/VM to further partition each LPAR into many virtual servers
- Virtualization of processor, communication, memory, storage, I/O, and networking resources
- Ability to significantly enhance the utilization of system resources
- Dynamic allocation of resources
- Performance of high-speed communications among LPARs and guests with HiperSockets
- Availability of advanced systems management, administration, and accounting tools

For the current information on z/VM, refer to the z/VM Web site at http://www.ibm.com/eserver/zseries/zvm/

Planned availability dates

December 3, 2004
- Virtual switch exploitation of Layer 2 support on OSA-Express on the z990 and z890
- Performance Toolkit for VM enhancements to support monitor records created by the SUSE LINUX 2.6 kernel

January 28, 2005
- z990 and z890 support for:
  - Crypto Express2
  - OSA-Express2
  - Additional device connections for TCP/IP for z/VM
  - TCP/IP stack utilization improvements for OSA-Express
  - Virtual switch exploitation of Layer 2 support on OSA-Express2

Note: FCP LUN access control by z/VM with Linux on zSeries guests will be supported at the availability of this function on the z990 and z890.

At a glance

z/VM V5.1 includes:
- Engine-based Value Unit pricing and a reduced entry price
- Support for the IBM @server zSeries 990 (z990) and 890 (z890) enhancements, including:
  - Improved security with guest support for Crypto Express2, replacing the PCICA and PCIXCC features
  - Improved bandwidth with support for OSA-Express2 GbE and 10 GbE
  - More flexible and efficient data transfer with support for OSA-Express Layer 2
  - An increase in the number of device connections for TCP/IP for z/VM to enable more virtual machines to be connected to an external network
  - Additional security for SCSI devices in a Linux on VM environment with support for FCP LUN access control when available on the z990 and z890
- New interactive source-level debugging tool for compiled applications

Key prerequisites

Refer to the Hardware requirements and Software requirements sections for details.

For ordering, contact:
Your IBM representative, an IBM Business Partner, or the Americas Call Centers at 800-IBM-CALL
Reference: LE001

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New pricing model for z/VM V5.1

Engine-based Value Unit pricing for z/VM V5 replaces the per-engine pricing model that is available with z/VM V4. Engine-based Value Unit pricing is designed to provide a decreasing price curve as hardware capacities and workload grow, which may help improve price/performance. Value Unit pricing can enable you to:

- Add capacity and workload with an incremental and improved price
- Manage software costs better
- Aggregate licenses acquired across machines that are part of your enterprise

Technology exploitation

z/VM V5.1 plans to support the enhancements to the IBM zSeries 890 (z890) and 990 (z990). For complete information on this announcement and the new features supported by z/VM, refer to Hardware Announcement 104-246, dated October 7, 2004. z/VM V5.1 plans to support the following functions of the z890 and z990:

Crypto Express2: z/VM V5.1 provides z/OS® and Linux for zSeries guest support for the PCIX Cryptographic Coprocessor (PCIXCC) feature made available for the z990 in September 2003 and for the z890 in May 2004. z/VM support 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 zSeries guests, with up to 256 dedicated queues

Starting in January 28, 2005, IBM plans to deliver support for the third-generation cryptographic feature, Crypto Express2, which replaces the PCICA and PCIXCC features. Crypto Express2 combines the functions of both PCICA and PCIXCC in one feature, providing improved secure-key operations. Coincident with the availability of this new cryptographic hardware feature, z/VM V5.1 intends to provide z/OS and Linux for zSeries guest support for Crypto Express2 as described above for the PCIXCC feature in January 28, 2005. Refer to the 2084/2086 PSP buckets to identify any required service for support of these features.

OSA-Express2: On January 28, 2005, IBM plans to introduce a new generation of the OSA-Express Gigabit Ethernet feature, as well as a 10-Gigabit Ethernet feature. This technology update, referred to as OSA-Express2, helps to provide a balanced system with sufficient throughput to satisfy the bandwidth demands of your applications. The OSA-Express2 Gigabit Ethernet (GbE) and 10 Gigabit Ethernet (10 GbE) features support Queued Direct Input/Output (QDIO). z/VM plans to exploit these new hardware features in V3.1 and later supported versions on January 28, 2005. Refer to the 2084/2086 PSP buckets to identify any required service for support of these features.

Small Computer System Interface (SCSI) Fibre Channel Protocol (FCP) disk usage: z/VM V5.1 supports SCSI FCP disk logical units (SCSI disks) for both system and guest use, as previously announced on April 7, 2004. SCSI disks supported are those within an IBM Enterprise Storage Subsystem (ESS) when it is connected to a Fibre-Channel fabric via zSeries FCP channels.

VM’s 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. This allows installation of z/VM from DVD to a SCSI disk, IPL from a SCSI disk using the z/VM Stand-Alone Program Loader (SAPL), dumping the VM system to a SCSI disk, as well as normal operation of z/VM and its guests.

The z/VM SCSI support for disks is based on emulation of the IBM FB-512 disk architecture and this emulation is also available for guest use. VM supports an individual emulated Fixed Block Architecture (FBA) disk up to 381 GB in size. 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. For more information on z/VM V5.1 support of SCSI disks, refer to Software Announcement 204-057, dated April 7, 2004.

Virtual switch exploitation of Layer 2 support: The virtual IP switch, introduced in z/VM V4.4, is designed to improve connectivity to a physical LAN for hosts coupled to a guest LAN. It eliminates the need for a routing virtual machine by including the switching function in CP to provide IPv4 connectivity to a physical LAN through an OSA-Express Adapter.

z/VM V5.1 is planned to be enhanced with a new transport option that defines the virtual switch as operating in Layer 2 mode. With the PTF for APAR VM63538, z/VM V5.1 will support Layer 2 mode for OSA-Express on December 3, 2004, and for OSA-Express2 on January 28, 2005. In this mode, each port on the virtual switch is referenced by its Media Access Control (MAC) address instead of by Internet Protocol (IP) address. Data is transported and delivered in Ethernet frames, providing the ability to handle protocol-independent traffic for both IP (IPv4 or IPv6) and non-IP, such as IPX, NetBIOS, or SNA. Coupled with the Layer 2 support in Linux for zSeries and the OSA-Express and OSA-Express2 support for the z890 and z990, Linux images deployed as guests of z/VM can operate more efficiently.

Port sharing on the OSA-Express or OSA-Express2 allows many stacks to share the same physical OSA NIC card, as well as providing a communication path between LPAR and z/VM without having to send the traffic flow over the physical wire. There is a restriction with the Layer 2 support in that port sharing is supported only between virtual switches that are of the same transport type, such as Layer 2 with Layer 2 and Layer 3 with Layer 3. A Layer 2 guest cannot communicate directly with a Layer 3 guest on the same adapter.

Delivery of support of Layer 2 by the z/VM virtual switch satisfies the Statement of Direction in Software Announcement 204-057, dated April 7, 2004.

Additional device connections for TCP/IP for z/VM

- TCP/IP stack utilization improvements for OSA-Express

For the z890 and z990 servers, the number of TCP/IP stacks that can share an OSA-Express adapter increases from 84 to 160 on October 29, 2004. This increase provides additional connections to enable more virtual machines to be connected to an external network and is planned to be supported on January 28, 2005, with PTFs for APARs PQ91421 and VM63524 for z/VM V3.1, V4.3, V4.4, and V5.1.

- Improved virtualization supporting more TCP/IP stacks with OSA-Express2

With the new OSA-Express2 feature on the z890 and z990, planned to be available on January 28, 2005, the
number of connections (TCP/IP stacks) allowed can be increased up to 640. Support for 640 TCP/IP stacks is provided by the OSA-Express2 features (Gigabit Ethernet SX, Gigabit Ethernet LX, 10 Gigabit Ethernet LR) running in QDIO mode only. z/VM plans to support this new capability to allow additional connections to virtual machines, particularly Linux images, with z/VM V5.1 on January 28, 2005, with PTFs for APARs PQ91421 and VM63524.

**FCP Logical Unit Number (LUN) access control by z/VM with Linux on zSeries guests:** z/VM V4.4 and V5.1 plan to support LUN access control for SCSI FCP disks connected to a FICON® Express at the availability of this function on the z990 and z890 with the PTF for APAR VM63328. This function was previewed in Hardware Announcement 104-346, dated October 7, 2004.

When available, the LUN access-control function of zSeries FCP channels is expected to provide added security for SCSI devices connected to a SAN, since a zSeries host can contain multiple operating-system images in different logical partitions and VM guests.

For a logical partition that runs z/VM, you can specify separate permissions for the VM system itself (when running z/VM V5.1 utilizing SCSI disks for system operations) and for each Linux guest. In addition, if you run a second-level z/VM system, you can specify separate permissions for that system and for each of its guests.

This statement represents IBM’s current intentions. IBM development plans are subject to change or withdrawal without further notice.

