



IBM z/VM V6.2 - Accelerate the journey to smarter computing with multi-system virtualization and virtual server mobility

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At a glance

With today's announcement, z/VM® V6.2 delivers on the promise of smarter computing with the next step in the evolution of mainframe virtualization. This release is designed to offer:

- Multi-system virtualization clustering technology allowing up to four z/VM instances to be clustered in a Single System Image (SSI) which offers clients:
 - Relief from the challenges associated with virtual machine sprawl on competitive systems
 - A more manageable infrastructure for cloud computing by providing a set of shared resources that can be managed as a single resource pool
 - Live Guest Relocation to move Linux™ virtual servers without disruption to the business, helping to avoid planned outages
 - Enhanced workload balancing with the added ability to move work to available system resources
- Improved systems management to help manage the life cycle of the z/VM hypervisors and the virtual servers
- IPv6 support for enhanced networking security, especially useful for doing business with the US Federal Government

For ordering, contact your IBM® representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: LE001).

Overview

Every IT leader is faced with the challenge of meeting an ever-increasing demand for IT resources while holding to a limited budget. This is leading to an era of information technology in which enterprises address this challenge through an IT transformation that IBM calls smarter computing. Smarter computing is based on an IT infrastructure that is designed for data, tuned to the task, and managed in the cloud. A key element of creating an infrastructure that is tuned to the task is virtualization and today's z/VM announcement focuses on virtualization enhancements that help reduce sprawling IT and provide flexibility to meet user demands with the underpinnings of the security, availability, scalability, and manageability of System z®.

This release introduces the next step in the evolution of mainframe virtualization. Multi-system virtualization helps clients avoid the virtual machine sprawl challenges of competitive systems and extends the z/VM virtualization technology to a new level, allowing up to four instances of z/VM to be clustered together as members in a Single System Image (SSI), where they can be managed as a single z/VM system and share system resources.

With the IBM z/VM Single System Image Feature (VMSSI), a running Linux virtual machine can be relocated from one member system to any other, a process known as Live Guest Relocation. Live Guest Relocation occurs without disruption to the business. It provides application continuity across planned z/VM and hardware outages and flexible workload balancing that allows work to be moved to available system resources.

Simplified systems management is realized with members of a z/VM cluster managed, serviced, and administered as one system. Coordination of members joining and leaving the cluster, maintaining a common view of member and resource states, and negotiating access to shared cluster resources are all done seamlessly. Servicing the z/VM software components of an SSI cluster is simplified by using a single service stream for all members. Sharing resources allows service to be rolled out to each member of the cluster on individual schedules, avoiding an outage for the entire cluster.

A fundamental strength of z/VM, the ability to share all system resources with very high levels of resource utilization, is extended with z/VM V6.2. Within a Single System Image, resources used by the z/VM hypervisors and the virtual machines are shared. This set of shared resources can be managed as a single resource pool and provides a more manageable infrastructure for cloud computing. These resources include User Directory, minidisks, spool files, and network device MAC addresses. Sharing minidisks among members can improve the integrity and performance of the system and provides a foundation for Live Guest Relocation. Sharing resources helps allow guests to access the same devices and networks regardless of which member they are logged on or relocated to.

Realizing the benefits of cloud computing begins with the foundation of smarter computing. z/VM is an integral component of that foundation where servers, operating systems, network resources, and disk storage are virtualized, shared, and dynamically provisioned. The VMSSI feature, with its ability to service and administer multiple instances of z/VM as if they were one integrated system, extending the pool of resources that can be managed and providing the basis for Live Guest Relocation, contributes to an optimized system, tuned for the task of driving greater performance and efficiency for each Linux workload.

To use the functions that define and maintain an SSI cluster, the IBM VMSSI feature must be licensed and enabled.

This support satisfies the statements of direction made in the following IBM Software Announcements:

- Software Announcement [210-234](#), dated July 22, 2010
- Software Announcement [209-401](#), dated October 20, 2009
- Software Announcement [209-207](#), dated July 07, 2009

Network virtualization in z/VM V6.2 includes support for the IBM zEnterprise™ System networks, additional support for IPv6, and support for multiple access ports per guest. Multiple access ports per guest makes it easier to configure server connectivity to multiple VLANs while also allowing users to choose which port numbers will be used.

For the most current information on z/VM, refer to the z/VM website at

<http://www.ibm.com/vm>

Key prerequisites

Refer to the [Hardware requirements](#) and [Software requirements](#) sections for details.

Planned availability date

December 02, 2011

Description

Virtualization technology and Linux enablement

Single System Images with the z/VM Cluster

This release implements multi-system virtualization using a z/VM Single System Image cluster composed of up to four z/VM systems. This multi-system virtualization technology for the mainframe extends the z/VM virtualization technology to a new level, allowing members of the cluster to share resources and synchronize with other nodes, together presenting the appearance of a single system.

Members of a cluster are part of the same Inter-System Facility for Communications (ISFC) collection, and use ISFC channel connections to communicate. All members of a cluster also share DASD for virtual machine and selected z/VM data, as well as LAN segments and IP subnets. The concept of a global virtual switch provides identical network connectivity across all active members within a cluster.

Simplified z/VM systems management is realized when z/VM instances are members of an SSI cluster and can be serviced and administered as one system. Sharing of resources used by both CP and virtual machines is coordinated among all members. This allows Linux guests to access the same devices and networks regardless of which member they are logged on or relocated to. Shared resources include:

- User Directory
- Minidisks
- Spool files
- Network device MAC addresses

Each member of a z/VM SSI cluster is able to communicate with all other active members. When a z/VM system is configured as a member of a cluster, it automatically joins the other members during system startup. Coordination of members joining and leaving the cluster, maintaining a common view of member and resource states, and negotiating access to shared cluster resources are all done seamlessly.

To use the functions that define and maintain a VMSSI cluster, the IBM Single System Image Feature (VMSSI) must be licensed and enabled.

Servicing a Single System Image Feature cluster is more efficient through the use of a single service stream. Time will be saved by the common application of service to all members of the cluster, while flexibility is provided in allowing members to roll out that service on individual schedules, avoiding an outage for the entire cluster. This allows running Linux guests to be relocated to a different member prior to a planned service outage.

Introducing Live Guest Relocation

Live Guest Relocation (LGR) provides the capability for a running Linux virtual machine to be moved without disruption from one z/VM system to another within a Single System Image.

Live Guest Relocation provides continuity for virtual server workloads over planned z/VM and machine outages, such as service and hardware upgrades. LGR allows applications to remain available over such outages with less effect on the application and less setup required. Verification that needed resources and machine features are available on the destination system prior to the relocation is provided. This verification may also be performed on request to assess a guest's eligibility for relocation. In an SSI cluster comprising different machine models, the architecture level presented to each guest is tailored to the set of machine features common to the member systems to which the guest may be relocated.

With the introduction of Live Guest Relocation among members of the SSI cluster, it is increasingly important to identify the level of Linux on System z running within each guest. Unsupported levels of Linux may not operate correctly following relocation. Additional information will be provided at the following website

<http://www.vm.ibm.com/zvm620>

Technology exploitation

IBM zEnterprise 196 and IBM zEnterprise 114

z/VM V6.2 supports the IBM zEnterprise 196 (z196) and IBM zEnterprise 114 (z114) and enables guests to exploit selected new features. In addition, V6.2 will recognize and report processing capability reduction due to customer-initiated power-saving mode or an autonomic response to environmental conditions and will reflect the change and its cause in monitor and accounting data streams. Supporting guests will also be notified of capability changes. The output of the QUERY CAPABILITY command has been enhanced to include information about such machine capacity changes.

System topology information for the z196 and z114 (and the System z10®) is collected in the CP monitor records. A configuration monitor record is used to collect the initial system topology and an event monitor record is cut whenever the system topology as changes.

CP will also collect part of the Basic-machine configuration information, which includes the hardware model number, in a configuration monitor record and an event monitor record.

z196 and z114 driver 93 provides a new physical-system-management time (SysMgmttime) value. z/VM will provide this information in a CP monitor record.

In addition, the Unified Resource Manager has been enhanced with firmware driver level 93 to support life-cycle management of individual members within a z/VM V6.2 SSI environment. Driver 93 is required for managing z/VM 6.2. However, the Unified Resource Manager does not support relocation of managed guests.

OSX and OSM channel path

z/VM includes support for two new System z channel path types (CHPIDs) to enable access to the networks that interconnect the components of the IBM zEnterprise System: zEnterprise 196 and zEnterprise 114, zEnterprise BladeCenter® Extension (zBX) with its integrated optimizers and select IBM blades, and zEnterprise Unified Resource Manager running in a Hardware Management Console (HMC). The new CHPIDs are based on the existing OSA-Express3 OSD channel path types:

- OSA-Express for zBX provides connectivity and access control to the intraensemble data network (IEDN) from the z196 or z114 to Unified Resource Manager functions using an OSA-Express3 or OSA-Express4S 10 Gigabit Ethernet feature configured as CHPID type OSX for application workloads.
- OSA-Express for Unified Resource Manager provides connectivity to the intranode management network (INMN) from the z196 or z114 to Unified Resource Manager functions using an OSA-Express3 1000BASE-T Ethernet feature configured as CHPID type OSM for management related functions.

These subchannels can be brought online and exploited when the z/VM image is managed by the Unified Resource Manager. Dynamic I/O support, using either CP commands or HCD (when z/VM is the controlling LPAR), and CP QUERY capabilities are provided for these two new channel path types.

FICON® Express8S and OSA-Express4S support

IBM has introduced a new I/O drawer and new form factor I/O cards for the z196 and z114 to support a direct Peripheral Component Interconnect Express® Generation 2 (PCIe Gen2) infrastructure with increased capacity, granularity, and infrastructure bandwidth, as well as increased reliability, availability, and serviceability:

FICON Express8S features for the storage area network (SAN) provide for single mode fiber (LX) and multimode fiber (SX) environments with two channels per feature, and two channel path identifiers (CHPIDs).

OSA-Express4S features for the local area network (LAN) provide for single mode fiber (LX, LR) and multimode fiber (SX, LR) environments. The 10 GbE features have one port per feature and one CHPID. The GbE features have two ports per feature and one CHPID shared by the two ports.

XRC time stamping support

z/VM exploits the Server Time Protocol (STP) facility to generate time stamps for guest and system DASD write I/O operations, allowing these I/O operations to be synchronized with those of other systems. This support allows data used by z/VM and its guests to be replicated asynchronously over long distances by IBM System Storage® z/OS® Global Mirror (formerly known as Extended Remote Copy, or XRC). For example, this allows z/VM to participate in a Geographically Disperse Parallel Sysplex® Metro/z/OS Global Mirror (GDPS/MzGM) environment. This satisfies the statement of direction in the XRC Services announcement dated March 23, 2010.

HyperSwap® improvements

The z/VM HyperSwap capability has been updated to provide higher Reliability, Availability, and Serviceability (RAS). The majority of this support is internal to the z/VM hypervisor. However, a noteworthy external change is the addition of INCLUDE and EXCLUDE options to the HYPERSWAP command to provide finer control over the z/VM missing interrupt automatic quiesce trigger. For example, devices can be excluded from the trigger, or with the INCLUDE option the trigger for a device can be made a multiple of the current z/VM MITIME setting. This support can improve the robustness of environments that have deployed z/VM with GDPS®, such as with GDPS/PPRC or GDPS/MzGM.

IBM Extended Address Volumes (EAV) support

The Extended Address Volumes (EAV) function on the IBM DS8000® adds support for ECKD™ volumes up to 262,668 cylinders. z/VM supports using EAV volumes for:

- Devices dedicated to guests
- Fullpack minidisks for guests that support EAV
- DDR
- FlashCopy® SE

CMS has been enhanced to support volumes up to 65,520 cylinders. CP continues to support volumes up to 65,520 cylinders.

IBM XIV® Storage Systems direct attachment support

z/VM supports the direct attachment of IBM XIV Storage Systems for system use (such as paging, spooling, and IPL). This support eliminates the need for z/VM to access XIV devices through the IBM SAN Volume Controller (SVC). This support

provides the ability to define system and guest volumes as emulated devices on XIV devices.

Dynamic emulated device path control

z/VM provides the ability to add and remove paths from an emulated device (representing a real SCSI device) while the device is online and possibly in use. This is especially useful for making configuration changes for z/VM system volumes that cannot be varied offline while z/VM is running.

IBM System Storage TS1140 Tape Drive (3592 Model E07)

The IBM System Total Storage TS1140 Tape Drive (3592 Model E07) can provide IBM System z customers with FICON or ESCON® attachment of the highest capacity, highest performing tape drives offered by IBM. Its corresponding Enterprise Tape, the new Controller Model C07 (or the existing Controller Model C06) can potentially benefit customers who use tape strictly for backup and archive, as well as customers who use tape for other applications.

The Enterprise Tape Controller 3592 Model C07 is the follow-on to the highly successful Enterprise Tape Controller 3592 Model C06 and is designed for FICON-only attached server environments where customers depend on the mainframe-class reliability, performance, and capacity that the 3592 Model C07 can provide. Attachment environments for the 3592 Model C07 with the 3592 Model E07 include:

- IBM 3584 Tape Library
- IBM 3952 F05 Tape Frame
- Stand-alone rack

Note: The 3592 Model E07 tape drive is not supported in the IBM 3494 Tape Library.

z/VM V5.4 and V6.1 support for the 3592 Model E07 tape drive is provided with APAR VM64979. In addition, tape library support for these drives is provided by DFSMS/VM FL221 with RMS APAR VM65005 and its prerequisite service. Attachment of these 3592 E07 drives under the Enterprise Tape Controller Model C07 does not require additional Software Maintenance.

CPU-Measurement Counter Facility host support

CP can collect counter data generated by the CPU-Measurement Facility for MONDATA and MONSET reports and include the counter data in the CP MONITOR data stream. Collection of the counter data can be enabled or disabled with the MONITOR SAMPLE command.

Systems management

Support for the IBM zEnterprise Unified Resource Manager

The IBM zEnterprise System is a workload-optimized multiplatform computing environment which spans and tightly integrates mainframe and distributed technologies. The IBM zEnterprise System consists of an IBM zEnterprise 196 (z196) or zEnterprise 114 (z114), the IBM zEnterprise BladeCenter Extension (zBX), and the IBM zEnterprise Unified Resource Manager. The Unified Resource Manager is a workload-optimized multiplatform Manager, running in a Hardware Management Console (HMC), which controls virtual server life-cycle management, which enables attached blades to help deliver end-to-end virtualization, and supports directed and dynamic virtual server provisioning across all hypervisors in the ensemble (PR/SM™, z/VM, and Power® VM) from a single uniform point of control.

Augmenting the existing z/VM virtual server management functions available on System z10, this support now also permits virtual servers to be created and deleted, allows real and virtual networking resources to be created and deleted, and allows real and virtual networking resources to be managed by the Unified Resource Manager.

Within a zEnterprise, a single z196 or z114 and an optional attached zBX is called a node. A collection of one or more zEnterprise nodes that are managed as a single logical virtualized system by the Unified Resource Manager is called an ensemble. An ensemble can consist of a single z196 or z114 with no zBX attached, or two to eight CPCs where at least one of the z196 or z114 machines has a zBX attached.

The intranode management network (INMN) is a 1000BASE-T Ethernet network that allows the Unified Resource Manager to manage the resources within a zEnterprise node. The intraensemble data network (IEDN) is a 10 Gigabit Ethernet network for application data communications within an ensemble. Data communications for workloads can flow over the IEDN within and between nodes of an ensemble. All of the physical and logical resources of the IEDN are configured, provisioned, and managed by the Unified Resource Manager.

The z/VM Systems Management Application Programming Interface (SMAPI), the Performance Toolkit for VM, and the z/VM Directory Maintenance Facility (DirMaint™) have been enhanced to enable the Unified Resource Manager to manage the z/VM hypervisor and the virtual servers it supports. The SMAPI enhancements provide new and updated APIs and function in the following functional areas:

- System configuration file management
- User directory management
- Disk management
- Network management
- Discontiguous saved segment (DCSS) management
- Guest facilities management
- Directory parsing
- API function level interrogation
- Performance and events management
- Image management

z/VM installation has been enhanced to create a system configuration which would allow management by the Unified Resource Manager or some other SMAPI client.

Dynamic discovery of FCP disks

The SCSIDISC utility, previously provided as a sample program, is now a fully supported part of z/VM. The SCSIDISC utility provides information about the DASD logical units (LUNs) accessible through virtual FCP devices available to the virtual machine. Using DASD that implement the Small Computer System Interface (SCSI) in emulated devices and directly attached FCP devices requires specific knowledge of the of the storage area network topology. The SCSIDISC utility provides a means to analyze this topology with no prior knowledge of it.

Enhanced systems management APIs

The z/VM systems management APIs have been enhanced to integrate the z/VM SSI clusters environment and other new functionality in z/VM V6.2, along with enhancements supporting the IBM zEnterprise Unified Resource Manager.

Enhanced Directory Maintenance Facility

The Directory Maintenance Facility for z/VM, function level 620, has been enhanced to support z/VM SSI clusters along with additional enhancements supporting the IBM zEnterprise Unified Resource Manager. New capabilities include support for the enhanced directory syntax for SSI, conversion of directory contents to aid transition to an SSI cluster and assistance in adjusting the directory when adding a member to the cluster.

These enhancements include:

- Several DirMaint commands have been updated to support new IDENTITY and SUBCONFIG directory entries and the new BUILD directory statement.
- The ADD command has been updated for cloning SUBCONFIG entries. In support of this, a new SSI_VOLUMES section has been added to the EXTENT CONTROL file.
- The DIRECTORY command has been updated to add, change or delete the SSI option and additional volume labels.
- The GLOBALOPTS, OPTION and SETOPTN commands have been updated to add, delete, alter or query the new CHPIDVIRTUALIZATION option.
- A new DIRM SSI command has been added to prepare a source directory for use within an SSI cluster.
- A new UNDOSSI command has been added to reverse changes made to a source directory by the DIRM SSI command.
- A new VMRELOCATE command has been added to support the new VMRELOCATE directory statement in a user or profile entry.
- New support has been added for the satellite server machines to act as a spool file bridge for commands to and responses from the DIRMAINT machine for users on remote nodes to the DIRMAINT machine in an SSI environment.

Enhanced Performance Toolkit

The Performance Toolkit for VM, function level 620, has been enhanced to provide the following new information in its reports:

- SSI cluster data
- CPU-Measurement Facility host counters
- Channel subsystem ID values
- Memory constraint relief values
- Multiple access ports per guest values
- Capacity-Change Reason and Capacity-Adjustment Indication values
- Ensemble membership and ID values
- Server Time Protocol (STP) Facility Configuration values
- Virtual NIC types, including IEDN and INMN
- Reorder settings for virtual machines
- New commands: FCONTROL EMERGENC and FCONTROL DUMPID

In addition, previously the MONWRITE module was generated to load at storage location X'20000' which would prevent other programs generated at the same storage location from being executed if called using the EXEC exit support on the MONWRITE command. The MONWRITE module is now generated as relocatable increasing the flexibility and usability of its EXEC exit support by allowing these additional programs to execute.

Network virtualization

Support for IBM zEnterprise System networks

z/VM enables access to the IBM zEnterprise System intranode management network (INMN) and intraensemble data network (IEDN) through its real and virtual networking capabilities. As a result, the deployment and management of z/VM network topology is integrated into the zEnterprise environment and can be managed by the Unified Resource Manager. When connected to a z196 or z114 through the INMN, the resources of the zBX are viewed as a logical extension of the z196/z114. These resources are then controlled and managed through the Hardware Management Console (HMC) and Support Element (SE) of the z196/z114. The INMN requires an OSA-Express3 1000BASE-T while the IEDN requires a port on two separate OSA-Express3 or OSA-Express4S 10 GbE features. Managing z/VM 6.2 from the Unified Resource Manager requires the zEnterprise z196 and z114 to be at a firmware driver level 93G.

MPROUTE upgrade

The z/VM MPROUTE server has been upgraded to provide functional equivalency to z/OS V1.12 OMPROUTE. z/VM MPROUTE now supports RFC 4191 and RFC 5175. For more information, refer to *z/VM: TCP/IP Planning and Customization*.

Additional IPv6 support

Support for IPv6 has been included in:

- z/VM TCP/IP FTP client and server
- z/VM TCP/IP SMTP client and server
- CMS NOTE and SENDFILE commands

The combination of these networking enhancements enables agencies doing business with the US Federal Government to support IPv6-based transmissions.

FTP enhancements

The following enhancements have been made to FTP:

- User passwords are now suppressed in trace output of the FTP server.
- File sizes reported in LIST output are now correct when using LISTFORMAT UNIX™ when the correct transfer mode was selected via LISTFORMAT UNIX.
- The SIZE column in the LIST output when in LISTFORMAT UNIX was increased to be able to show large file sizes.
- Broken SFS ALIAS files are now correctly handled.
- Wildcard support was implemented for BFS file systems (removing an existing restriction).

Multiple access ports per guest

z/VM now provides the ability for a guest to have multiple unique access ports connected to the same virtual switch instance. Each access port has its own attributes (promiscuous and OSDSIM authority) and VLAN ID. Methods to associate guest NICs and virtual switch ports are also provided. With this support, configuring a server to provide connectivity to multiple VLANs is easier because the guest does not need to be VLAN-aware. In addition, customers can choose which port numbers will be used. Because the mapping of systems to switch ports is known ahead of time, SNMP monitoring of the switch status is more useful, allowing virtual switches to be monitored and managed more like real switches. For more information, refer to *z/VM: Connectivity*.

OSA Address Table support

The z/VM TCP/IP NETSTAT command has been enhanced with an option to display information such as IP addresses and MAC addresses from the OSA Address Table (OAT) for OSA devices including those managed by virtual switch controllers. Installation of OSA/SF to satisfy diagnostic requirements in service situations is no longer necessary for OSA-Express3 devices.

LDAP server upgrade

The z/VM TCP/IP LDAP server and utilities have been upgraded to equivalency with z/OS V1.12.

Scalability

Memory constraint relief

Frame allocation management has improved system memory scalability and decreased memory and processor constraints for larger memory sizes.

Disabling the guest page reordering process

The SET REORDER command allows the guest page reordering process to be disabled for the entire z/VM system or for specific virtual machines, helping to improve performance for guests with large memory footprints. The QUERY REORDER command displays the system default reorder setting or the reorder setting for a specific virtual machine.

Improved page release serialization

The page release serialization process has been improved to help reduce system overhead and increase guest throughput.

Enhanced contiguous frame coalescing

Contiguous frame coalescing algorithms have been enhanced to increase the probability and reduce the overhead of z/VM finding multiple adjacent frames of real memory when necessary, helping to increase system throughput.

Alternate method for hard limiting of scheduled system resources

z/VM supports a new LIMITHARD operand on the SET SRM command. This operand selects the method the CP scheduler will use to enforce the hard limiting of scheduled system resources. This setting affects only users with absolute maximum shares defined with the SET SHARE command or the SHARE directory statement. The LIMITHARD CONSUMPTION option selects a method of hard limiting that is based on a guest's measured processor utilization. The LIMITHARD DEADLINE option selects the traditional method of hard limiting, which enforces limits based on a calculated deadline. The CONSUMPTION method, which is the default, is generally more accurate than the DEADLINE method.

Security

z/VM SSL server upgrade and FIPS support

The z/VM SSL server has been upgraded to use z/OS V1.12 System SSL technology. The z/VM SSL server includes support for the Federal Information Protection Standard (FIPS) 140-2. FIPS is a government required procedure for authenticating the security of a certificate database that requires signing of the database and using separate cipher suites for traffic encryption and decryption.

Additional enhancements to the z/VM SSL server improve the ability to provide concurrent secure connectivity by increasing its overall capacity while decreasing the amount of system resources it requires:

- A new threading model has been implemented to improve the handling of multiple worker threads.
- Support for multiple SSL servers allows for a pool of SSL servers to work in conjunction with a single TCP/IP stack.

ESM access control for real devices

The CP ATTACH and GIVE commands have been enhanced to enable use of an external security manager (ESM) to provide mandatory access control and discretionary access control for real devices. Which guests can connect to z/VM real devices can be controlled by using profiles in the new VMDEV resource class. z/VM can call the ESM for an authorization check in the VMDEV class when connecting a real device to a virtual machine for exclusive use or when connecting a tape device to a virtual machine for shared use.

ESM access control for SET SECUSER and SET OBSERVER

The CP SET SECUSER command, which specifies a single console image facility (SCIF) secondary user ID for a virtual machine, and the SET OBSERVER command, which specifies a virtual machine to receive console output for another virtual

machine, can now be used when ESM mandatory access control (security label checking) is active.