IBM zSeries is interested in obtaining customers to participate in an Early Support Program (ESP) to exploit the FCP LUN Access Control function on a z990 or z890. If you have an interest in participating, contact Kathy Kulchock at 845-433-3028, or kathyk@us.ibm.com. All inquiries should be received by November 15, 2004, to be considered for this program. Responses to this notice do not imply a commitment to be a participant in this ESP, but rather allow you to be considered for selection.

**Application enablement**

**New interactive source-level debugging tool for compiled applications:** IBM Debug Tool for z/VM V4.1 (5654-A23) is an IBM interactive source-level debugging tool for compiled applications. It helps you increase debugging efficiencies and aids in reducing application-development cycle times. This program testing and analysis aid helps you examine, monitor, and control the execution of application programs written in C, C++, COBOL, or PL/I on a z/VM system. By using the disassembly view, Debug Tool can also support programs compiled with the NOTEST compiler option and applications that include other languages such as Assembler. For additional information on the IBM Debug Tool for z/VM V4.1, refer to Software Announcement 204-212, dated September 21, 2004.

**Note:** For a description of previously announced enhancements and other product packaging changes for z/VM V5.1 which were made available on September 24, 2004, refer to Software Announcement 204-057, dated April 7, 2004.

**Accessibility by people with disabilities**

The following features support use by people with disabilities:

- Operation by keyboard alone
- Optional font enlargement and high-contrast display settings
- Screen readers and screen magnifiers tested for use by people with visual impairment

**Engine-based Value Unit pricing**

Engine-based Value Unit pricing for z/VM V5.1 is designed to provide a decreasing price curve as hardware capacities and workload grow, which may help improve price/performance.

There may also be a price benefit when you grow your capacity. Additional capacity is not priced starting at the base with a higher price per unit. Instead, additional capacity is priced starting at the capacity (engines) on which z/VM V5.1 has already been installed.

**Note:** Value Units of a given product cannot be exchanged, interchanged, or aggregated with Value Units of another product.

**IPLA and Subscription and Support considerations**

IPLA licenses can be transferred from one machine to another within, but not limited to, an enterprise. The customer may aggregate the capacity for all the processors the product is operated on to achieve a more economic price. This will result in a single Proof of Entitlement. It is the customer’s responsibility to manage the distribution of Value Units within the limits of the entitlement of the product license.

S&S must cover the same capacity as the product license entitlement. Subscription and Support will be available in the country in which the agreement is made.

A no-charge S&S registration record will be established for each designated machine where z/VM V5.1 and the priced, optional features of DirMaint®, RACF®, and the Performance Toolkit for VM are running to register S&S entitlement for these features. These no-charge S&S registration records will be linked to the billable S&S and all billable S&S within the scope of the engine-based Value Units aggregation will be linked together.

S&S is an annual charge and should be kept at an annual term.

**Product positioning**

z/VM V5 has a new pricing model that:

- Helps reduce the expense of incremental growth, that is, the price per-engine for z/VM V5 becomes less as more engines are added (purchased)
- Can make it more affordable for you to add z/VM to an existing standard engine environment

The success of Linux on zSeries is largely attributed to the business value Linux-based solutions derived from the zSeries virtualization technology, provided by z/VM and IBM zSeries servers. z/VM extends the zSeries technology by offering clients the ability to host a large number of Linux servers on a single mainframe and also provides an operational environment that is well-suited for on demand computing: highly flexible, adaptable, and efficient.

z/VM V5 offers new levels of price/performance, functional capabilities, and hardware exploitation that are expected to increase the attractiveness of deploying Linux solutions on the mainframe. Clients can add capacity to existing zSeries systems for hosting...
Linux-on-z/VM workloads by configuring their server with Integrated Facility for Linux (IFL) engines.

The new z/VM V5 pricing model can make it more feasible for clients to add z/VM virtualization technology to their standard engine environment (compared to the pricing models of z/VM V3 and V4). This helps enable clients to use z/VM to host workloads that cannot run on IFL engines, such as z/OS, VSE, z/VSE (when available), or TPF, or to consolidate existing VM/ESA® or z/VM V3 and V4 workloads onto a single, larger zSeries server.

Note: z/VSE can execute in 31-bit mode only. It does not implement z/Architecture™, and specifically does not implement 64-bit mode capabilities. z/VSE is designed to exploit selected features of IBM zSeries hardware.

z/VM V5 is the follow-on product for VM/ESA, z/VM V3, and z/VM V4. z/VM V5 requires z/Architecture (64-bit) for execution; therefore, it will run only on zSeries 990, 900, 890, and 800 servers (or equivalent). z/VM V5 provides additional support and exploitation opportunities for the thousands of users who have built enterprise-wide automation and infrastructure enhancements on the VM platform in support of their applications, database systems, and on demand business solutions.

z/VM V5 is intended to address the following situations:

- Running more Linux server images on a single zSeries server. Considerably more images than are currently supported by the LPAR mode of operation (30 on the z990 and z890 and 15 on all other supported zSeries servers) can be achieved with z/VM guest support. These Linux on zSeries server images can be deployed on standard engines (CPs) or IFL engines with z/VM V5. Running multiple Linux on zSeries server images on an IFL-configured z/VM system may not increase the IBM software charges of your existing zSeries environment. z/OS, z/OS.e, z/VM, TPF, VSE/ESA™, z/VSE (when available), or Linux customers can add z/VM V5 running on IFL engines to their environment without necessarily increasing software costs on the standard engines (CPs).

- Moving select Linux, Windows, and UNIX workloads to a single zSeries server while maintaining distinct server images and current LAN topology. This ability can help reduce systems management complexity. Since the number of real hardware servers and associated physical LANs is reduced, cost savings may be realized by managing large server farms deployed on virtual servers instead of using multiple hardware servers. Deploying Linux workloads on z/VM V5 is particularly attractive if they interact with applications or data located on the same zSeries server.

- Enhanced virtual networking. This provides external connectivity for Guest LANs through an OSA-Express adapter without requiring a VM or Linux router virtual machine.

- Executing 64-bit operating systems running on a zSeries server. This helps provide real memory constraint relief by running z/VM V5 in 64-bit mode on a zSeries server. This constraint relief is provided for ESA/390 guest operating systems. Running TPF or large numbers of MVS™, OS/390®, VSE/ESA, or Linux server images may benefit from z/VM 64-bit support.

- Migrating from VM/ESA to z/VM V5. This helps enable:
  - More memory to cache CMS minidisks by exploiting memory above 2 GB for minidisk cache
  - Connectivity (TCP/IP) enhancements and additional device support

- Added security with SSL-protected TCP/IP network traffic, such as Telnet sessions and Web transactions

Note: IBM discontinued program services for VM/ESA V2.4 on June 30, 2003.

- Migrating from OS/390 to OS/390 R10, z/OS, or z/OS.e using z/VM V5. This can provide added flexibility for migration, production, and testing.

- Enhanced guest Parallel Sysplex® support in z/VM with the exploitation of the z/Architecture. This can enable addressability of larger amounts of real and virtual memory, allowing the development and testing of 64-bit Parallel Sysplex applications in a guest environment.

Statement of direction

- IBM intends to expand the exploitation of 64-bit support in future z/VM releases to provide better utilization of main storage in configurations larger than 2 GB to help ease constraints imposed by demands for main storage below 2 GB.

- In the future, Linux guests running on z/VM may benefit from IBM Virtualization Engine™ support for Linux on zSeries, which is intended to include Enterprise Workload Manager support for zSeries, Linux for zSeries participation in IBM Director Multiplatform, and the IBM Dynamic Infrastructure for mySAP Business Suite, a solution using Virtualization Engine systems provisioning.

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

Reference information

For information on the zSeries 990, refer to:

- Hardware Announcement 104-346, dated October 7, 2004
- Hardware Announcement 104-118, dated April 7, 2004
- Hardware Announcement 103-280, dated October 7, 2003
- Hardware Announcement 103-142, dated May 13, 2003

For information on the zSeries 890, refer to:

- Hardware Announcement 104-346, dated October 7, 2004
- Hardware Announcement 104-117, dated April 7, 2004

For information on the zSeries 900, refer to:

- Hardware Announcement 102-209, dated August 13, 2002
- Hardware Announcement 102-123, dated April 30, 2002
- Hardware Announcement 101-308, dated October 4, 2001
- Hardware Announcement 100-323, dated October 3, 2000

For information on the zSeries 800, refer to:

- Hardware Announcement 102-052, dated February 19, 2002
For information on the zSeries Offering for Linux, refer to:

• Hardware Announcement 102-030, dated January 29, 2002

For z/VM capabilities, refer to:

• z/VM V5.1 Software Announcement 204-057, dated April 7, 2004
• z/VM V4.4 Software Announcement 203-128, dated May 13, 2003
• z/VM V4.3 Software Announcement 202-104, dated April 30, 2002
• z/VM V4.2 Software Announcement 201-286, dated October 4, 2001
• z/VM V4.1 Software Announcement 201-163, dated May 29, 2001
• z/VM V3.1 Availability Software Announcement 201-041, dated February 20, 2001
• z/VM V3.1 Software Announcement 200-358, dated October 3, 2000

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Education support

IBM IT Education Services offers classroom training, e-learning, conferences, certification, course roadmaps, and more. These publicly held or privately available courses are focused on z/VM® and Linux™ on zSeries®. IBM IT Education Services also provides on-site training with customized content and course materials for small or large groups.

The course catalog includes:

- HLX13 — Linux Basics — A zSeries and S/390® Perspective (3.0 days)
- ZV100 — z/VM and Linux Connectivity and Management (3.5 days)
- ZL100 — Linux Implementation for zSeries and S/390 (3.0 days)
- ZV062 — Installing, Configuring and Servicing z/VM for Linux Guests (4.5 days)
- ZL150 — Advanced Solutions for Linux on zSeries (4.0 days)

For information on these courses or additional VM education, contact your local IBM Learning Services or call IBM IT Education Services at 800-IBM-TEACH (426-8322) for catalogs, schedules, and enrollments. You may also visit the IBM IT Education Services Web site at


Select “Course Catalog,” then under “Software,” select either “Linux, UNIX®, and Open Source” then “Linux for zSeries and S/390,” or under “Hardware,” select “zSeries and S/390” then “z/VM and VM/ESA®” or “Linux for zSeries and S/390.”

For one low price, the IBM Education Card gives one person unlimited IBM Education for one full year on IBM Learning Services public courses and IBM IT Education Services U.S. technical conferences. For more information on the IBM Education Card and other savings programs, you may visit the IBM IT Education Services Web site at


Technical conferences

The technical conference for 2004, IBM zSeries Expo for z/OS®, VSE, z/VM, and Linux on zSeries, is scheduled for November 1-5, 2004, in Miami Beach, Florida.

For more information about IBM technical conferences, visit

http://www.ibm.com/services/learning/conf/

Mark your calendars for 2005 IBM technical conferences:

- IBM zSeries Technical Conference, April 11-15, 2005, in Innsbruck, Austria
- IBM zSeries EXPO, September 19-23, 2005, in San Francisco, California

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

http://www.ibm.com/eserver/zseries/zvm/education/

Offering information

Product information is available via the Offering Information Web site

http://www.ibm.com/common/ssi

Publications

Unlicensed documentation

Unlicensed documents within the z/VM V5 library are available as Adobe PDF files, IBM BookManager® files, or printed books.

Some publications identified as basic publications are automatically shipped in printed format, at no additional charge, when you order the z/VM V5 base product.

The other publications are supplied only in PDF or BookManager format with z/VM V5. Some of these publications also have printed versions. They can be ordered separately, for a fee, using the specific publication numbers through the IBM Publications Center at


The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided. Payment options for orders are via credit card (in the USA) or customer number for 50 countries. A large number of publications are available online in various file formats, and they can all be downloaded by all countries free of charge.

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Note: PNS subscribers most often order their publications via the Publications Center.

All publications updated for z/VM V5.1 are available as PDF files, which may be printed.

Adobe PDF files: Publications that are available in PDF format (except for the Guide for Automated Installation and Service) are provided on the IBM eServer zSeries Online Library: z/VM Collection (supplied with z/VM V5.1, at no additional charge) and from the Publications Center Web site at


Publications are also available from the IBM z/VM Internet Library at


You can view a PDF file using the Adobe Acrobat Reader, which is available free from the Adobe Web site at

http://www.adobe.com

You can also print the entire publication or just the section in which you are interested.

IBM BookManager files: Publications that are available in BookManager format are provided on the IBM eServer zSeries Online Library: z/VM Collection (supplied with z/VM V5.1, at no additional charge). BookManager files are also available from the Publications Center Web site at


Publications changed for this announcement of enhancements for z/VM V5.1 are listed below. The General Information publication is planned to be available on October 12, 2004. All other changed publications are planned to be available from the Publications Center and the z/VM Internet Library on December 3, 2004.

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BKM = BookManager

Note: An X in one of the columns indicates available formats.

Optional Performance Toolkit for VM feature unlicensed documentation

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BKM = BookManager

Note: An X in one of the columns indicates available formats.

Displayable softcopy publications

The displayable softcopy publications in this announcement have not been changed from the original announcement of z/VM V5.1. Refer to Software Announcement 204-057, dated April 7, 2004.

Source file publications: z/VM V5.1 manuals are not offered in source file form.

Licensed publications: z/VM V5.1 does not have any licensed publications.
**Technical information**

**Specified operating environment**

**Hardware requirements:** z/VM V5.1 will operate on:
- IBM @server zSeries 990
- IBM @server zSeries 890
- IBM @server zSeries 900
- IBM @server zSeries 800
- Equivalent server

Specific processor facilities required by z/VM V5.1 can be found on the z/VM Web site at


Refer to the appendix of the z/VM General Information manual for more information. The General Information manual will be available on October 7, 2004.

**Installation requirements**

- Installation requires a local non-SNA 3270 terminal or equivalent.
- The 3270 Integrated Console available with the z990 and z890 satisfies this requirement.
- Installation from magnetic tape requires a tape drive capable of reading 3480 or 3590 tape cartridges.
- Installation from CD-ROM requires one of the following:
  - Optical Media Attach/2 (5621-264); however, this product has been withdrawn from marketing.
  - 2074 Console Support Controller capable of reading Optical Media Attach format.

Refer to IBM Hardware Announcement 102-054, dated February 26, 2002.

- Installation to ECKD DASD requires 3390 Model 3 or 9 DASDs, or DASD that is defined to emulate these specific models.

**Note:** IBM does not recommend using a real 3390 Model 9 for performance reasons.

- Installation from DVD requires the Hardware Management Console (HMC) Level 1.8 or later.
- Installation to FCP-attached SCSI requires ESS SCSI disks or equivalent.

**TCP/IP for z/VM V5.1 hardware requirements:** TCP/IP for z/VM V5.1 requires one of the following:
- IBM 3172 Interconnect Controller with the Interconnect Controller Program (ICP) V3 (5621-425)
- IBM Open Systems Adapter 2 (OSA-2) Token Ring, Fast Ethernet, and 155 ATM
- IBM Open Systems Adapter Express (OSA-Express) Gigabit Ethernet (GbE), 1000BASE-T Ethernet, and Token Ring
- IBM Open Systems Adapter Express2 (OSA-Express2) GbE, 10 GbE, 1000BASE-T Ethernet, and Token Ring
- IBM 37xx communications controller using X.25 or SNA connections

Native attachment of the IBM 3745 to TCP/IP and associated dynamic IP routing within the 3745 is not supported.
- IBM 8232 LAN Channel Station Model 1 or 2
- HYPERchannel A220 Processor Adapter 42990007

TCP/IP for z/VM V5.1 supports the HYPERchannel Series A devices (and HYPERchannel Series DX devices that are functioning as Series A devices). For additional information, refer to the appropriate Network Systems Corporation documentation.

- RS/6000® Channel Attachment using the Block Multiplexer Channel or ESCON® Adapter
- IBM 3088 Multisystem Channel Communication Unit
  - TCP/IP for z/VM V5.1 supports direct connection to another TCP/IP for VM, OS/390®, or z/OS using the IBM 3088.
- IBM ESCON Channel-to-Channel Adapter
  - TCP/IP for z/VM V5.1 supports direct connection to another TCP/IP for VM, OS/390, or z/OS using the IBM ESCON Channel-to-Channel Adapter.
- IBM FICON™ Channel-to-Channel Adapter
  - TCP/IP for z/VM V5.1 supports direct connection to another TCP/IP for VM, OS/390, or z/OS using the IBM FICON Channel-to-Channel Adapter.
- IBM HiperSockets
  - VM programs using TCP/IP can communicate via HiperSockets with other VM programs using TCP/IP and with guest operating systems and other logical partitions using TCP/IP.

TCP/IP for z/VM V5.1 also requires a 3270-equivalent workstation for TCP/IP administration.

** VM Guest RSA-Assist Support for Linux hardware requirements:** In order for the VM Guest RSA-Assist Support for Linux to operate, corresponding function in Linux on zSeries and one of the following are required:
- IBM Crypto Express2
- IBM PCI Express Cryptographic Coprocessor (PCIXCC)
- IBM PCI Cryptographic Coprocessor (PCIICC)
- IBM PCI Cryptographic Accelerator (PCICA)

**Software requirements**

**Prerequisite requirements**

- EREP VM (5654-260) V3.5.0.
- Device Support Facilities — ICKDSF VM (5684-042) V1.17.0. Any fixes requested for ICKDSF should specify the PTF number of the VMSES/E formatted update. VMSES/E installable PTFs have the release number G14. “G” indicates Release 17 of ICKDSF and “14” indicates VMSES/E format.