Enhanced RACF® Security Server

The RACF Security Server for z/VM, function level 620, has been enhanced to provide the following:

- Support for z/VM SSI clusters
When RACF is used in a z/VM SSI cluster, all member systems will share the RACF database, providing z/VM guests with a common and consistent security image.
- Support for defining protected user IDs
Protected user IDs are protected from being used to log on to the system and from being revoked through inactivity or unsuccessful attempts to access the system using incorrect passwords and password phrases.
- Mandatory access control and discretionary access control for z/VM real devices (CP ATTACH and GIVE commands)
- Mandatory access control for the CP SET SECUSER and SET OBSERVER commands

Crypto Express3 support

z/VM provides guest support for the Crypto Express3 feature on supported IBM System z servers. Like the Crypto Express2, the Crypto Express3 can be defined as either a coprocessor or an accelerator and supports both encrypted key and clear key applications. In addition to the guest support, the QUERY CRYPTO command has been enhanced to provide information about users who have virtual crypto queues defined for sharing.

Protected key CPACF support

The CP Assist for Cryptographic Functions (CPACF) hardware feature supports high-performance bulk encryption using clear cryptographic keys, and also supports encrypted keys that are enabled for guest use. z/VM supports machine generated cryptographic wrapping keys and generates unique wrapping key masks for each guest virtual machine. This ensures that the encrypted keys can be used only by the guest for which the keys are intended.

EAL4+ certification for z/VM V6.1

z/VM V6.1 with the RACF Security Server optional feature, including labeled security, is being evaluated and certified for conformance to the Operating System Protection Profile (OSPP) of the Common Criteria standard for IT security, ISO/IEC 15408, at Evaluation Assurance Level 4+ (EAL4+). This satisfies the statement of direction made in the IBM Software Announcement dated July 22, 2010.

All of the z/VM V6.1 service items that were included in the EAL4+ certification are included in the z/VM V6.2 base product.

Application enablement

z/Architecture® CMS

z/Architecture CMS (z/CMS), previously shipped as a sample program, is now a fully supported part of z/VM. z/CMS runs in IBM z/Architecture 31-bit addressing mode in an ESA or XA virtual machine and enables CMS programs to use z/Architecture instructions, including those that operate on 64-bit registers, while permitting existing ESA/390 architecture CMS programs to continue to function without change.

z/CMS protects customers' existing investment in CMS-based applications and infrastructure, and enables new applications to be developed which exploit features and instructions available only in z/Architecture.

Program Management Binder upgrade

The Program Management Binder for CMS has been upgraded to the Binder level shipped with z/OS V1.12 MVS™ Program Management. The new level of the Binder includes the following enhancements:

- The COMPAT option of the BIND command includes three new suboptions: ZOSV1R10, ZOSV1R11, and ZOSV1R12.
- The RMODE option of the BIND command includes new suboptions.
- The IEWPARMS DDNAME file can be used to set Binder options.
- The Binder includes a new C/C++ API.

Language Environment® upgrade

The z/VM Language Environment runtime libraries have been upgraded to z/OS V1.12 equivalency.

Support for XL C/C++ Compiler for z/VM, V1.3

z/VM V6.2 supports the IBM XL C/C++ Compiler for z/VM, V1.3, which is a z/VM-enabled version of the z/OS V1.12 XL C/C++ compiler.

For further information on the IBM XL C/C++ For z/VM V1.3 product, refer to Software Announcement [211-369](#), dated October 12, 2011.

Installation, serviceability, and packaging

IBM z/VM Single System Image Feature

The new IBM Single System Image Feature (VMSSI) enhances the z/VM systems management, communications, disk management, device mapping, virtual machine definition management, installation, and service functions to enable multiple z/VM systems to share and coordinate resources within a Single System Image (SSI) structure. This combination of enhanced functions provides the foundation that enables Live Guest Relocation, which is the ability for a Linux guest to be moved from one z/VM system to another within the SSI cluster.

This optional feature must be ordered through the z/VM System Delivery Offering (SDO). For information about the license requirements for this feature, refer to *z/VM: License Information*.

This support satisfies the statement of direction made in the IBM Software Announcements dated July 7, 2009, October 20, 2009, and July 22, 2010.

Installation process improvements

A number of enhancements have been made to the z/VM installation process. The process supports installation of either a non-SSI (traditional) z/VM system or an SSI cluster consisting of from one to four members. The installation procedure has been restructured so that all planning information is gathered at one time and installation is initiated with a single command. This change minimizes the chance of errors, as the planning information is validated before the actual installation begins. Additionally, customers are now able to specify labels for all DASD volumes, including the system residence volume.

VMSES/E enhancements

VMSES/E has been enhanced to support z/VM SSI clusters. Product service disks and inventory are shared by all member systems in an SSI cluster. Each member of the cluster has its own production disks, allowing flexibility for placing new service into production in a staged fashion. With the Single System Image Feature Linux guests can be moved from one SSI member to another ahead of most planned outages, such as those required for service and hardware upgrades. Without the relocation capability, an outage for the guest would be necessary.

VMSES/E has been enhanced to record the serviced objects and copy only those serviced objects to the appropriate production disks. Previously, entire disks were copied. This change is less disruptive to the running system. A new release-specific maintenance user ID is supplied for the cluster and this user ID owns the product service disks, including the test build disks.

Common service file pool

A new common service file pool, VMPSFS, contains the service directories for any products installed to SFS. This common file pool allows members of the cluster to share information stored within the file pool.

Miscellaneous

Withdrawal of support

With z/VM V6.2, IBM has withdrawn support for the following functions:

- Kerberos Authentication System. This satisfies the statement of direction made in IBM Software Announcement [208-249](#), dated August 05, 2008.
- Native Domain Name System (DNS) server (NAMESRV). IBM will continue to support the use of DNS servers on other platforms for TCP/IP host name resolution. This satisfies the statement of direction made in IBM Software Announcements [209-207](#), dated July 07, 2009, and [210-234](#), dated July 22, 2010.
- RESOURCE function of the VMSES/E VMFINS command. The NORESOURCE option will continue to be supported on the VMFINS command and is the default. This satisfies the statement of direction made in IBM Software Announcement [210-234](#), dated July 22, 2010.

Shipping the zMAP agents with z/VM discontinued

The z/VM Manageability Access Point (zMAP) Agent and Platform Agent for the IBM Systems Director Server for Linux on System z, previously shipped with z/VM V6.1, are no longer shipped with z/VM V6.2.

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 V6 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 flat price per unit. Instead, additional capacity is priced starting at the capacity (processors) on which z/VM V5 has already been installed, which may result in a lower unit price.

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

A no-charge Subscription and Support registration record will be established for each designated machine where z/VM V6.2 and the priced, optional features of Single System Image Feature, DirMaint, RSCS, RACF Security Server, and the Performance Toolkit for VM are running. These no-charge Subscription and Support

registration records will be linked to the billable Subscription and Support and all billable Subscription and Support within the scope of the engine-based Value Units aggregation will be linked together.

Subscription and Support (S&S) is an annual charge and should be kept at an annual term.

Product positioning

The success of Linux on System z can be attributed in part to the business value that Linux-based solutions derived from the IBM mainframe virtualization technology provided by z/VM running on IBM System z servers. z/VM technology offers the ability to host a large number of Linux servers on a single mainframe while also providing a highly flexible, adaptable, and efficient operational environment that is well-suited for a dynamic infrastructure.

Today's announcement strengthens the z/VM offering by allowing you to manage, service, and administer up to four z/VM systems running in separate LPARs or separate servers as if they were one z/VM system. This cluster of z/VM systems is called a Single System Image. z/VM support for Live Guest Relocation allows running guests to be relocated to a different member within the Single System Image prior to a planned outage.

z/VM V6.2 operates on IBM System z10, zEnterprise 196 and 114, and newer servers. Like z/VM V5, z/VM V6 requires z/Architecture (64 bit) for execution and can host 31-bit (ESA/390) guest operating systems and z/Architecture (64-bit) guest operating systems.

Clients can add capacity to IBM mainframe servers for hosting Linux on System z workloads by configuring their servers with Integrated Facility for Linux (IFL) processors.

z/VM V6.2 provides additional support and exploitation opportunities for many 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.

Statement of direction

- **Support for HiperSockets™ Completion Queue**

IBM plans to support transferring HiperSockets messages asynchronously, in addition to the current synchronous manner on z196 and z114. This data transfer method can be especially helpful in burst situations. The Completion Queue function is designed to allow HiperSockets to transfer data synchronously if possible and asynchronously if necessary, thus combining ultra-low latency with more tolerance for traffic peaks. HiperSockets Completion Queue is planned to be supported in a future z/VM deliverable.

- **Support for HiperSockets integration with the Intraensemble Data Network (IEDN)**

Within a zEnterprise environment, it is planned for HiperSockets to be integrated with the intraensemble data network (IEDN), extending the reach of the HiperSockets network outside of the central processor complex (CPC) to the entire ensemble, appearing as a single Layer 2 network. HiperSockets integration with the IEDN is planned to be supported in a future z/VM deliverable.

- **Support for High Performance FICON (zHPF) Guest Exploitation**

IBM intends to provide support for guest virtual machines utilizing the High Performance FICON for System z (zHPF) I/O protocol. z/VM will support guest operating systems that issue single track as well as multiple track zHPF I/O.

- **Support for GDPS 3.8 Hyperswap**

IBM intends to provide in a future z/VM release support for Disk subsystem pre-emptive HyperSwap and Summary event notification for PPRC suspend scalability. These two new functions are applicable to GDPS/PPRC 3.8 and supporting IBM DASD hardware. In addition, IBM intends to provide in a future z/VM release support for an alternate subchannel set to place PPRC secondary devices. This support is also applicable to GDPS/PPRC 3.8.

- **Stabilization of z/VM Performance Toolkit rmfpm support**

z/VM Performance Toolkit support for rmfpm has been stabilized and may cease to function as the underlying Linux system evolves. Support for the Linux rmfpm agent has already been withdrawn and is available on an as-is basis.

- **Withdrawal of HMC z/VM Tower Systems Management**

z/VM V6.2 is intended to be the last release supported by the HMC z/VM Tower function management originally introduced with System z9®. The alternative implementation of virtual server and virtual resource management for z/VM V6 continues to be supported by the zEnterprise Unified Resource Manager on a zEnterprise server or later.

- **Withdrawal of Support for A220 and CLAW Device Drivers**

z/VM V6.2 is intended to be the last release to support HYPERchannel Processor Adapter 42990007 and HYPERchannel Series A devices and HYPERchannel Series DX devices which are functioning as Series A devices.

- **Withdrawal of z/VM Dynamic Host Configuration Protocol (DHCP) Server**

z/VM V6.2 is intended to be the last release to support a native Dynamic Host Configuration Protocol (DHCP) server.

- **Withdrawal of z/VM Line Printer Daemon (LPD) Server Support**

z/VM V6.2 is intended to be the last release to support a native Line Printer Daemon (LPD) link driver. IBM recommends using RSCS for remote printing instead, but plans to continue to support the LPR client for use with LPD on other platforms.

- **Withdrawal of the OVERRIDE Utility and UCR Support**

z/VM V6.2 is intended to be the last release to support the OVERRIDE utility and User Class Restructuring (UCR). IBM supports native CP commands for the creation and modification of privilege classes and recommends the use of these commands instead of OVERRIDE today.

- **Withdrawal of CSE**

z/VM V6.2 is intended to be the last release to support the Cross System Extensions (CSE) environment. The z/VM VMSSI feature, introduced in z/VM V6.2, includes most of the functionality in CSE, and extends it with new capabilities such as Live Guest Relocation and autonomic minidisk cache management. VMSSI is the new technology for clustering z/VM systems.

IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion. Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

Reference information

For information about the System zEnterprise, refer to the following.

For z114 hardware capabilities, refer to:

- Hardware Announcement [111-136](#), dated July 12, 2011

For z196 hardware capabilities, refer to:

- Hardware Announcement [111-167](#), dated October 12, 2011
- Hardware Announcement [111-121](#), dated July 12, 2011
- Hardware Announcement [110-170](#), dated July 22, 2010
- Hardware Announcement [110-177](#), dated July 22, 2010

For information about the System z10 Enterprise Class, refer to:

- Hardware Announcement [109-678](#), dated October 20, 2009
- Hardware Announcement [109-417](#), dated July 21, 2009
- Hardware Announcement [109-230](#), dated April 28, 2009
- Hardware Announcement [108-794](#), dated October 21, 2008
- Hardware Announcement [108-296](#), dated May 06, 2008
- Hardware Announcement [108-154](#), dated February 26, 2008

For information about the System z10 Business Class, refer to:

- Hardware Announcement [109-678](#), dated October 20, 2009
- Hardware Announcement [109-417](#), dated July 21, 2009
- Hardware Announcement [109-230](#), dated April 28, 2009
- Hardware Announcement [108-754](#), dated October 21, 2008

For z/VM V6.1 capabilities, refer to:

- Software Announcement [210-234](#), dated July 22, 2010
- Software Announcement [209-401](#), dated October 20, 2009
- Software Announcement [209-207](#), dated July 07, 2009

For z/VM V5.4 capabilities, refer to:

- Software Announcement [208-249](#), dated August 05, 2008

For information about FICON Express8, refer to:

- Hardware Announcement [109-417](#), dated July 21, 2009

Program number

Program name	Program number
z/VM version 6 (V6.2)	5741-A07
z/VM version 6 SDO (V6.2)	5741-A08
z/VM subscription & support (V1.1)	5741-SNS

Note: z/VM V6.2 and the optional features must be ordered using the z/VM V6.2 SDO packaged offering, program number 5741-A08. Program number 5741-A07 is used for pricing, billing, and central service.

Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld® ID and password are required (use IBM ID).

Education support

IBM Training 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 for System z. IBM Training also provides on-site training with customized content and course materials for small or large groups.

The z/VM and Linux course catalog includes:

- ZV020 - **z/VM Introduction and Concepts** (3 days)
- ZV100 - **z/VM and Linux Connectivity and Management** (3.5 days)
- ZV060 - **Installing, Configuring and Servicing z/VM for Linux Guests** (5 days)
- MZ062 - **Installing, Configuring and Servicing z/VM for Linux Guests** (Instructor-led Online (ILO) - 5 days)
- ZV200 - **z/VM RACF and DirMaint Implementation** (4.5 days)

The Linux course catalog includes:

- ZL120 - **Linux Basics - A zSeries® Perspective** (2 days)
- ZL100 - **Linux Implementation for zSeries** (3 days)
- ZL150 - **Advanced Solutions for Linux on zSeries** (4 days)
- ZL180 - **Automated Deployment of Linux Images under z/VM** (4.0 days)

Private offerings of these classes and customized education may also be requested from IBM.

For information on these courses or additional z/VM education, contact your local IBM IT Education Services (ITES) or call IBM Training at 800-IBM-TEACH (426-8322) for catalogs, schedules, and enrollments.

You may also visit the IBM Training website at

<http://www.ibm.com/training/>

For z/VM and Linux education, select "Training Finder - US," then under "Technology area," select "Mainframe servers," then under "Mainframe servers," select "z/VM and Linux."

For Linux education, select "Training Finder - US," then under "Technology area," select "Linux," then "Linux on System z."

IBM IT Training offers various savings programs on IBM education. For more information on the savings programs available in your country, visit the IBM Training website at

<http://www.ibm.com/training/>

Select "Browse for training by country," select a country, then select "IBM Education Pack."

Technical Conferences

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).

For more information about IBM Technical Conferences, visit

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

Information on live virtual classes available for z/VM, Linux, and z/VSE® can be found at

<http://www.ibm.com/vm/education/lvc>

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

<http://www.ibm.com/vm/education/>

Offering Information

Product information is available via the Offering Information website

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

Publications

Publications within the z/VM V6.2 library are available as Adobe™ PDF files and IBM BookManager® files. z/VM V6.2 documentation is also available in the z/VM V6.2 Information Center.

Some publications are also available in printed format. Basic publications are automatically shipped in printed format, at no additional charge, when you order the z/VM V6.2 base product. The other publications are supplied only in PDF or BookManager format with z/VM V6.2.

All z/VM publications can also be obtained separately from IBM (printed publications require payment of a fee) using the specific publication numbers through the IBM Publications Center at

<http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>

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 20 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.

News of many publications may be subscribed with "My notifications" at

<http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>

Note: This IBM website requires you to register for an ID and password.

Adobe PDF files

Publications that are available in PDF format are provided on the *IBM Online Library: z/VM Collection* except for the following:

- z/VM: Installation Guide

One copy of the DVD is supplied with z/VM V6.2, at no additional charge. Additional copies of the DVD are available (for a fee) from the Publications Center website at

<http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>

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

<http://www.ibm.com/vm/library/>

You can view a PDF file using the Adobe Reader, that is available free from the Adobe website 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 Online Library: z/VM Collection*.

One copy of the DVD is supplied with z/VM V6.2, at no additional charge. Additional copies of the DVD are available (for a fee) from the Publications Center website at

<http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>

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

<http://www.ibm.com/vm/library/>

The BookManager files can be read by either BookManager READ for VM (a separately orderable product) or IBM Softcopy Reader (supplied on the DVD).

z/VM V6.2 Information Center

IBM also publishes the z/VM V6.2 documentation (information for the z/VM base and optional features) in an information center using the IBM Eclipse Help System framework.

The z/VM V6.2 Information Center is planned to be available:

- On an IBM website at
<http://publib.boulder.ibm.com/infocenter/zvm/v6r2/index.jsp>
- On a DVD, which allows you to install the z/VM Information Center on a workstation or intranet. The DVD is orderable (for a fee) using form number SK5T-7098 from the Publications Center website at

<http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>

Printed books

All z/VM V6.2 basic publications are available as printed books and are orderable from the Publications Center.

One copy of the basic z/VM V6.2 printed publications, and one copy of the z/VM V6.2 online publications DVD, are supplied automatically with the basic machine-readable material.

z/VM V6.2 publications

All new edition and unchanged publications for z/VM V6.2 are listed below. All publications are planned to be available from the Publications Center, z/VM Internet Library, and the z/VM Information Center on December 02, 2011.

Basic z/VM V6.2

Title	Order number	Format		
		PDF	BKM	Print
z/VM: Installation Guide	GC24-6246	X		X
z/VM: License Information	GC24-6200	X		X

BKM = BookManager

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

Note: The *z/VM: Getting Started with Linux on System z* is not available in printed format nor shipped with your order. The *z/VM Summary for Automated Installation*

and Service (Tape Installation) and z/VM Summary for Automated Installation and Service (DVD Installation) have been discontinued with z/VM V6.

z/VM V6.2 Base

Updated or new for z/VM V6.2:

Title	Order number	Format	
		PDF	BKM
z/VM: CMS and REXX/VM Messages and Codes	GC24-6161	X	X
z/VM: CMS Application Development Guide	SC24-6162	X	X
z/VM: CMS Application Development Guide for Assembler	SC24-6163	X	X
z/VM: CMS Callable Services Reference	SC24-6165	X	X
z/VM: CMS Commands and Utilities Reference	SC24-6166	X	X
z/VM: CMS File Pool Planning Administration, and Operation,	SC24-6167	X	X
z/VM: CMS Macros and Functions Reference	SC24-6168	X	X
z/VM: CMS Planning and Administration	SC24-6171	X	X
z/VM: CMS User's Guide	SC24-6173	X	X
z/VM: Connectivity	SC24-6174	X	X
z/VM: CP Commands and Utilities Reference	SC24-6175	X	X
z/VM: CP Exit Customization	SC24-6176	X	X
z/VM: CP Messages and Codes	GC24-6177	X	X
z/VM: CP Planning and Administration	SC24-6178	X	X
z/VM: CP Programming Services	SC24-6179	X	X
z/VM: Diagnosis Guide	GC24-6187	X	X
z/VM: General Information	GC24-6193	X	X
z/VM: Getting Started with Linux on System z	SC24-6194	X	X
z/VM: Glossary	GC24-6195	X	X
z/VM: Group Control System	SC24-6196	X	X
z/VM: I/O Configuration	SC24-6198	X	X
z/VM: Language Environment User's Guide	SC24-6199	X	X
z/VM: Migration Guide	GC24-6201	X	X
z/VM: OpenExtensions Callable Services Reference,	SC24-6203	X	X
z/VM: Other Components Messages and Codes	GC24-6207	X	X
z/VM: Performance	SC24-6208	X	X
z/VM: Performance Toolkit Guide	SC24-6209	X	X
z/VM: Performance Toolkit Reference	SC24-6210	X	X
z/VM: Program Management Binder for CMS	SC24-6211	X	X
z/VM: REXX/VM Reference	SC24-6221	X	X
z/VM: Running Guest Operating Systems	SC24-6228	X	X
z/VM: Saved Segments Planning and Administration	SC24-6229	X	X
z/VM: Secure Configuration Guide	SC24-6230	X	X
z/VM: Service Guide	GC24-6247	X	X
z/VM: System Operation	SC24-6233	X	X
z/VM: Systems Management Application Programming,	SC24-6234	X	X
z/VM: TCP/IP Diagnosis Guide	GC24-6235	X	X
z/VM: TCP/IP LDAP Administration Guide	SC24-6236	X	X
z/VM: TCP/IP Messages and Codes	GC24-6237	X	X
z/VM: TCP/IP Planning and Customization	SC24-6238	X	X
z/VM: TCP/IP Programmer's Reference	SC24-6239	X	X
z/VM: TCP/IP User's Guide	SC24-6240	X	X
z/VM: VM Dump Tool	GC24-6242	X	X
z/VM: VMSES/E Introduction and Reference	GC24-6243	X	X

BKM = BookManager

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

z/VM V6.2 Base - Unchanged editions

Not updated for z/VM V6.2:

Publications

Title	Order number	Format	
		PDF	BKM
z/VM: CMS Application Multitasking	SC24-6164	X	X
z/VM: CMS Pipelines Reference	SC24-6169	X	X
z/VM: CMS Pipelines User's Guide	SC24-6170	X	X
z/VM: CMS Primer	SC24-6172	X	X
z/VM: CPI Communications User's Guide	SC24-6180	X	X
z/VM: Dump Viewing Facility	GC24-6191	X	X
z/VM: Enterprise Systems Architecture/ Extended Configuration Principles of Operation,	SC24-6192	X	X
z/VM: OpenExtensions Advanced Application Programming Tools	SC24-6202	X	X
z/VM: OpenExtensions Commands Reference	SC24-6204	X	X
z/VM: OpenExtensions POSIX Conformance Document	GC24-6205	X	X
z/VM: OpenExtensions User's Guide	SC24-6206	X	X
z/VM: Reusable Server Kernel Programmer's Guide and Reference	SC24-6220	X	X
z/VM: REXX/VM User's Guide	SC24-6222	X	X
z/VM: Virtual Machine Operation	SC24-6241	X	X
z/VM: XEDIT Commands and Macros Reference	SC24-6244	X	X
z/VM: XEDIT User's Guide	SC24-6245	X	X

BKM = BookManager

Optional RACF Security Server Feature - New editions

Updated for z/VM V6.2:

Title	Order number	Format	
		PDF	BKM
z/VM: RACF Security Server Auditor's Guide	SC24-6212	X	X
z/VM: RACF Security Server Command Language Reference	SC24-6213	X	X
z/VM: RACF Security Server Macros and Interfaces	SC24-6216	X	X
z/VM: RACF Security Server Messages and Codes	GC24-6217	X	X
z/VM: RACF Security Server Security Administrator's Guide	SC24-6218	X	X
z/VM: RACF Security Server System Programmer's Guide	SC24-6219	X	X
z/VM: Security Server RACROUTE Macro Reference	SC24-6231	X	X

BKM = BookManager

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

Optional RACF Security Server Feature - Unchanged editions

Not updated for z/VM V6.2:

Title	Order number	Format	
		PDF	BKM
z/VM: RACF Security Server Diagnosis Guide	GC24-6214	X	X
z/VM: RACF Security Server General User's Guide	SC24-6215	X	X

Optional RSCS Feature - New editions

Updated for z/VM V6.2:

Title	Order number	Format	
		PDF	BKM

z/VM: RSCS Networking Messages and Codes	GC24-6225	X	X
z/VM: RSCS Networking Operation and Use	SC24-6226	X	X
z/VM: RSCS Networking Planning and Configuration	SC24-6227	X	X

BKM = BookManager

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

Optional RSCS Feature - Unchanged editions

Title	Order number	Format	
		PDF	BKM
z/VM: RSCS Networking Diagnosis	GC24-6223	X	X
z/VM: RSCS Networking Exit Customization	SC24-6224	X	X

Optional Directory Maintenance Facility Feature - New editions

Title	Order number	Format	
		PDF	BKM
z/VM: Directory Maintenance Facility Commands Reference	SC24-6188	X	X
z/VM: Directory Maintenance Facility Messages	GC24-6189	X	X
z/VM: Directory Maintenance Facility Tailoring and Administration Guide	SC24-6190	X	X

BKM = BookManager

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

Optional Performance Toolkit for VM Feature - New editions

Updated for z/VM V6.2:

Title	Order number	Format	
		PDF	BKM
z/VM: Performance Toolkit Guide	SC24-6209	X	X
z/VM: Performance Toolkit Reference	SC24-6210	X	X