The prerequisite no-charge products EREP and ICKDSF are preinstalled on the base product system DDRs. The PTF for APAR PQ84848 has been applied to the ICKDSF product preinstalled with z/VM V5.1. This PTF provides the necessary function for ICKDSF to support large FBA devices. When ordering z/VM V5.1, you must already be licensed for these products (5654-260 and 5684-042) or a separate order must be placed for each of these products to establish a license. Refer to the Preinstalled products.
and features section for additional information on ordering EREP and ICKDSF.

Optional product/feature requirements

- IBM High Level Assembler (5696-234) requirements
  - High Level Assembler V1.2.0, or later, is required to:
    - Create a new DMSTRT for system languages (NLS)
    - Create image libraries for system printers (FCBs)
    - Create GCS application segments (CONTENTS macro)
    - Access major CMS application interfaces (CMSCALL)
    - Access most CP application interfaces (DIAGNOSE)
    - Use the AVS tuning control module (AGWTUN)
    - Use RAS tools (such as MDCHECK, FS2FSER, AFTCHAIN, PRINTBLK, and PRINTFST)
    - Use the CMS Pipelines Assemble macros interface
    - Assemble exit routines for DirMaint and RSCS
    - Customize Language Environment or compile assembler routines used in mixed-language user applications
  - High Level Assembler V1.3.0, or later, is required to:
    - Assemble applications that exploit the IEEE Floating Point hardware facility
  - High Level Assembler V1.4.0, or later, is required to:
    - Add devices that cannot be sensed (updating HCPrio ASSEMBLE)
    - Perform local modifications to modules written in assembler
    - Service the CP Loader (HCPLDR)
    - Create the Stand-Alone Dump Utility (HCPSADMP EXEC)
    - Assemble any CP modules
    - Assemble exit routines for CP
    - Reassemble CP replacement parts for the RACFs for z/VM optional feature

- Performance Toolkit for VM FL510
  The PTF for APAR VM63580 is required for the Performance Toolkit to support monitor records created by the SUSE LINUX 2.6 kernel.

- Shared-DASD Complex and CSE Cluster Program requirements
  In a shared-DASD complex, a single Directory Maintenance Facility (DirMaint) server with a single source directory can manage the object directory on up to 16 z/VM systems, if the DirMaint executable code disks and source directory disk are shared among all the systems. The following are required to support the shared-DASD complex:
    - Directory Maintenance Facility, Function Level 510 (FL510)

    Within the shared-DASD complex, all z/VM systems must be running the same DirMaint FL510 service level. Therefore, you must be licensed for the DirMaint FL510 feature on any z/VM V5 system in the complex; you must be licensed for the DirMaint FL410 feature on any z/VM V4 system in the complex; and you must be licensed for the IBM Directory Maintenance VM/ESA program product, Version 1 (5748-XE4) Release 5.0, on any z/VM V3 system in the complex.

- A CSE cluster consists of two, three, or four z/VM systems. The following are required to support the CSE function:
  - The same DirMaint requirements as for the shared-DASD complex described above.
  - For shared spool and cross-system messaging:
    - VM/Pass-Through Facility, Version 2 (5684-100) Release 1.1 or later

- RACF
  - The PTF for APAR VM63452 has been applied to the RACF for z/VM optional feature preinstalled with z/VM V5.1. This PTF provides the necessary RACF support for enhanced authorization for Guest LANs and virtual switches.
  - The PTF for APAR VM63337 has been applied to the HCD and HCM facilities preinstalled with z/VM V5.1. This PTF provides the necessary function to support the z890 and z990 with z/VM V5.1.

- POSIX requirements
  - Developing POSIX applications requires IBM C for VM/ESA V3.1.0 (5654-033) or C/C++ for z/VM V1.1 (5654-A22).

- DFSMS/VM® requirements
  - ISPF V3.2.0 (5684-043) or a subsequent release for DFSMS/VM usage. ISPF is not required, if you are using only the 3495 Tape Library Dataserver support of DFSMS.
  - DirMaint Facility of z/VM V5, if the minidisk management function is needed.
  - RACF for z/VM optional feature or its equivalent, if a security product is needed for authorization.
  - Tivoli® Storage Manager Extended Edition for z/OS and z/VM V5.2 (5698-A11), Tivoli Storage Manager for z/OS and z/VM V5.2 (5698-A13), or Tivoli Storage Manager for VM (5697-TS9), if Migration Level 2 (ML2) function of DFSMS/VM is used.
  - TCP/IP for z/VM V5.1 to access the IBM 3495 Tape Library Dataserver for processors capable of 3490/3490E tape I/O, but incapable of 3495 Tape Library Data Server control.
  - Remote Spooling Communications Subsystem Networking (RSCS) V3.2.0 (5684-096), or later, for remote operations.
  - IBM Compiler for REXX/370 (5695-013) and IBM Library for REXX/370 (5695-014), or the compiled REXX installation-wide exit or a compiled ACS REXX exit is desired.
For additional information on OSA/SF, refer to Hardware Announcement 103-142, dated May 13, 2003. For specific function and for the most current information on Linux distributions, refer to http://www.ibm.com/zseries/os/linux/dist.html

Limitations

- z/VM V5.1 will operate only on hardware servers that support z/Architecture™ (64-bit), including the zSeries 990, 890, 900, and 800 servers (or equivalent).
- Linux is the only guest operating system z/VM will support on IFL engines (other than z/VM V4 or z/VM V5 itself). Linux can also run on IFL engines in LPAR mode.
- Use of IFL engines on z800 and z900 machines requires LPAR mode. Customers who choose to add IFL engines to a z800 or z900 machine running in basic mode will also have to run their operating system on the standard engine(s) in LPAR mode. This is not a consideration for z990 and z890 machines, which do not have basic mode.
- z/VM V5.1 does not provide support for V=R nor V=F guest images. Customers running V=R and V=F guests should consider this when migrating to z/VM V5.1. The processor requirements to run as a V=V guest, that was previously run as V=R, may be significant due to the loss of various hardware assists.

Performance considerations: System performance depends on the hardware resources allocated to z/VM V5.1 and on the level of activity within each Linux image. The results of the performance evaluation of z/VM V5.1 are available in the z/VM Performance Report on the z/VM Web site at http://www.ibm.com/eserver/zseries/zvm/perf/docs/

Additional z/VM performance information is available on the z/VM Web site at http://www.ibm.com/eserver/zseries/zvm/perf/tips/

For assistance in understanding the performance implications for a particular situation, contact your IBM representative or your IBM Business Partner.

User group requirements: This announcement satisfies or partially satisfies requirements from one or more of the worldwide user group communities. Groups include World Alliance of VSE and VM (WAVV), COMMON, COMMON Europe, GUIDE/SHARE EUROPE, Interaction (Australia/NZ, includes the former ASG and COMMON Australia), Japan GUIDE/SHARE (JGS), and SHARE Inc.
User group requirements satisfied in this release:

<table>
<thead>
<tr>
<th>Requirement number</th>
<th>Requirement description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR1201033216</td>
<td>Use the Hardware Management Console DVD for installation of z/VM</td>
</tr>
<tr>
<td>MR0805032753</td>
<td>Provide Peer-to-Peer Remote Copy (PPRC) warning messages when one or more paths have been removed or established between the PPRC pair</td>
</tr>
<tr>
<td>MR0608004444</td>
<td>Allow MAKESITE to support names longer than 24 characters</td>
</tr>
<tr>
<td>MR0929034546</td>
<td>Allow installation of z/VM on device type 3390-9</td>
</tr>
<tr>
<td>MR0719025939</td>
<td>Provide PCICC/PCICA support for z/OS guest under z/VM</td>
</tr>
<tr>
<td>MR1021033547</td>
<td>Enhance AUTORESTART processing for OSD and HIPERS devices under TCP/IP</td>
</tr>
</tbody>
</table>

Planning Information

Customer responsibilities

z/VM V5 Subscription & Support (S&S): To order z/VM V5.1, you must use the SDO, program number 5741-A06. The z/VM base system, any ordered optional z/VM features, and any ordered SDO licensed products will be delivered as part of the z/VM SDO.

If you desire the level of service provided under the IBM ICA license agreement with S/390 and z/VM licensed products, you are strongly encouraged to order the program number for z/VM S&S (5741-SNS). This program number provides enhanced support that includes telephone assistance (voice support for defects during normal business hours) and access to updates, releases, and versions of the program for as long as support is in effect. z/VM S&S will be automatically added to your order. If you do not desire the S&S license for z/VM and/or the optional features of DirMaint, RACF, or the Performance Toolkit for VM, you must take specific action to decline this support.

To host Linux guests of z/VM V5.1, you must also obtain a Linux on zSeries distribution. Information on those Linux distributors that have a marketing relationship with IBM can be found at http://www.ibm.com/zseries/os/linux/dist.html

License Products packaged with z/VM V5.1: With the availability of z/VM V5.1, the following priced, optional products or features are automatically shipped and preinstalled on the z/VM V5.1 base product media:

- Performance Toolkit for VM
- Remote Spooling Communication System (RSCS)
- Directory Maintenance Facility (DirMaint)
- Resource Access Control Facility (RACF)

For more information on these products or features, refer to the Preinstalled products and features section.

These products or features must be enabled before using. If you choose to enable them, you must have a license for the product or the feature.

If you do not have a license for RSCS, DirMaint, RACF, or the Performance Toolkit for VM, you may establish one by placing an order for the optional feature. This will allow shipment of the basic publications for the products, including the program directories. The program directories include instructions for enabling use of the products.

For other IBM Licensed Products or products from Independent Software Vendors (ISVs), you should review the following support documents:

- Independent software vendor products available for z/VM can be found at http://www.ibm.com/zseries/zvm/vendor/
- IBM licensed programs available for z/VM can be found at http://www.ibm.com/zseries/zvm/related/

Device support to be withdrawn: z/VM V5.1 does not support the following devices:

- All 3370 DASD
- All 3375 DASD
- All 3380 DASD, except for the RAMAC® emulated 3380 models J and K and 3390 DASD running in 3380-track-compatibility mode
- All Multiprise® Internal Disk
- All 3830 DASD Control Units
- All 3880 DASD Control Units
- All 3995 Optical Dataservers
- All 9332 Disks
- All 9335 Disks
- All 9336, except for simulated VDISKs and emulated SCSI LUNs
- All 9340 DASD
- All 2440 Tape drives
- All 3420 Tape drives
- All 3422 Tape drives, except for OMA/2 CD-ROM drive that emulates 3422 devices
- All 3424 Tape drives
- All 3430 Tape drives
- All 9348 Tape drives
- All 3803 Tape Control Units
- All 9221 DASD/Tape Controllers
- All SDLC ICAs (SDLC integrated communication attachment)
- All BSC ICAs (BSC integrated communication attachment)
- All CETI ICAs (9221 integrated communication attachment)

Note: “All” refers to all models of these devices supported by VM.

Note: This list may not be complete and omission from this list does not mean that the device is supported. For a list of devices supported by z/VM V5, refer to z/VM: General Information.
Running 370-mode applications: To simplify the migration of older applications and facilitate the running of 370-mode-only CMS applications in non-370-mode virtual machines, such as XA or XC mode, IBM provides the 370 Accommodation function. This function originally shipped with VM/ESA V1.2.1 (available July 1993) and has since been enhanced as the result of customer experience and input. 370 Accommodation handles the vast majority of inconsistencies between 370 mode and either XA or XC mode, eliminating the need to change these applications to exploit the new architectures.

z/VM V5 supports only XA-, ESA-, and XC-mode virtual machines. z/VM V5 does not support 370-mode virtual machines. 370-mode virtual machines are converted to XA mode during logon processing. The 370 Accommodation function is still supported for applications. If you find your applications cannot run under the current level of CMS, you should use the 370 Accommodation function or modify your applications, if possible. If problems persist, call IBM Service for assistance.

Direct customer support: Direct customer support is provided by IBM Operational Support Services — SoftwareXcel. This fee service enhances customers’ productivity by providing voice and electronic access into the IBM support organization. IBM Operational Support Services — SoftwareXcel will help answer questions pertaining to usage and suspected software defects for eligible products.

Installation and technical support is provided by Global Services. For more information call 800-IBM-4YOU (426-4968).

For technical support or assistance, go to http://www.ibm.com/support or contact your IBM representative for additional assistance.

Packaging: The z/VM V5.1 product package is distributed with the following:

- International Program License Agreement (IPLA) (Z125-3301)
- Proof of Entitlement (PoE)
- License Information Document (LID) (GC24-6102)
- If ordering to install using 3480 tape:
  - Basic machine-readable material on 3480 tape cartridges for installation to a 3390 DASD
  - Stacked Recommended Service Update (RSU) 3480 tape cartridge(s) containing required service
- If ordering to install using 3590 tape:
  - Basic machine-readable material on a 3590 tape cartridge for installation to a 3390 DASD
  - Stacked RSU 3590 tape cartridge(s) containing required service
- If ordering to install using CD-ROM:
  - Basic machine-readable material on four CD-ROMs for installation to a 3390 DASD
  - RSU CD-ROM containing required service
- If ordering to install using DVD:
  - Basic machine-readable material on one DVD for installation to a SCSI disk
  - Basic machine-readable material on one DVD for installation to a 3390 DASD
  - RSU DVD containing required service

Note: The DVD format is a binary image, not in z/VM DDR format.

- One CD-ROM containing the IBM eServer zSeries Online Library: z/VM Collection
- One tape containing the z/VM SDO Optional Products Enabling Aid labeled “z/VM Licensed Program Products.” If any SDO Optional Products are ordered, the Enabling Aid will be stacked on the tape labeled “z/VM Licensed Program Products.” Refer to the media report included with your shipment from IBM.

- Publications
  - z/VM: Guide for Automated Installation and Service (GC24-6099)
  - z/VM: Getting Started with Linux on zSeries (SC24-6096)

- Program directories for z/VM V5.1, z/VM V5.1 SDO, and the preinstalled products
- Program directories for DirMaint, RACF, and the Performance Toolkit for VM if these optional features are ordered

Starting with the delivery of z/VM V4.3, z/VM was made available on 3590 media. With this capability, multiple physical tape images can now be delivered on consolidated (or stacked) tape(s) for z/VM. For example, the multiple tape volumes previously required to deliver the z/VM base system media on 3480 now require only a single 3590 tape. This is made possible by taking advantage of the larger storage capacity of the 3590 media. Additionally, optional products, offered in the z/VM SDO, may now be stacked on a physical tape, labeled “z/VM Licensed Program Products.” In order to determine the contents of these stacked tapes, you must refer to the media report included with your shipment.

Security, auditability, and control

The announced program uses the security and auditability features inherent in the virtual machine and the System/370™, ESA/370, and ESA/390 architectures, and z/Architecture. The security and auditability of z/VM V5 are the same for ESA/390 and z/Architecture. The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

Ordering information

z/VM V5 is a zSeries operating system designed to host guest operating systems (Linux on zSeries, z/OS, z/OS.e, OS/390, VSE/ESA™, TPF, and VM itself), application development, database management, on demand business, and office systems.

Performance Toolkit for VM

The Performance Toolkit for VM feature was derived from the IBM FCON/ESA program (5788-LGA) and made available with z/VM V4.4. It has been updated in z/VM V5.1 to provide functional equivalence to the Performance Reporting Facility (PRF) priced optional feature.
The Performance Toolkit for VM feature is considered to be a program update for the RealTime Monitor (RTM) and/or the Performance Reporting Facility (PRF) of z/VM V4 as defined in the z/VM Addendum for Support, Z125-6547. Therefore, any existing z/VM V4 customer who has purchased a Subscription & Support (S&S) license for the RTM or PRF feature is entitled to receive a no-charge upgrade for the Performance Toolkit for VM feature when ordering z/VM V5.1.

The priced, optional features RTM and PRF are not available with z/VM V5.1 nor can they be licensed on z/VM V5.1. They remain available with z/VM V4.4. Future performance management enhancements are planned to be made to the Performance Toolkit for VM.

IBM strongly encourages customers to order S&S for the Performance Toolkit for VM feature. S&S provides an easy and effective way by which customers have access, during the coverage period, to eligible new versions and releases of the Performance Toolkit for VM feature. S&S also provides the level of support that was available when customers paid a monthly license charge for products with the IBM Customer Agreement software license.

**High Level Assembler (5696-234)**

The High Level Assembler (5696-234) is available on a special-bid basis for licensing on IFL engines.

The High Level Assembler is required for z/VM to:
- Apply corrective service to RACF for z/VM and any associated CP parts that affect this product
- Change exit routines or perform local modifications for any IBM VM product or vendor product
- Build the Stand-Alone Dump routine or HCPLDR

For pricing, terms and conditions, and special-bid requests, customers should contact an IBM representative or Business Partner.