BKM = BookManager

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

Optional DFSMS/VM Feature - New editions

Updated for z/VM V6.2:

Title	Order number	Format	
		PDF	BKM
z/VM: DFSMS/VM Removable Media	SC24-6185	X	X

Optional DFSMS/VM Feature - Unchanged editions

Not updated with z/VM V6.2:

Title	Order number	Format	
		PDF	BKM
z/VM: DFSMS/VM Customization	SC24-6181	X	X
z/VM: DFSMS/VM Diagnosis Guide	GC24-6182	X	X
z/VM: DFSMS/VM Messages and Codes	GC24-6183	X	X
z/VM: DFSMS/VM Planning Guide Services	SC24-6184	X	X
z/VM: DFSMS/VM Storage Administration	SC24-6186	X	X

BKM = BookManager

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

Other publications - New editions

Updated or new with z/VM V6.2:

Title	Order number	Format	
		PDF	BKM
Device Support Facilities: User's Guide and Reference	GC35-0033	X	X
Environmental Record Editing and Printing Program (EREP): Reference	GC35-0152	X	X
System z10™: Open Systems Adapter-Express3 Integrated Console Controller Dual-Port User's Guide	SA23-2266	X	X
zEnterprise System, System z10, System z9® and eServer™ zSeries: Open Systems Adapter-Express Customer's Guide and Reference	SA22-7935	X	X
z/OS and z/VM: Hardware Configuration Definition Messages	SC33-7986	X	X
z/OS and z/VM: Hardware Configuration Manager User's Guide	SC33-7989	X	X
z/OS: Language Environment Concepts Guide	SA22-7567	X	X
z/OS: Language Environment Debugging Guide	GA22-7560	X	X
z/OS: Language Environment Programming Guide	SA22-7561	X	X
z/OS: Language Environment Programming Reference	SA22-7562	X	X
z/OS: Language Environment Run-Time Messages	SA22-7566	X	X
z/OS: Language Environment Writing Interlanguage Communication Applications,	SA22-7563	X	X
z/OS: MVS Program Management: Advanced Facilities	SA22-7644	X	X
z/OS: MVS Program Management: User's Guide and Reference	SA22-7643	X	X

BKM = BookManager

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

Note: The updates in these new editions may not contain any new z/VM information.

Other publications - Unchanged editions

Not updated with z/VM 6.2:

Title	Order number	Format		
		PDF	BKM	Print
Network Job Entry: Formats and Protocols	SA22-7539	X	X	
z/OS: IBM Tivoli® Directory Server Plug-in Reference for z/OS	SA76-0148	X	X	
System z9 and eServer zSeries 890 and 990: Open Systems Adapter-Express Integrated Console Controller User's Guide	SA22-7990	X	X	
System z: Open Systems Adapter-Express Integrated Console Controller 3215 Support	SA23-2247	X	X	
CMS/TSO Pipelines: Author's Edition	SL26-0018	X	X	
Common Programming Interface Communications Reference	SC26-4399	X	X	
Common Programming Interface Resource Recovery Reference	SC31-6821	X	X	
Environmental Record Editing and Printing Program (EREP): User's	GC35-0151	X	X	

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

Redbooks and Redpapers

IBM Redbooks® and 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.

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Technical information

Specified operating environment

Hardware requirements

z/VM V6.2 does not require a new Architecture Level Set (ALS). It will run on the same ALS that is available for z/VM V6.1 as described:

- zEnterprise 196
Refer to the DEVICE2817 Preventive Service Planning (PSP) bucket for the minimum MCL level and any required updates or PTFs.
- zEnterprise 114
Refer to the DEVICE2818 Preventive Service Planning (PSP) bucket for the minimum MCL level and any required updates or PTFs.
- System z10 Enterprise Class
Refer to the DEVICE2097 Preventive Service Planning (PSP) bucket for the minimum MCL level and any required updates or PTFs.
- System z10 Business Class
Refer to the DEVICE2098 Preventive Service Planning (PSP) bucket for the minimum MCL level and any required updates or PTFs.

Refer to the z/VM website at

<http://www.ibm.com/vm/zvm620/architecture/>

Refer to the appendix of the *z/VM General Information* manual for more information.

Software requirements

Prerequisite requirements

- EREP VM (5654-260) V3.5.0.
 - The following PTFs have been applied to the z/VM V6.2 system deliverable.
 - PTF for APAR VM63624 provides the necessary function to support the DS6000™ and DS8000.
 - PTF for APAR VM64367 provides the necessary support for the System z10.
 - PTF for APAR VM64807 provides support for z196
 - PTF for APAR VM64928 provides support for z114
- 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 H14. 'H' indicates Release

17 of ICKDSF and '14' indicates VMSES/E format. The following PTFs have been applied to the z/VM V6.2 system deliverable:

- PTF for APAR PQ84848 provides the necessary function for ICKDSF to support large FBA devices.
- PTFs for APARs PQ96706 and PQ95319 provide the necessary function for ICKDSF to support the DS8000 and DS6000 storage devices, respectively.
- PTF for APAR PQ87899 provides enablement for CP volume ownership function which is required by z/VM version 6 release 2.0.

The prerequisite no-charge products, **EREP** and **ICKDSF**, are preinstalled on the base product system deliverable.

When ordering z/VM V6.2, you must already be licensed for EREP (5654-260) and ICKDSF (5684-042) or a separate order must be placed for each of these products to establish a license.

Refer to the [Licensing for z/VM V6.2](#) section for additional information on ordering EREP and ICKDSF.

Optional product/Feature requirements

- DFSMS/VM requirements
 - ISPF V3.2.0 (5684-043) or a subsequent release for DFSMS/VM use. ISPF is not required if you are using only the 3495 Tape Library Dataserver support of DFSMS.
 - DirMaint Facility optional feature of z/VM V6.2 if the minidisk management function is needed.
 - RACF Security Server for z/VM optional feature of z/VM V6.2 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) and Language Environment component supplied with z/VM if Migration Level 2 (ML2) function of DFSMS/VM is used.

Note: Program numbers 5698-A11 and 5698-A13 were withdrawn from marketing on January 21, 2005, and service support was discontinued on April 30, 2007.

For current information regarding the discontinuance of service, refer to the z/VM Licensed Program (LP) Migration Matrix at

<http://www.ibm.com/vm/techinfo/lpmigr/>

Note: Program number 5697-TS9 was withdrawn from marketing on March 7, 2005, and service was discontinued on March 31, 2006.

- TCP/IP for z/VM V6.2 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.
- RSCS FL620 feature for remote operations.
- IBM Compiler for REXX/370 (5695-013) and IBM Library for REXX/370 (5695-014), if the compiled REXX installation-wide exit or a compiled ACS REXX exit is desired.
- The PTF for APAR VM63746 allows DFSMS/VM RMS on z/VM V6.2, and later to share tape drive devices using the multi-access tape feature of the CP ATTACH command. This allows, for example, z/VM 3590 install media to be inserted, and z/VM 6.2 to be installed from, an Automated Tape Library (ATL).

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

- Hardware Configuration Definition (HCD) and Hardware Configuration Manager (HCM) requirements

- The required support for the System z10 and zEnterprise 196 and 114 have been applied to HCD/HCM supplied with z/VM V6.2.
 - IBM High Level Assembler (5696-234) requirements
 - High Level Assembler V1.5.0, 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, FS2SFSE, AFTCHAIN, PRINTBLK, and PRINTFST)
 - Use the API for data compression
 - 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
 - Assemble applications that exploit the IEEE Floating Point hardware facility
 - Add devices that cannot be sensed (updating HCPRIO ASSEMBLE)
 - Perform local modifications to modules written in assembler
 - Assemble any CP modules
 - Assemble exit routines for CP
 - The PTF for APAR PK58463 is required for High Level Assembler V1.5 to support the new instructions provided with the System z10 server.
 - The PTF for APAR PK97799 provided support for zEnterprise 196 and 114.
 - The High Level Assembler V1.6 contains the support for the System z10 instruction set and was made available on July 11, 2008. For additional information about the High Level Assembler V1.6, refer to Software Announcement [208-145](#), dated June 24, 2008.
- Note:** An equivalent product may be used in place of the High Level Assembler.
- Language Environment
 - Requires High Level Assembler V1.5.0, or later to customize Language Environment options
 - Online displayable publications requirements
 - BookManager files can be read by either BookManager READ for VM (a separately orderable product) or IBM Softcopy Reader (supplied on DVD). APAR GC05366 for BookManager/VM READ is required for READ/VM V1.3 Public Library to run in a non-370 mode. BookManager products also have prerequisite product requirements. Specific details are available in the BookManager announcement documentation.
 - POSIX requirements
 - Developing POSIX applications requires C/C++ for z/VM V1.1 or XL C/C++ for z/VM V1.2 or V1.3 (5654-A22).
 - RSCS Networking FL620 requirements
 - To communicate with users in an SNA network requires ACF/VTAM for VM/ESA®, V4.2 (5654-010).
 - To communicate within an IP network requires TCP/IP for z/VM FL620.
 - Group Control Subsystem (GCS) must be configured and activated
 - 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:

- DirMaint, Function Level 620 (FL620)

Within the shared-DASD complex, all z/VM systems must be running the same DirMaint FL620 service level. Therefore, you must be licensed for the DirMaint FL620 feature on any z/VM V6.2 system in the complex.

OSA and Open Systems Adapter/Support Facility (OSA/SF) program requirements

OSA/SF 4.4.0 is provided with and supported on z/VM and can be accessed by a CMS user ID, a REXX EXEC, or a Java-based Graphical User Interface (GUI). The GUI needs access to the Java™ 1.4 runtime and help on the workstation.

Access at the OSA/SF GUI requires the following communications protocols:

- For TCP/IP communication:
 - TCP/IP for z/VM on the host
 - TCP/IP on the workstation

To support an OSA in TCP/IP Passthru mode in a z/VM V6.2 environment, OSA/SF requires TCP/IP for z/VM V6.2. OSA/SF support is required in this mode only if access to one of the OSA's ports is being shared by more than one host program.

The following PTFs have been applied to the z/VM V6.2 system deliverable:

- The PTF for APAR OA15170 provides the necessary function to display information for OSN features on the z10 and support for Layer 2.
- The PTF for APAR OA23824 is required for OSA/SF to support the OSA-Express3 enhancements on the System z10.
- The PTF for APAR OA37060 is required for OSA/SF to support OSA Express4S on zEnterprise 196 and 114.

For additional information about OSA/SF, refer to Hardware Announcement [103-142](#), dated May 13, 2003.

TCP/IP for z/VM V6.2 program requirements

TCP/IP for z/VM V6.2 has the following additional program requirements:

- If a primary or secondary domain name server (not a caching-only name server) or the network database server is to be run:
 - IBM DB2® Server for VSE & VM V7.1 (5697-F42), or later
- If programs are developed in C:
 - IBM C for VM/ESA V3.1 (5654-033), C/C++ for z/VM V1.1 or XL C/C++ for z/VM V1.2 or V1.3 (5654-A22)
- If programs are developed in Pascal:
 - IBM VS Pascal V1.2 (5668-767) Compiler and Library

Linux program requirements

Linux for System z is not provided with z/VM V6. In order to operate Linux as a guest of z/VM, Linux must be obtained from a Linux distribution partner.

For specific function and for the most current information on Linux distributions, refer to

<http://www.ibm.com/systems/z/os/linux/dist.html>

For current promotional pricing for Linux distributions, refer to

http://www.ibm.com/systems/z/os/linux/about/about_gettingstarted.html

The program's specifications and specified operating environment information may be found in documentation accompanying the program, if available, such as a README file, or other information published by IBM, such as an announcement letter. Documentation and other program content may be supplied only in the English language.

Limitations

- z/VM V6 continues to operate only on System z10 or zEnterprise servers.
- Linux and OpenSolaris are the only guest operating systems z/VM will support on IFL processors (other than z/VM V4, V5, or V6 themselves).
- z/VM V6 does not provide support for V=R or V=F guest, even on servers that provide basic mode. Customers using basic mode to run V=R and V=F guests should consider this when migrating to z/VM V6. The increase in processor requirements to run 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 V6.2 and on the level of activity within each Linux image.

z/VM performance information is available on the z/VM website at

<http://www.ibm.com/vm/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 customer suggestions or one or more of the worldwide user group communities. Groups include COMMON, COMMON Europe, Guide Share Europe (GSE), InterAction (Australia/New Zealand), Japan Guide Share (JGS), and SHARE Inc.

User group requirements satisfied with this announcement:

Requirement number	Requirement description
MR0312073259	Add Date Time + System ID to Termination Messages
MR0314115638	z/CMS 64bit addressing
MR0408104926	Grant different VLAN tag for virtual NIC on same VSWITCH
MR0325094433	Pre-Defined NIC to VSWITCH port mapping
MR0111082558	Request a VLAN parameter on the NICDEF directory statement
MR1215065635	Crypto Guest Compatibility Support
MR0115074938	Continuous Guest Move
MR0303085525	ISFC Link Redundancy
MR0118066848	RACF Protected Userid Attribute on RACF/VM to prohibit Revocation of Server type userids due inactivity
MR0621075716	RACF/VM Protected Userid Attribute to protect LogonBy Service Machines from Revocation
MR1008082850	Provide query capability for active external security manager (ESM)
MR0317061736	Partially satisfies (RRSF) command propagation support
MR0526064025	Add IPv6 support to current TCP/IP client and server

Planning information

Customer responsibilities

z/VM V6.2 Subscription and Support (S&S)

To order z/VM V6.2, you must use the SDO, program number 5741-A08. 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, RSCS, RACF Security Server, VMSSI, or the Performance Toolkit for VM, you must take specific action to decline this support.

To host Linux guests of z/VM V6, you must also obtain a Linux for System z distribution. Information on those Linux distributor partners that have a marketing relationship with IBM can be found at

<http://www.ibm.com/systems/z/os/linux/dist.html>

Licensed products packaged with z/VM V6.2

With the availability of z/VM V6, the following priced, optional products or features are automatically shipped and preinstalled on the z/VM V6 base product media:

- **DirMaint FL620 feature**
- **RSCS FL620 feature**
- **RACF Security Server FL620 feature**
- **Performance Toolkit for VM FL620 feature**
- **Single System Image FL620 feature (VMSSI)**

For more information on these products or features, refer to the [Licensing for z/VM V6.2](#) 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 DirMaint, RSCS, RACF, VMSSI or the Performance Toolkit for VM, you may establish one by placing an order for the optional features. You will receive a Memo to Users for the optional feature or program product. The Memo to Users includes the 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/vm/vendor/>
- IBM licensed programs available for z/VM can be found at <http://www.ibm.com/vm/related/>

High Level Assembler (5696-234)

The High Level Assembler (5696-234) or an equivalent product is required for z/VM to:

- Change exit routines or perform local modifications for any IBM VM product or vendor product

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 for to purchase the High Level Assembler for Linux on System z (5799-TCQ) and for its annual Subscription & Support (5799-TCR).

Running 370-mode applications

To simplify the migration of older applications and facilitate the running of 370-mode-only CMS applications in XA-mode, ESA-mode, or XC-mode virtual machines, IBM provides the *370 Accommodation* function. This function originally shipped with VM/ESA V1.2.1 (available July 1993). 370 Accommodation handles the vast majority of inconsistencies between 370-mode and XA-mode, ESA-mode, or XC-mode, eliminating the need to change these applications to exploit the new architectures.

z/VM V6 supports only XA-mode, ESA-mode, and XC-mode virtual machines. z/VM V6 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, contact the IBM Service for assistance.

Direct customer support

Direct customer support is provided by IBM Operational Support Services - SoftwareXcel. This fee service enhances your productivity by providing voice and electronic access into the IBM support organization. IBM Operational Support Services - SoftwareXcel helps answer questions pertaining to use 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

z/VM V6.2

The z/VM V6.2 product package is distributed with the following:

- International Program License Agreement (IPLA) (Z125-3301).
- License Information Document (LID) (GC24-6200).
- If ordering to install using 3590 or 3592 tape:
 - Basic machine-readable material on a 3590 or a 3592 tape cartridge for installation to 3390 DASD.
 - Stacked RSU on a 3590 or 3592 tape cartridge containing required service.
- If ordering to install using DVD:
 - Basic machine-readable material on one DVD for installation to SCSI disk.
 - Basic machine-readable material on one DVD for installation to 3390 DASD.
 - RSU DVD containing required service.

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

- If ordering to install from electronic delivery:
 - Binaries from DVD for installation to SCSI disk, provided in a ZIP file.
 - Binaries from DVD for installation to 3390 DASD, provided in a ZIP file.
 - RSU DVD containing required service, provided in a ZIP file.

Note: Electronic delivery provided as binary images from DVD are provided as ZIP files.

- One **IBM Online Library: z/VM Collection**.
- Publications:

- z/VM: Installation Guide (GC24-6246)
- Memo to Users for z/VM V6.2, z/VM V6.2 SDO, the preinstalled products, and the optional features if ordered.

Restricted source and PL/X source

The restricted source and the PL/X source are not orderable or shipped with z/VM V6. Both will be available as no-charge downloads 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 V6.2 and entitlement will be verified when you request the source code. After approval, you will receive instructions describing how to download the code.

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 V6 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.

Software Services

IBM Software Services has the breadth, depth, and reach to manage your services needs. You can leverage the deep technical skills of our lab-based Software Services team and the business consulting, project management, and infrastructure expertise of our IBM Global Services team. Also, we extend our IBM Software Services reach through IBM Business Partners to provide an extensive portfolio of capabilities. Together, we provide the global reach, intellectual capital, industry insight, and technology leadership to support a wide range of critical business needs.

To learn more about IBM Software Services or to contact a Software Services sales specialist, visit

<http://www.ibm.com/software/sw-services/>

Ordering information

Charge metric

Pricing metric description

The products and features in this announcement have one pricing metric - Value Units based on the number of processors. Value Unit pricing with a decreasing one-time charge (OTC) price per engine, subject to the tiers as documented in Value Unit Exhibit VUE021, is available for the z/VM V6 optional features of DirMaint, RSCS, RACF, the Performance Toolkit for VM, and VMSSI for S&S entitlements at initial order of z/VM V6 or its features. Value Units of a given product cannot be exchanged, interchanged, or aggregated with Value Units of another product.

Engine-based Value Unit pricing of z/VM V6 is different than MSU-based Value Unit pricing, which is available on other IBM software products.

Program name	Program number	Pricing metric description
z/VM V6	5741-A07	Value Units
RSCS Feature	5741-A07	Value Units

RACF Security Server Feature	5741-A07	Value Units
DirMaint Feature	5741-A07	Value Units
Performance Toolkit for VM Feature	5741-A07	Value Units
Single System Image Feature	5741-A07	Value Units

Value Unit pricing for the z/VM V6 S&S and its optional, priced features provides a lower price per processor as more Value Units are licensed with z/VM V6 and the optional, priced features. Clients may aggregate the capacity for all the processors running z/VM V6 and the optional, priced features across the enterprise to achieve a more economical price. There may also be a price benefit when clients increase their capacity. Additional capacity is not priced starting at the base with a flat price per unit. Instead, additional capacity is priced starting at the capacity on which z/VM V6 has already been installed, which may result in a lower unit price for the z/VM V6.2 S&S and the optional, priced features.

Engine-based Value Unit pricing is designed to provide a lower entry price and a decreasing price curve as hardware capacities and workload grow, which may help improve price/performance. Engine-based Value Unit pricing is different than MSU-based Value Unit pricing, which is available on other IBM software products. Value Unit pricing may help clients:

- 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

If the client purchased an S&S contract for the z/VM V4 or V5 optional features of DirMaint, RACF Security Server, RACF for z/VM, RSCS and the Performance Toolkit for VM the client is entitled to a no-charge upgrade to those same optional features on z/VM V6.2.

Translation from Processor to Value Units

The total number of engine-based Value Units is calculated according to the following example.

If the customer has installed six processors and will be operating z/VM V6 on all six processors, the applicable Value Units would be:

$$(3 * 10) + (3 * 9) = 57 \text{ Value Units}$$

The following z/VM V6 products and optional features and their associated Subscription and Support (S&S) are affected by the metric change from a "flat per-processor price" to "engine-based Value Units":

IPLA program number	S&S program number	Program description
5741-A07	5741-SNS	z/VM V6
5741-A07	5741-SNS	RSCS Feature
5741-A07	5741-SNS	RACF Security Server Feature
5741-A07	5741-SNS	DirMaint Feature
5741-A07	5741-SNS	Performance Toolkit for VM Feature
5741-A07	5741-SNS	Single System Image Feature

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 V6 on a processor per-day basis during your peak periods. For additional information about On/Off CoD, refer to Software Announcement [203-202](#), dated August 12, 2003 and Marketing Announcement 304-004, dated January 13, 2004.

The programs in this announcement have Value Unit-Based pricing.

Program number	Program name	Value Unit Exhibit
5741-A07	z/VM V6	VUE021

For each System z IPLA program with Value Unit pricing, the quantity of that program needed to satisfy applicable IBM terms and conditions is referred to as the 'required license capacity'. Your required license capacity is based upon the following factors:

- the System z IPLA program you select
- the applicable Value Unit exhibit
- the applicable terms

Value Unit Exhibit VUE021

Engine-based Value Units for a specified number of engines are determined by the following table:

Level	Engines minimum	Engines maximum	Value Units per engine
Base	1	3	10
Tier A	4	6	9
Tier B	7	9	8
Tier C	10	12	7
Tier D	13	16	6
Tier E	17	20	5
Tier F	21	25	4
Tier G	26	+	3

Order z/VM SDO through the Internet

Shopz provides an easy way to plan and order System z software upgrades, including z/VM. Using Shopz, customers can quickly generate orders for z/VM SDOs. Additionally, Shopz 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). Shopz is available in the United States and several countries in Europe. In countries where Shopz 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 Shopz website at

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

The z/VM V6.2 base operating system and SDO licensed products are eligible for Internet delivery using the Shopz website and are planned to be available after the general availability of z/VM V6.2.

Basic license

Licensing for z/VM V6.2

The following z/VM V6 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 processors with z/VM V6:

IPLA program number	SDO program number	S&S program number	Program description
5741-A07	5741-A08	5741-SNS	z/VM V6
5741-A07	5741-A08	5741-SNS	RSCS Feature
5741-A07	5741-A08	5741-SNS	RACF Security Server Feature
5741-A07	5741-A08	5741-SNS	DirMaint Feature
5741-A07	5741-A08	5741-SNS	Performance Toolkit for VM Feature
5741-A07	5741-A08	5741-SNS	Single System Image Feature

The program number, 5741-A07, is used for licensing z/VM V6. You must specify the number of engine-based Value Units for the number of processors required as calculated by the Workload Pricer tool, WL Pricer.

When ordering z/VM V6.2 to operate on standard processors (CPs) for a single server within the enterprise, you must specify Value Units equal to the Value Units to cover the number of standard processors (CPs) on your 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 V6 product operating on standard processors.

When ordering z/VM V6.2 to operate on IFL processors for a single server within the enterprise, you must specify Value Units equal to the Value Units to cover the number of IFL processors on your 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 V6 product operating on IFL processors.

The quantity ordered cannot exceed the maximum number of processors per server. The number of processors for a single server to be used to calculate Value Units should not be more than:

Quantity			
IFL processors	Standard processors	Maximum processors	Processor for each server
64	64	64	System z10 EC (2097)
10	5	10	System z10 BC (2098)
80	80	80	zEnterprise 196 (2817)
10	5	10	zEnterprise 114 (2818)

The optional features DirMaint, RSCS, RACF, VMSSI 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, RSCS, RACF, VMSSI 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 IBM International Agreement for Acquisition of Support, Z125-6011 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 V6.

z/VM V6.2 (5741-A07) Basic License

Entitlement identifier	Description	License option/Pricing metric
S015HSV	z/VM V6	Use-based OTC, Per Value Unit
S015HST	DirMaint Feature	Use-based OTC, Per Value Unit
S015HSX	RSCS Feature	Use-based OTC, Per Value Unit
S015HSZ	RACF Feature	Use-based OTC, Per Value Unit
S015HSW	Performance Toolkit for VM Feature	Use-based OTC, Per Value Unit
S016SX7	z/VM Single System Image Feature	Use-based OTC, Per Value Unit

z/VM V6.2 Base SDO (5741-A08) - S015HT5

Orderable supply ID	Language	Distribution medium
S016VLH	US English	3590 Tape
S016VLJ	US English	3592 Tape

z/VM V6.2 Base SDO (5741-A08) - S015HTF

Orderable supply ID	Language	Distribution medium
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S016VLK US English DVD

Optional features of z/VM V6.2 SDO (5741-A08)

DirMaint Feature (5741-A08) - S015HT7

Orderable supply ID	Language	Distribution medium
S016VKV	US English	3590 Tape
S016VKW	US English	3592 Tape
S016VL4	US English	DVD

RSCS Feature (5741-A08) - S015HTD

Orderable supply ID	Language	Distribution medium
S016VL9	US English	3590 Tape
S016VLB	US English	3592 Tape
S016VLC	US English	DVD