**Pricing metric description**

The products and features in this announcement have one pricing metric — Value Units based on the number of engines. Value Unit pricing with a decreasing one-time charge (OTC) price per engine, subject to the tiers as documented in Value Unit Exhibit VUE00021, is now available for z/VM Version 5 Release 1 and the optional features of DirMaint, RACF, and the Performance Toolkit for VM, and S&S entitlements at initial order of z/VM V5.1 or the features. The customer’s Proof of Entitlement (PoE) for new licenses and additional capacity orders for existing licenses for the product and priced, optional features as well as the S&S will be based on engine-based Value Units. PoEs are product specific. Value Units of a given product cannot be exchanged, interchanged, or aggregated with Value Units of another product.

Because the Performance Toolkit for VM feature was derived from the IBM FCON/ESA program (5788-LGA), any existing VM customers who have previously purchased FCON/ESA are entitled to receive a no-charge upgrade for the Performance Toolkit for VM feature when ordering z/VM V5.1. FCON/ESA was withdrawn from marketing for all releases of VM/ESA and z/VM at the availability of the Performance Toolkit for VM feature on z/VM V4.4 on August 15, 2003. Service support for FCON/ESA will end either at the announced end of service date of the VM operating system on which FCON/ESA is running or on December 31, 2004, whichever is earlier. The discontinuance of support for FCON/ESA is planned to occur as follows:

<table>
<thead>
<tr>
<th>z/VM version/ release</th>
<th>Announced VM EOS date</th>
<th>Date of VM announcement</th>
<th>FCON/ESA EOS date</th>
</tr>
</thead>
<tbody>
<tr>
<td>z/VM V3.1</td>
<td>December 31, 2005</td>
<td>August 3, 2004</td>
<td>December 31, 2004</td>
</tr>
<tr>
<td>z/VM V4.2</td>
<td>December 30, 2003</td>
<td>October 4, 2001</td>
<td>December 30, 2003</td>
</tr>
<tr>
<td>z/VM V4.3</td>
<td>May 31, 2005</td>
<td>May 13, 2003</td>
<td>December 31, 2004</td>
</tr>
<tr>
<td>z/VM V4.4</td>
<td>September 30, 2006</td>
<td>April 7, 2004</td>
<td>December 31, 2004</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Program name</th>
<th>Program number</th>
<th>Pricing metric description</th>
</tr>
</thead>
<tbody>
<tr>
<td>z/VM V5.1</td>
<td>5741-A05</td>
<td>Value Units</td>
</tr>
<tr>
<td>RACF for z/VM feature</td>
<td>5741-A05</td>
<td>Value Units</td>
</tr>
<tr>
<td>DirMaint feature</td>
<td>5741-A05</td>
<td>Value Units</td>
</tr>
<tr>
<td>Performance Toolkit for VM</td>
<td>5741-A05</td>
<td>Value Units</td>
</tr>
</tbody>
</table>

Value Unit pricing for z/VM V5 can provide for a lower price per engine as more Value Units are licensed with z/VM V5.1. You may aggregate the capacity for all the processors running z/VM V5 across the enterprise to achieve a more economical price. There may also be a price benefit when you grow your capacity. Additional capacity will not be priced starting at the base with a higher price per unit, but based on the capacity (engines) for which z/VM V5.1 has already been installed.

**Translation from engines to Value Units:** Engine-based Value Units for a specified number of engines are determined by the following table, which is also Value Unit Exhibit VUE021:

<table>
<thead>
<tr>
<th>Number of engines</th>
<th>Value Units per engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>1 — 3</td>
</tr>
<tr>
<td>Tier A</td>
<td>4 — 6</td>
</tr>
<tr>
<td>Tier B</td>
<td>7 — 9</td>
</tr>
<tr>
<td>Tier C</td>
<td>10 — 12</td>
</tr>
<tr>
<td>Tier D</td>
<td>13 — 16</td>
</tr>
<tr>
<td>Tier E</td>
<td>17 — 20</td>
</tr>
<tr>
<td>Tier F</td>
<td>21 — 25</td>
</tr>
<tr>
<td>Tier G</td>
<td>26 +</td>
</tr>
</tbody>
</table>

See the Pricing section for the “price per Value Unit” in Software Announcement 204-057, dated April 7, 2004.
The total number of engine-based Value Units is calculated according to the following example.

If the customer has installed six engines and will be operating z/VM V5.1 on all six engines, the applicable Value Units would be:

\[(3 \times 10) + (3 \times 9) = 57 \text{ Value Units}\]

The following z/VM V5.1 products and optional features and their associated Subscription and Support (S&S) are affected by the metric change from "flat per-engine price" to "engine-based Value Units" based on the number of engines:

<table>
<thead>
<tr>
<th>IPLA program number</th>
<th>S&amp;S program number</th>
<th>Program description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5741-A05</td>
<td>5741-SNS</td>
<td>z/VM V5.1</td>
</tr>
<tr>
<td>5741-A05</td>
<td>5741-SNS</td>
<td>RACF for z/VM feature</td>
</tr>
<tr>
<td>5741-A05</td>
<td>5741-SNS</td>
<td>DirMaint feature</td>
</tr>
<tr>
<td>5741-A05</td>
<td>5741-SNS</td>
<td>Performance Toolkit for VM feature</td>
</tr>
</tbody>
</table>

The products in this announcement are available with IBM Software On/Off Capacity on Demand (On/Off CoD). If you are running On/Off CoD on your IBM servers, you can now also pay for z/VM V5.1 on a processor engine per-day basis during your peak periods. For additional information on On/Off CoD, refer to Software Announcement 203-202, dated August 12, 2003 and Marketing Announcement 304-004, dated January 13, 2004.

**Order VM SDO and VSE SIPO through the Internet**

ShopzSeries provides an easy way to plan and order zSeries software upgrades. This now includes VM and VSE. Using ShopzSeries, customers can quickly generate orders for VM SDOs and VSE SIPOs. Additionally, ShopzSeries will ensure your order is technically correct (that is, ensures any corequisite or prerequisite or incompatibility conditions are resolved to ensure timely order placement and processing). ShopzSeries is available in the United States and several countries in Europe. In countries where ShopzSeries is not available yet, contact your IBM representative (or IBM Business Partner) to handle your order via the traditional IBM ordering process. For more details and availability, visit the ShopzSeries Web site at

http://www.ibm.com/software/ShopzSeries

**Internet delivery of z/VM SDO Licensed Products through ShopzSeries:** z/VM SDO licensed products for z/VM V4.4 and z/VM V5.1 are now eligible for Internet delivery using the ShopzSeries Web site. The z/VM base operating system cannot be delivered using Internet delivery of ShopzSeries.

To order, specify the program number and the desired distribution medium. To suppress shipment of media, select the license-only option in CFSW.

**Licensing for z/VM V5.1**

The following z/VM V5.1 base and optional features and their associated Subscription and Support (S&S) are affected by the metric change from "flat price per engine" on z/VM V4 to “Value Units” based on the number of engines:

<table>
<thead>
<tr>
<th>IFL engines</th>
<th>Quantity</th>
<th>Standard engines</th>
<th>For each server</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4</td>
<td>zSeries 800 (2066)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>zSeries Offering for Linux (2066-0FL)</td>
<td></td>
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<tr>
<td>15</td>
<td>16</td>
<td>zSeries 900 (2064)</td>
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</tr>
<tr>
<td>4</td>
<td>4</td>
<td>zSeries 890 (2086)</td>
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<tr>
<td>32</td>
<td>32</td>
<td>zSeries 990 (2084)</td>
<td></td>
</tr>
</tbody>
</table>

The optional features DirMaint, RACF for VM, and the Performance Toolkit for VM are preinstalled on the base system media. Ordering these features establishes a license for entitlement purposes and you will also receive a program directory for the optional features ordered. If you intend to use DirMaint, RACF for VM, or the Performance Toolkit for VM, now or at a later date, you must establish a license for billing and shipment of publications.
The Performance Toolkit for VM feature is considered a program update for the RTM and PRF features as defined in the z/VM Addendum for Support, Z125-6547. Therefore, any existing z/VM V4 customers, with licenses for the RTM or PRF features, who have also purchased S&S for either the RTM or PRF feature, are entitled to receive a no-charge upgrade for the Performance Toolkit for VM feature when ordering z/VM V5.1.

There are no licensing changes for this announcement of z/VM V5.1. Refer to Software Announcement 204-057, dated April 7, 2004, for complete licensing information.

**Ordering z/VM V5.1 using the SDO**

Orders for z/VM V5.1 commenced on September 10, 2004. When placing an order, if you wish to have that order fulfilled with z/VM V5.1, you will need to specify a customer requested arrival date (CRAD) of September 24, 2004, or later. The enhancements to z/VM V5.1 will be delivered through the service stream on the dates as specified in the Planned availability section within this announcement. Production of z/VM V5.1 orders is planned to begin on September 24, 2004.

z/VM V4.4 will continue to be available after the availability z/VM V5.1. z/VM V4.4 will not be withdrawn from marketing at this time and will continue to be supported until September 30, 2006.

z/VM V3.1 was withdrawn from marketing as previously announced in Withdrawal Announcement 903-239, dated December 2, 2003. End of service was also announced for z/VM V3.1, RealTime Monitor (RTM) V1.5.3, VM Performance Reporting Facility (VMPRF) V2.2.1, and Directory Maintenance Facility for VM/ESA (DirMaint) V1.5 with an effective date of December 31, 2005, in Withdrawal Announcement 904-151, dated August 3, 2004.

Orders for z/VM V5.1 and the optional features must use the z/VM V5.1 SDO packaged offering, program number 5741-A06. The z/VM base system, any ordered optional z/VM features, and any ordered SDO licensed products will be delivered as part of the z/VM SDO.

You must specify the disk type to which you will install and the desired distribution medium.

With the ordering of z/VM V5.1, you will receive a system DDR tape, CD-ROM, or DVD containing the program code for z/VM V5.1, an IPLA for 5741-A05, a License Information Document (LID), PoE, program directories, one copy of the basic z/VM V5.1 printed publications, and one copy of the z/VM V5.1 online publications on CD-ROM.

The only change for this announcement regarding the ordering for z/VM V5.1 is the inclusion of the IBM Debug Tool for z/VM V4.1 into the SDO. Refer to Software Announcement 204-057, dated April 7, 2004, for complete ordering information.

**Support for z/VM V5.1**

**Program name:** z/VM Subscription & Support

**Program number:** 5741-SNS

Support for z/VM V5.1 is provided and licensed under the:

- IBM Agreement for Acquisition of Programs and Support (Z125-5790)
- IBM International Agreement for Acquisition of Support (Z125-6011)
- IBM International Agreement for Acquisition of Programs and Support (Z125-5599), with the
- Attachment for Support and its Addendum for Support for z/VM (Z125-6457)

This 5741-SNS order establishes entitlement records as well as support for z/VM V5.1 or the optional features. If an 5741-SNS order is declined, you will only be entitled to support under the basic warranty for z/VM V5.1 (5741-A05).

z/VM has adopted the support lifecycle extensions as announced in Software Announcement 203-204, dated August 12, 2003, which provide for 3 years of technical support after general availability. Therefore,

- Central service for z/VM V5.1 (5741-A05) is planned to be available by IBM until September 30, 2007.
- Central service for z/VM V4.3 was announced to be discontinued on June 30, 2004, in Software Announcement 202-104, dated April 30, 2002. To conform to the 3 year life for technical support, service discontinuance for z/VM V4.3 has been extended until May 31, 2005.
- Central service for z/VM V4.4 was announced to be discontinued on July 31, 2005, in Software Announcement 203-128, dated May 13, 2003. To conform to the 3 year life for technical support, service discontinuance for z/VM V4.4 has been extended until September 30, 2006.

The z/VM S&S provides:

- Corrections that fix substantial deviations of unmodified products from the then-current code, publications, and informal documentation (that is, release notes and memos).
- Software product updates that are improvements, extensions, and other changes IBM, at its discretion, deems to be reasonable.
- Recommended Service Updates (RSUs), new versions, and new releases at no additional charge.

**Technical support:**

- A reasonable amount of remote assistance via telephone, mail, facsimile (fax), or e-mail to address suspected IBM program defects, where available, during normal IBM business hours from Monday through Friday, except local holidays. Exceptions from normal IBM business hours are Severity 1 problems.
- Temporary fixes for problems (where known), where they exist.

Refer to the Addendum for Support for z/VM (Z125-6457) for contact information.

On-site (local) support, although available, is provided as part of the IBM portfolio of fee-based services.

z/VM S&S annual support charges, based on the number of Value Units specified, will be automatically added to your order. If you do not desire the S&S license for z/VM and/or the optional features of DirMaint, RACF for VM, or the Performance Toolkit for VM, you must take specific action to decline this support.

A no-charge S&S registration record will be established on each designated machine where z/VM V5.1 and the priced, optional features of DirMaint, RACF, and the Performance Toolkit for VM are running. These no-charge S&S registration records will be linked to the billable S&S
and all billable S&S within the scope of the engine-based Value Units aggregation will be linked together.

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

The maximum number of engines for a single server to be used to calculate Value Units should not be more than:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Engine Type</th>
<th>Value Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>IFL Standard Engines</td>
<td>800 (2066)</td>
</tr>
<tr>
<td>4</td>
<td>zSeries Offering for Linux</td>
<td>0 (2066-0FL)</td>
</tr>
<tr>
<td>15</td>
<td>zSeries 900</td>
<td>900 (2064)</td>
</tr>
<tr>
<td>4</td>
<td>zSeries 890</td>
<td>890 (2066)</td>
</tr>
<tr>
<td>32</td>
<td>zSeries 990</td>
<td>990 (2064)</td>
</tr>
</tbody>
</table>

There are no changes for this announcement for ordering z/VM V5.1 S&S. Refer to Software Announcement 204-057, dated April 7, 2004, for completing ordering information.

National Language Translation

When you order z/VM V5.1, the National Language Translation files for message repositories, help files, and other panels or files are included with the system.

The following components or features are supported by z/VM V5.1 in the following languages:

- German — CP, CMS (including CMS Utilities), REXX
- Japanese Kanji — CP, CMS (including CMS Utilities), REXX, PIPES

The DirMaint feature provides National Language Translation for DirMaint messages in Kanji and is automatically included with this feature.

To receive the translated help files for DFSMS/VM in Kanji, you must order the no-charge optional DFSMS/VM feature using the z/VM V5.1 System Delivery Option (SDO). You will also receive the base DFSMS/VM feature when ordering DFSMS/VM Kanji feature.

SDO optional Licensed Products updated for z/VM V5.1

The following table provides new feature numbers for the optional licensed product that is new with the availability of z/VM V5.1 announced today. For a complete list of the media feature numbers previously announced for z/VM V5.1, refer to Software Announcement 204-057, dated April 7, 2004.

<table>
<thead>
<tr>
<th>Description</th>
<th>Program number</th>
</tr>
</thead>
<tbody>
<tr>
<td>5654-A23 IBM Debug Tool for z/VM V4.1</td>
<td>5741-A06</td>
</tr>
<tr>
<td>5654-A23 IBM Debug Tool for z/VM V4.1</td>
<td>5741-A06</td>
</tr>
<tr>
<td>5684-043 ISPF V3 DAN</td>
<td>5739-A04</td>
</tr>
<tr>
<td>5684-043 ISPF V3 DES</td>
<td>5739-A04</td>
</tr>
<tr>
<td>5684-043 ISPF V3 DEU</td>
<td>5739-A04</td>
</tr>
<tr>
<td>5684-043 ISPF V3 PTA</td>
<td>5739-A04</td>
</tr>
<tr>
<td>5664-281 3270 PC FileTr</td>
<td>5739-A04</td>
</tr>
</tbody>
</table>

Withdrawn products from the z/VM SDO: The following products are not included in the z/VM V5.1 SDO (5741-A06) as previously announced for z/VM V5.1 in Software Announcement 204-057, dated April 7, 2004.

<table>
<thead>
<tr>
<th>Description</th>
<th>Program number</th>
</tr>
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<tbody>
<tr>
<td>5739-A03 RTM feature</td>
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<tr>
<td>5739-A03 PRF feature</td>
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<tr>
<td>5739-A03 Restricted Source</td>
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<td>5697-TS9 ADSM</td>
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<td>5684-043 ISPF V3 DAN</td>
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<tr>
<td>5684-043 ISPF V3 DEU</td>
<td>5739-A04</td>
</tr>
<tr>
<td>5684-043 ISPF V3 PTA</td>
<td>5739-A04</td>
</tr>
</tbody>
</table>

Preinstalled products and features

Since z/VM V4.1, several products were automatically preinstalled on the base product DDRs. Since then, subsequent releases have integrated additional products in the base of z/VM.

- EREP and ICKDSF
  The prerequisite no-charge products EREP (5654-260) and ICKDSF (5684-042) are preinstalled on the base product system DDRs. If you intend to use EREP or ICKDSF now or at a later date, you must establish a license for billing and shipment of publications by placing an order for each of these products. Because the product code is already preinstalled, you will not receive media but only publications.

- Language Environment
  Language Environment is integrated into the base of z/VM V5.1.

- HCD and HCM
  HCD and HCM provides a comprehensive I/O configuration management environment, similar to that available with the z/OS operating system. HCD and HCM is delivered preinstalled into the base of z/VM V5.1, enabled for use, and is available at no additional charge.

- OpenExtensions Shell and Utilities
  OpenExtensions Shell and Utilities, previously a priced, optional feature of VM/ESA, is included in z/VM V5.1, or later, with no licensing or billing requirements.

- CMS Utilities
  CMS Utilities, which was a priced, optional feature of VM/ESA and z/VM V3.1, is included in z/VM V5.1, or later, at no additional charge.