RACF Security Server Feature (5741-A08) - S015HTC

Orderable supply ID	Language	Distribution medium
S016VL2	US English	3590 Tape
S016VL3	US English	3592 Tape
S016VL8	US English	DVD

Performance Toolkit for VM Feature (5741-A08) - S015HTB

Orderable supply ID	Language	Distribution medium
S016VL0	US English	3590 Tape
S016VL1	US English	3592 Tape
S016VL7	US English	DVD

z/VM Single System Image Feature (5741-A08) - S016SX6

Orderable supply ID	Language	Distribution medium
S016VLG	US English	3590 Tape
S016VLD	US English	3592 Tape
S016VLF	US English	DVD

z/VM Subscription and Support (5741-SNS)

Entitlement identifier	Description	License option/Pricing metric
S0111PX	z/VM	Basic ASC, per Value Unit SW S&S No charge, decline SW S&S No-charge, SW S&S Registration
S016VKN	Single System Image	Basic ASC, per Value Unit SW S&S No charge, decline SW S&S No-charge, SW S&S Registration
S0111R1	DirMaint Feature	Basic ASC, per Value Unit SW S&S No charge, decline SW S&S No-charge, SW S&S Registration
S013T6B	RSCS Feature	Basic ASC, per Value Unit SW S&S No charge, decline SW S&S No-charge, SW S&S Registration
S0111R0	RACF Feature	Basic ASC, per Value Unit SW S&S No charge, decline SW S&S No-charge, SW S&S Registration
S0111PZ	Performance Toolkit for VM Feature	Basic ASC, per Value Unit SW S&S No charge, decline SW S&S No-charge, SW S&S Registration

The features are for the stand-alone product and not for ordering.

z/VM Base S&S (5741-SNS) - S0111HH

Orderable

supply ID	Language	Description
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S0111HJ	US English	z/VM V6.2 3390 Sys DDR (Support for 5741-A07)
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z/VM Base S&S (5741-SNS) - S0111HK

Orderable

supply ID	Language	Description
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S0111HL	US English	z/VM V6.2 DVD Sys Image (Support for 5741-A07)
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z/VM Base S&S (5741-SNS) - S0111H7

Orderable

supply ID	Language	Description
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S0111H8	US English	DirMaint Feature (Support for 5741-A07)
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z/VM Base S&S (5741-SNS) - S013T6C

Orderable

supply ID	Language	Description
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S013T6D	US English	RSCS Feature (Support for 5741-A07)
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z/VM Base S&S (5741-SNS) - S0111HC

Orderable

supply ID	Language	Description
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S0111HD	US English	RACF Security Server Feature (Support for 5741-A07)
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z/VM Base S&S (5741-SNS) - S0111HF

Orderable

supply ID	Language	Description
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S0111HG	US English	Performance Toolkit for VM feature (Support for 5741-A07)
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z/VM Base S&S (5741-SNS) - S016VKN

Orderable

supply ID	Language	Description
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S016VKT	US English	Single System Image feature (Support for 5741-A07)
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z/VM Base S&S (5741-SNS) - S0111H9

Orderable

supply ID	Language	Description
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S0111HB	US English	z/VM V6.2 DFSMS/VM feature (Support for 5741-A07)
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Ordering z/VM V6.2 using the SDO

Orders for z/VM V6.2 will be accepted beginning November 29, 2011. When placing an order, if you wish to have that order fulfilled with z/VM V6.2, you will need to specify a customer requested arrival date (CRAD) of December 02, 2011, or later. Orders including the new optional VMSSI feature may not be scheduled to ship prior to December 02, 2011. Production of z/VM V6.2 orders is planned to begin on December 02, 2011.

Orders for z/VM V6.2 and the optional features must use the z/VM V6.2 SDO packaged offering, program number 5741-A08. 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 desired distribution medium.

With the ordering of z/VM V6.2, you will receive a system deliverable tape or DVD containing the program code for z/VM V6.2, an IPLA for 5741-A07, a LID, program directories, and one copy of each publication available for z/VM V6.2 as listed in the [Packaging](#) section of this announcement.

Examples

- Example 1 - You currently do not have z/VM V6 licensed on any processors on any System z10 server within your enterprise. Your engine-based Value Units for licensing (5741-A07) are 0.

If you will be licensing z/VM V6 and designating **two** IFL processors on a single System z10 server within your enterprise as running z/VM V6, you will specify the desired distribution medium. When licensing using 5741-A07, capacity to be specified in engine-based Value Units would be $(2 * 10)$ or **20** resulting in a total of 20 Value Units.

- Example 2 - You currently are not running z/VM V6 on standard processors (CPs) but you are running z/VM V6 on **one** IFL processor (probably running Linux on System z) on a single System z10 server within your enterprise. Your engine-based Value Units for licensing (5741-A07) are 10.

If you will be licensing z/VM V6 and designating **two** additional IFL processors on a single System z10 server within your enterprise as running z/VM V6, you will specify the desired distribution medium. When licensing using 5741-A07, additional capacity to be specified in engine-based Value Units would be $(2 * 10)$ or **20** resulting in a total of 30 Value Units.

- Example 3 - You currently are running z/VM V6 on **two** standard processors (CPs) on a single System z10 server within your enterprise. Your engine-based Value Units for 5741-A07 are 20.

If you will be licensing z/VM V6 and designating **two** additional standard processors (CPs) on a single System z10 server within your enterprise as running z/VM V6, you will specify the desired distribution medium. When licensing using 5741-A07, additional capacity to be specified in engine-based Value Units would be $(1 * 10) + (1 * 9)$ or **19** resulting in a total of 39 Value Units.

- Example 4 - You currently are running z/VM V6 on **two** standard processors and on **one** IFL processor (probably running Linux for System z) on a single System z10 server within your enterprise. Your engine-based Value Units for 5741-A07 are 30.

If you will be licensing z/VM V6 for **four** additional processors and designating **one** as a standard processor and the remaining **three** as IFL processors on a single System z10 server within your enterprise as running z/VM V6, you will specify the desired distribution medium. When licensing using 5741-A07, additional capacity to be specified in engine-based Value Units would be $(3 * 9) + (1 * 8)$ or **35** resulting in a total of 65 Value Units.

- Example 5 - You currently do not have z/VM V6 licensed on any processors on any System z10 server within your enterprise. Your engine-based Value Units are 0.

If you will be licensing z/VM V6 and designating **two** standard processors on one System z10 server and on an additional System z10 server within your enterprise, you will license z/VM V6 on **one** standard processor and on **two** IFL processors, you will specify the desired distribution medium. When licensing using 5741-A07, additional capacity to be specified in engine-based Value Units would be $(3 * 10) + (2 * 9)$ or **48** resulting in a total of 48 Value Units because of aggregating the licenses within the enterprise.

Support for z/VM V6.2

Program name: z/VM Subscription & Support

Program number: 5741-SNS

Support for z/VM V6 is provided and licensed under the IBM International Agreement for Acquisition of Support (Z125-6011).

This 5741-SNS order establishes entitlement records as well as support for z/VM V6.2 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 V6.2 (5741-A07).

z/VM has adopted the support life-cycle extensions as announced in Software Announcement [203-204](#), dated August 12, 2003, which provide for 3 years of technical support after general availability.

Central service for z/VM V6.2 (5741-A07) is planned to be available by IBM until April 30, 2015.

IBM announced its intention to discontinue service support for z/VM V5.4 (5741-A05) to be effective September 30, 2011, in Software Announcement [208-249](#), dated August 05, 2008.

The date planned for discontinuing service support for z/VM V5.4 has been extended to September 30, 2013.

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, deem 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 email 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 (high impact) problems. Support for high impact suspected IBM defects is available 24 hours a day, 7 days a week.
 - Temporary fixes for problems (where known), where they exist.

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, RSCS, RACF, VMSSI 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 V6 and the priced, optional features of DirMaint, RSCS, RACF, VMSSI 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 quantity ordered cannot exceed the maximum number of processors per server. The number of processors for a single server to be used to calculate Value Units should not be more than:

Quantity			
IFL processors	Standard processors	Maximum processors	for each server
64	64	64	System z10 EC (2097)
10	5	10	System z10 BC (2098)

National Language Translation

When you order z/VM V6.2, 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 V6.2 in the following languages:

- 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 V6 System Delivery Option (SDO).

z/VM V6.2 SDO optional licensed products

Program name: z/VM V6.2 SDO

Program number: 5741-A08

The following table provides the orderable supply features for the optional licensed products with z/VM V6.2.

Orderable supply feature numbers for 5741-A08

Orderable supply	Language	Medium	Description
S016VLH	US English	3590 Tape	5741-A07 3590 3390 Sys DDR
S016VLJ	US English	3592 Tape	5741-A07 3592 3390 Sys DDR
S016VLK	US English	DVD	5741-A07 DVD System Image
S016VLV	US English	3590 Tape	5741-A07 3590 DirMaint
S016VLW	US English	3592 Tape	5741-A07 3592 DirMaint
S016VL4	US English	DVD	5741-A07 DVD DirMaint
S016VL9	US English	3590 Tape	5741-A07 3590 RSCS
S016VLB	US English	3592 Tape	5741-A07 3592 RSCS
S016VLC	US English	DVD	5741-A07 DVD RSCS
S016VL2	US English	3590 Tape	5741-A07 3590 RACF Sec Server
S016VL3	US English	3592 Tape	5741-A07 3592 RACF Sec Server
S016VL8	US English	DVD	5741-A07 DVD RACF Sec Server
S016VL0	US English	3590 Tape	5741-A07 3590 Performance Toolkit for VM
S016VL1	US English	3592 Tape	5741-A07 3592 Performance Toolkit for VM
S016VL7	US English	DVD	5741-A07 DVD Performance Toolkit for VM
S016VLD	US English	3590 Tape	5741-A07 3590 VMSSI
S016VLF	US English	3592 Tape	5741-A07 3592 VMSSI
S016VLG	US English	DVD	5741-A07 DVD VMSSI
S016VL5	US English	DVD	5741-A07 z/VM Collection Kit DVD
S016VKR	US English	3590 Tape	5741-A07 3590 DFSMS/VM Feature
S016VKS	US English	3592 Tape	5741-A07 3592 DFSMS/VM Feature

Orderable supply	Language	Medium	Description
S015TFL	US English	3590 Tape	5684-042 3590 ICKDSF SES/E
S015TFM	US English	3592 Tape	5684-042 3592 ICKDSF SES/E
S015T97	US English	3590 Tape	5686-065 3590 ACF/VTAM SUITE
S015T98	US English	3592 Tape	5686-065 3592 ACF/VTAM SUITE
S015TBN	US English	3590 Tape	5654-010 3590 ACF/VTAM - VM
S015TBP	US English	3592 Tape	5654-010 3592 ACF/VTAM - VM
S015TDJ	US English	3590 Tape	5654-260 EREP VM
S015TDK	US English	3592 Tape	5654-260 EREP VM
S015TBZ	US English	3590 Tape	5695-013 REXX/370 Compiler
S015TC0	US English	3592 Tape	5695-013 REXX/370 Compiler
S015TC1	US English	3590 Tape	5695-014 REXX/370 Library
S015TC2	US English	3592 Tape	5695-014 REXX/370 Library
S015TDZ	US English	3590 Tape	5696-234 3590 HLASM V1.6
S015TF0	US English	3592 Tape	5696-234 3592 HLASM V1.6
S015TF1	US English	3590 Tape	5696-234 3590 HLASM V1.6 Toolkit
S015TF2	US English	3592 Tape	5696-234 3592 HLASM V1.6 Toolkit
S015TBB	US English	3590 Tape	5654-A22 3590 XL C/C++ for z/VM
S015TBC	US English	3592 Tape	5654-A22 3592 XL C/C++ for z/VM
S015TD8	US English	3590 Tape	5654-A23 3590 Debug Tool
S015TBT	US English	3590 Tape	5655-T13 3590 zSecure Mgr for RACF
S015TBV	US English	3592 Tape	5655-T13 3592 zSecure Mgr for RACF
S015TB6	US English	3590 Tape	5697-F42 3590 DB2 Client for VM
S015TB7	US English	3592 Tape	5697-F42 3592 DB2 Client for VM
S015TCH	US English	3590 Tape	5697-F42 3590 DB2 ControlCtr
S015TCJ	US English	3592 Tape	5697-F42 3592 DB2 ControlCtr
S015TCX	US English	3590 Tape	5697-F42 3590 DB2 Data Res
S015TCZ	US English	3592 Tape	5697-F42 3592 DB2 Data Res
S015TBW	US English	3590 Tape	5697-F42 3590 DB2 RXSQL VM
S015TBX	US English	3592 Tape	5697-F42 3592 DB2 RXSQL VM
S015TD0	US English	3590 Tape	5697-F42 3590 DB2 Svr for VM
S015TD1	US English	3592 Tape	5697-F42 3592 DB2 Svr for VM
S015TBJ	US English	3590 Tape	5697-F42 3590 QMF™ for VM
S015TBK	US English	3592 Tape	5697-F42 3592 QMF for VM
S015T9V	US English	3590 Tape	5697-J05 3590 Archive Manager z/VM
S015T9W	US English	3592 Tape	5697-J05 3592 Archive Manager z/VM
S015T9X	US English	3590 Tape	5697-J06 3590 Backup/Restore
S015T9Z	US English	3592 Tape	5697-J06 3592 Backup/Restore
S015TC5	US English	3590 Tape	5697-J08 3590 Tape Manager
S015TC6	US English	3592 Tape	5697-J08 3592 Tape Manager
S016H71	US English	3590 Tape	5697-J10 3590 Operations Manager
S016H70	US English	3592 Tape	5697-J10 3592 Operations Manager
S0167RS	US English	3590 Tape	5698-A36 3592 OMEGAMON® XE
S0167RT	US English	3592 Tape	5698-A36 3592 OMEGAMON XE
S015K BX	US English	3590 Tape	5684-043 3590 ISPF V3 ENU
S015K C5	US English	3592 Tape	5684-043 3592 ISPF V3 ENU
S015K CH	US English	3590 Tape	5684-123 3590 ISPF/PDF V3
S015K CF	US English	3592 Tape	5684-123 3592 ISPF/PDF V3