- Open Systems Adapter Support Facility (OSA/SF)
  OSA/SF (4.4.0) is a host-based tool supporting OSA-2 and OSA-Express features and is included in z/VM V5.1, or later, with no licensing or billing requirements.

- TCP/IP for z/VM and NFS
  The TCP/IP base and the Network File System (NFS) feature of TCP/IP are delivered preinstalled, enabled for use, and are available at no additional charge.
• RSCS V3.2.0

RSCS V3.2.0 (5684-096) is preinstalled with z/VM V5.1, in a disabled state. If you intend to use RSCS for more than operating network-attached printers now or at a later date, you must establish a license for billing and shipment of publications. If you already have a license for the product, you may follow the enablement instructions in the program directory for the product to enable the product for use on your system. A license is established for RSCS V3.2.0 by placing an order for the product. Because the product code is already preinstalled, you will not receive media but only publications.

• DirMaint, RACF for z/VM, and the Performance Toolkit for VM optional features for z/VM V5.1

DirMaint, RACF for z/VM, and the Performance Toolkit for VM optional features for z/VM V5.1 are preinstalled in a disabled state. If you intend to use any one of these features, now or at a later date, you must establish a license for billing and shipment of publications. Enablement instructions are provided in the program directory for each feature to enable the feature for use on your system. A license is established by placing an order for the feature. Because the product code is already preinstalled, your will not receive media but only publications.

Note: The DirMaint feature for z/VM and the Performance Toolkit for VM feature have a new function level, FL510, and operate only on z/VM V5 or later.

**Single version charging**

To elect single version charging, the customer must notify IBM and identify the prior program and replacement program and the machine the programs are operating on.

**Terms and conditions**

**Licensing:** IBM International Program License Agreement. Proofs of Entitlement (PoE) are required for all authorized use.

These products are licensed under the IBM Program License Agreement (IPLA), the associated Agreement for Acquisition of Support, and the Addendum for Support Z125-6547 which provides for support with ongoing access to releases and versions of the program. These programs have a one-time license charge for use of the program and an annual renewable charge for the enhanced support that includes telephone assistance (voice support for defects during normal business hours) as well as access to updates, releases, and versions of the program as long as support is in effect. S/390 and zSeries IBM Operational Support Services —SoftwareXcel is an option for those customers who desire added services.

**Limited warranty applies:** Yes

**Warranty:** This program has warranty for a minimum of one year from acquisition from IBM or authorized IBM Business Partner. The warranty provided to the customer, for at least one year from acquisition, is access to databases (read Web sites) for program information and FAQs, including any known fixes to defects, which customers can download or obtain otherwise and install at their leisure.

**Program support:** Enhanced Support, called Subscription and Support, includes telephone assistance (voice support for defects during normal business hours) as well as access to updates, releases, and versions of the program as long as support is in effect. The customer will be notified of discontinuance of support with 12 months’ notice.

**Money-back guarantee:** If for any reason you are dissatisfied with the program, return it within 30 days from the invoice date to the party (either IBM or its reseller) from whom you acquired it for a refund. This applies only to your first acquisition of the program.

**Copy and use on home/portable computer:** No

**Volume orders (IVO):** No

**Passport Advantage® applies:** No

**Usage restriction:** Yes

- z/VM V5.1 will support the zSeries 990, 900, 890, and 800 or equivalent servers. For information about specific z/VM machine requirements and programming requirements, refer to the z/VM: General Information manual, GC24-6095.
- 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 engines.
- Only Linux workloads in an LPAR or Linux guests of z/VM V5 can operate on the IFL engines and they cannot run other IBM operating systems except z/VM V4 or z/VM V5.
- When ordering z/VM V5.1 or the optional features to operate on any of the standard engines (CPs), you must order Value Units equal to the number of Value Units for the total number of standard engines (CPs) on your zSeries 990, 900, 890, or 800 server.
- When ordering z/VM V5.1 or the optional features to operate on IFL engines, you must order Value Units equal to the number of Value Units for the total number of IFL engines on your zSeries 990, 900, 890, or 800 server.
- When ordering z/VM V5.1 or the optional features to operate on standard engines (CPs) AND IFL engines, you must order Value Units equal to the total number of Value Units for the total number of engines (standard plus IFL) on your zSeries 990, 900, 890, or 800 server.

**Software Maintenance applies:** No

For operating system software, the revised IBM Operational Support Services —SoftwareXcel offering will provide support for those operating systems and associated products that are not available with the newly announced Software Maintenance offering. This will ensure total support coverage for your enterprise needs, including IBM and selected non-IBM products. For complete lists of products supported under both the current and revised SoftwareXcel offering, visit

http://www.ibm.com/services/sl/products

For additional information on the revised IBM Operational Support Services, refer to Services Announcement 601-023, dated July 10, 2001.
**IBM Operational Support Services — SoftwareXcel:** Yes

**Variable charges apply:** No

**Educational allowance available:** Yes, 15% education allowance applies to qualified education institution customers.

**Products eligible for single version charging (SVC)**

SVC is applicable only when running on standard engines and the maximum time for which it applies is 12 months.

<table>
<thead>
<tr>
<th>Replaced program number</th>
<th>Program name</th>
<th>Replacement program number</th>
<th>Program name</th>
</tr>
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<tbody>
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<td>z/VM Version 3</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
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<tr>
<td>5654-030</td>
<td>VM/ESA Version 2</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
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<tr>
<td>5684-112</td>
<td>VM/ESA Version 1</td>
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<td>z/VM V5.1</td>
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<tr>
<td>5664-167</td>
<td>VM/SP™</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
</tr>
<tr>
<td>5664-173</td>
<td>VM/SP HPO</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
</tr>
<tr>
<td>5664-301</td>
<td>VM/IS Base (Core)</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
</tr>
<tr>
<td>5664-308</td>
<td>VM/XA SP</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
</tr>
<tr>
<td>5735-FAL</td>
<td>TCP/IP Version 2</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
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<tr>
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<td>5741-A05</td>
<td>z/VM V5.1</td>
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<tr>
<td>5796-PNA</td>
<td>VM Realtime Monitor</td>
<td>5741-A05</td>
<td>z/VM V5.1 Performance Toolkit for VM feature</td>
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<tr>
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<td>VMMAP</td>
<td>5741-A05</td>
<td>z/VM V5.1 Performance Toolkit for VM feature</td>
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<td>RealTime Monitor</td>
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<td>5741-A05</td>
<td>z/VM V5.1 DirMaint feature</td>
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<tr>
<td>5740-XXH</td>
<td>RACF</td>
<td>5741-A05</td>
<td>z/VM V5.1 RACF for z/VM feature</td>
</tr>
<tr>
<td>5688-198</td>
<td>Language Environment/370</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
</tr>
<tr>
<td>5706-116</td>
<td>DFSMS/VM</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
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<tr>
<td>5668-911</td>
<td>OS/PL/I V2 Library</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
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<td>OS PL/I Resident Library</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
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<td>5741-A05</td>
<td>z/VM V5.1</td>
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<td>VS COBOL II Library Only</td>
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<td>5740-LM1</td>
<td>VS COBOL Library Only</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
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<tr>
<td>5688-039</td>
<td>C/370™ Library</td>
<td>5741-A05</td>
<td>z/VM V5.1</td>
</tr>
</tbody>
</table>

**On/Off Capacity on Demand**

To be eligible for On/Off Capacity on Demand pricing, customers must be enabled for temporary capacity on the corresponding hardware, and the required contract — Z125-6611, Attachment for Customer Initiated Upgrade and IBM eServer On/Off Capacity on Demand —Software —must be signed prior to use.

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The IBM Electronic Service Agent is no-additional-charge software that resides on your IBM eServer system. It is designed to proactively monitor events and transmit system inventory information to IBM on a periodic customer-defined timetable. The IBM Electronic Service Agent tracks system inventory, hardware error logs, and performance information. If the server is under a current IBM maintenance service agreement or within the IBM warranty period, the Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to provide proactive service that maintains higher system availability and performance. In addition, information collected through the Service Agent will be made available to IBM service support representatives when they are helping answer your questions or diagnosing problems.

To learn how IBM Electronic Services can work for you, visit

http://www.ibm.com/support/electronic

**Prices**

The products and features in this announcement have one pricing metric — Value Units based on the number of engines. The change from z/VM V4 pricing applies only to the z/VM V5.1 base and the priced, optional features of DirMaint, RACF, and the Performance Toolkit for VM and the S&S entitlements at the initial order.

The prices for the products and features in this announcement have not been changed from the original announcement of z/VM V5.1. Refer to Software Announcement 204-057, dated April 7, 2004.

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**Reference:** LE001

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**Note:** Shipments will begin after the planned availability date.

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