Preinstalled products and features

- **EREP and ICKDSF**

The prerequisite no-charge products, EREP (5654-260) and ICKDSF (5684-042) are preinstalled on the base product system deliverable. 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, your order should indicate that shipment of media should be suppressed for these products. This can be accomplished by including the Delivery Option feature number 3471 (Ship Documentation Only), which designates the shipment of publications only.

- **Language Environment**

Language Environment is integrated into the base of z/VM V6.2.

- **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 V6.2, enabled for use, and is available at no additional charge.

- **OpenExtensions Shell and Utilities**

OpenExtensions Shell and Utilities is included in z/VM V6.2 with no licensing or billing requirements.

- **CMS Utilities**

CMS Utilities is included in z/VM V6.2 at no additional charge.

- **Open Systems Adapter Support Facility (OSA/SF)**

OSA/SF (V4.4.0) is a host-based tool supporting OSA-2 and OSA-Express features and is included in z/VM V6.2 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.

- **DirMaint, RSCS, RACF Security Server, Performance Toolkit for VM, and VMSSI** priced optional features for z/VM V6.2

DirMaint, RSCS, RACF Security Server, Performance Toolkit for VM, and VMSSI are preinstalled in a disabled state. Pricing is based on engine-based Value Units, and can be licensed on IFL and standard processor processors. 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 memo to users provided with each feature to allow enablement of the feature for use on your system. A license is established by placing an order for the feature.

On/Off CoD

z/VM V6.2 is eligible for On/Off CoD with a temporary use charge calculated based on processor-per-day use.

z/VM V6.2 (5741-A07) Temporary Use Charge

Entitlement identifier	Description	License option/Pricing metric
S015HSV	z/VM V6	On/Off CoD, Per Processor-day TUC
S015HST	DirMaint Feature	On/Off CoD, Per Processor-day TUC
S015HSX	RSCS Feature	On/Off CoD, Per Processor-day TUC
S015HSZ	RACF Feature	On/Off CoD, Per Processor-day TUC
S015HSW	Performance Toolkit for VM Feature	On/Off CoD, Per Processor-day TUC
S016SX7	VM Single System Image Feature	On/Off CoD, Per Processor-day TUC

Terms and conditions

The information provided in this announcement letter is for reference and convenience purposes only. The terms and conditions that govern any transaction with IBM are contained in the applicable contract documents such as the IBM International Program License Agreement, IBM International Passport Advantage® Agreement, and IBM Agreement for Acquisition of Software Maintenance.

Licensing

IBM International Program License Agreement including the License Information document and Proof of Entitlement (PoE) govern your use of the program. PoEs are required for all authorized use.

Agreement for Acquisition of Software Maintenance

The following agreement applies for Software Subscription and Support (Software Maintenance) and does not require customer signatures:

- IBM Agreement for Acquisition of Software Maintenance (Z125-6011)

These programs are licensed under the IBM Program License Agreement (IPLA) and the associated Agreement for Acquisition of Software Maintenance, which provide 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.

License Information form number

GC24-6200

On or near the planned availability date, the License Information (LI) document will be available for review on the IBM Software License Agreement website

<http://www.ibm.com/software/sla/sladb.nsf>

Limited warranty applies

Yes

Limited warranty

IBM warrants that when the program is used in the specified operating environment, it will conform to its specifications. The warranty applies only to the unmodified portion of the program. IBM does not warrant uninterrupted or error-free operation of the program or that IBM will correct all program defects. You are responsible for the results obtained from the use of the program.

IBM provides you with access to IBM databases containing information on known program defects, defect corrections, restrictions, and bypasses at no additional charge. For further information, consult the *IBM Software Support Handbook* found at

<http://www.ibm.com/support/handbook>

IBM will maintain this information for at least one year after the original licensee acquires the program (warranty period).

Program support

Enhanced support, called Subscription and Support, includes telephone assistance, as well as access to updates, releases, and versions of the program as long as support is in effect. You will be notified of discontinuance of support with 12 months' notice.

Money-back guarantee

If for any reason you are dissatisfied with the program and you are the original licensee, you may obtain a refund of the amount you paid for it, if within 30 days of your invoice date you return the program and its PoE to the party from whom you obtained it. If you downloaded the program, you may contact the party from whom you acquired it for instructions on how to obtain the refund.

For clarification, note that for programs acquired under any of IBM's On/Off Capacity on Demand (On/Off CoD) software offerings, this term does not apply since these offerings apply to programs already acquired and in use by you.

Volume orders (IVO)

No

Passport Advantage applies

No

Usage restriction

Yes

- z/VM Version 6 Release 2 operates on the IBM System z10 Enterprise Class (z10 EC) and IBM System z10 Business Class (z10 BC) and zEnterprise 196 and 114. The Program requires hardware that implements the IBM 64-bit z/Architecture in order to execute properly and therefore Licensee is not authorized to install or use this Program on any machine that does not properly implement 64-bit z/Architecture. For information about specific z/VM machine requirements and programming requirements, refer to the *z/VM: General Information* manual, GC24-6193.
- Licensee's entitlement is for only the quantity of engine-based Value Units licensed. These engine-based Value Units can be for either standard processors (CPs) or Integrated Facility for Linux (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 version 6 release 2 to operate on standard processors (CPs) for a single server within the enterprise, Licensee must specify Value Units equal to the Value Units to cover the number of standard processors (CPs) on Licensee's 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 V6 product operating on standard processors.
- When ordering z/VM version 6 release 2 to operate on IFL processors for a single server within the enterprise, Licensee must specify Value Units equal to the Value Units to cover the number of IFL processors on Licensee's 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 V6 product operating on IFL processors.
- If Licensee is running z/VM version 6 release 2 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).
- Licensee may only transfer the Program to another party, in connection with Licensee's transfer of the machine on which Licensee is entitled to operate the Program (referred to as a "Limited Transfer"), provided that any such Limited Transfer of the Program requires Licensee to transfer Licensee's rights and obligations under the Agreement to the transferee and therefore terminates Licensee's authorization to continue to use the Program. When the machine and the Program are transferred, Licensee must either provide a printed copy of the Agreement or, if electronic licensing is used for the Program, take the necessary actions that will require electronic acceptance of the Agreement by the transferee prior to the transferee's first use of the Program.

Software Subscription and Support (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 Software Subscription and Support (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 offering, visit

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

IBM Operational Support Services - SoftwareXcel

Yes

System i Software Maintenance applies

No

Variable charges apply

No

Educational allowance available

Yes. A 15% education allowance applies to qualified education institution customers.

Products eligible for single version charging

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

The SVC offering is valid only while both the predecessor product and the replacement product are:

- Both running on the same CPU
- Licensed under the same IBM customer number
- In the process of being migrated from the older product to the newer one by the customer
- Providing the same function

Note: When the SVC offering meets these requirements, you must order the appropriate number of Value Units for z/VM V6.2 to be eligible.

Replaced programs		Replacement programs	
Program number	Program name	Program number	Program name
5654-A17	z/VM Version 3	5741-A07	z/VM V6.2
5654-030	VM/ESA Version 2	5741-A07	z/VM V6.2
5684-112	VM/ESA Version 1	5741-A07	z/VM V6.2
5664-167	VM/SP	5741-A07	z/VM V6.2
5664-173	VM/SP HPO	5741-A07	z/VM V6.2
5664-301	VM/IS Base (Core)	5741-A07	z/VM V6.2
5664-308	VM/XA SP	5741-A07	z/VM V6.2
5735-FAL	TCP/IP Version 2	5741-A07	z/VM V6.2
5798-FAL	TCP/IP Version 1	5741-A07	z/VM V6.2
5796-PNA	VM Realtime Monitor	5741-A07	z/VM V6.2
5664-191	VMMAP	5741-A07	z/VM V6.2
5798-DWD	RealTime Monitor VM/ESA	5741-A07	z/VM V6.2
5684-073	VMPRF	5741-A07	z/VM V6.2
5748-XE4	DirMaint	5741-A07	z/VM V6.2
5740-XXH	RACF	5741-A07	z/VM V6.2
5664-188	RSCS V2	5741-A07	z/VM V6.2
5684-096	RSCS V3	5741-A07	z/VM V6.2
5688-198	Language Environment/370	5741-A07	z/VM V6.2

5706-116 DFSMS/VM	5741-A07 z/VM V6.2
5668-911 OS/PL/I V2 Library	5741-A07 z/VM V6.2
5734-LM4 OS PL/I Resident Library	5741-A07 z/VM V6.2
5734-LM5 OS PL/I Transient Library	5741-A07 z/VM V6.2
5688-022 VS COBOL II Library Only	5741-A07 z/VM V6.2
5668-940 VS COBOL II Library Only	5741-A07 z/VM V6.2
5740-LM1 OS/VS COBOL Library Only	5741-A07 z/VM V6.2
5688-039 C/370™ Library	5741-A07 z/VM V6.2

On/Off Capacity on Demand (CoD)

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Choose the option entitled Purchase / upgrade tools.

The products and features in this announcement have one pricing metric - Value Units based on the number of processors. The charge applies only to the z/VM V6.2 base and the priced, optional features of DirMaint, RSCS, RACF, Performance Toolkit for VM, the VMSSI, and the S&S entitlements at the initial order.

Program name: z/VM Version 6 Release 2

Program number: 5741-A07

Entitlement Identifier	Description	License option / Pricing metric
S015HSV	z/VM V6	Use-based OTC, Per Value Unit On/Off CoD, Per Processor-day TUC
S015HST	DirMaint Feature	Use-based OTC, Per Value Unit On/Off CoD, Per Processor-day TUC
S015HSX	RSCS Feature	Use-based OTC, Per Value Unit On/Off CoD, Per Processor-day TUC
S015HSZ	RACF Feature	Use-based OTC, Per Value Unit On/Off CoD, Per Processor-day TUC
S015HSW	Performance Toolkit for VM Feature	Use-based OTC, Per Value Unit On/Off CoD, Per Processor-day TUC
S016SX6	Single System Image Feature	Use-based OTC, Per Value Unit On/Off CoD, Per Processor-day TUC

Subscription and Support PID 5741-SNS

Entitlement identifier	Description	License option / Pricing metric
S0111PX	z/VM V6	Basic ASC, per Value Unit SW S&S No charge, decline SW S&S No-charge, SW S&S Registration
S0111R1	DirMaint Feature	Basic ASC, per Value Unit SW S&S No charge, decline SW S&S No-charge, SW S&S Registration
S013T6B	RSCS Feature	Basic ASC, per Value Unit SW S&S No charge, decline SW S&S No-charge, SW S&S Registration
S0111R0	RACF Feature	Basic ASC, per Value Unit SW S&S No charge, decline SW S&S No-charge, SW S&S Registration
S0111PZ	Performance Toolkit for VM Feature	Basic ASC, per Value Unit SW S&S No charge, decline SW S&S No-charge, SW S&S Registration
S016VKN	Single System Image Feature	Basic ASC, per Value Unit SW S&S No charge, decline SW S&S No-charge, SW S&S Registration

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