IBM z/VM V6.3 - Virtualization with efficiency at scale

At a glance

IBM® z/VM® V6.3 extends the mainframe virtualization platform to help you reshape and derive more value from your experiences. z/VM V6.3 is designed to offer:

- Improved economies of scale with z/VM support for 1 TB of real memory.
  - Better performance for larger virtual machines.
    -- Quadruples memory scalability while continuing to maintain greater than 90% resource utilization.
  - Additional vertical scalability to help reduce logical partition (LPAR) sprawl.
    -- Considerably more virtual machines can be consolidated into a single LPAR, depending on workload characteristics.
  - Reduced administrative expense through managing a smaller number of large-capacity z/VM host servers.
- Improved performance with HiperDispatch.
  - More efficient utilization of CPU hardware resources for dispatched work.
- Adoption of OpenStack as part of the IBM cloud strategy. In concert, IBM is making contributions to the OpenStack project that are designed to enable z/VM V6.3 to be the first System z® operating environment to be managed by these open cloud architecture-based interfaces.
- Simplified migration to z/VM V6.3 with upgrade in place, which reduces the effect of an upgrade on active workloads.
- Highly secure industry-standard support that is required for banking and financial-industry applications.
- Support for the new IBM zEC12 and zBC12 servers.

Today's z/VM provides a highly secure and scalable enterprise cloud infrastructure and an environment for efficiently running multiple diverse critical applications with support for more virtual servers than any other platform in a single footprint. Enhancements that provide improved scalability and better price performance strengthen z/VM as a foundation for optimized workload deployment with reduced costs per virtual server.

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

Overview

Organizations around the world are recognizing the increasing role that technology plays in driving change as they shift investments from infrastructure maintenance toward new projects that drive business innovation. The explosive growth of mobile devices, big data, cloud computing, and social media represents a clear opportunity to reshape business models, create competitive advantage, and help deliver significant business value. In order to capitalize on these emerging opportunities, you recognize the need to respond with increased agility to deliver new services, while addressing cost, complexity, and risk. This requires an optimized infrastructure that is integrated, flexible, and secure.

The IBM zEnterprise™ System is a modern mainframe that is uniquely suited to deliver industry-leading innovation and value. It allows your organization to exploit new technologies to help improve efficiency and speed time to market. It is designed to unlock the power of big data with the integration of business intelligence and transactional processing to help deliver competitive advantages through actionable insights gained from real-time analytics. Advanced virtualization features like multisystem virtualization and Live Guest Relocation with System z , z/VM , and Linux™ on System z help to provide an efficient infrastructure for deploying private clouds to support workloads that scale both horizontally and vertically at a low total cost of ownership. And, with its high level of security, you can put your trust in the IBM zEnterprise System to protect your most valuable information, helping to reduce organizational and reputational risk.

With the increase of business scale, workloads are continuing to grow in size, putting significant pressure on the resource requirements of virtual machines. New enhancements to z/VM V6.3 now support 1 TB of real memory to help clients keep pace with increasing business demands while continuing to allow for the highest levels of shared resource utilization. This support may increase server consolidation ratios. z/VM V6.3 is the premier virtualization platform, supporting more virtual servers than any other in a single footprint. It provides industry-leading capabilities to efficiently scale both horizontally and vertically, enabling clients to support growing business demands while lowering the cost of service delivery.

In addition to more memory we have also addressed the increasing workload demands for processor cycles and for quicker access to memory. z/VM HiperDispatch does that by strengthening the affinity between where work is dispatched and where the data used by that work exists, thereby avoiding delays to retrieve that data. z/VM HiperDispatch is expected to provide improved throughput depending on workload characteristics, with memory-intensive workloads running on large numbers (16 to 32) of physical processors most likely to achieve the highest performance gains.

To accelerate the delivery of its cloud offerings, IBM recently announced plans to base all of its cloud services and software on open architecture and standards, including OpenStack. OpenStack is an infrastructure as a service (IaaS) cloud computing open source project. IBM joined the project in 2012 and in support of System z is making contributions to the OpenStack project that are designed to enable z/VM V6.3 to be the first System z operating environment that can be managed with these open cloud architecture-based interfaces.

For clients who want to administer virtual servers with Extreme Cloud Administration Toolkit (xCAT), a scalable open source tool developed by IBM , xCAT is now provided with z/VM V6.3. It no longer needs to be separately downloaded, installed, and configured. Users can quickly deploy xCAT with a small amount of tailoring.

Clients can migrate from z/VM V6.2 to z/VM V6.3 in a shorter period of time with automation provided by a new upgrade installation procedure. Automation eliminates the effort required to copy and reconfigure your current environment and the hardware resources associated with migration. Taking advantage of Live Guest Relocation in conjunction with such an upgrade can completely eliminate a planned outage of active workloads.

z/VM V6.3 security enhancements provide support for extending digital signature cryptography with support for the IBM Enterprise Public Key Cryptography Standards (PKCS) #11 (EP11) coprocessor. z/VM provides guest support to protect data and comply with Europay, Mastercard, and Visa (EMV), the global standard for authenticating credit and debit card transactions.

This new release of z/VM , coupled with support for the new IBM System zEC12 and zBC12 servers, helps provide the foundation for a highly secure and scalable enterprise cloud infrastructure and an environment for efficiently running multiple critical industry applications. Examples of new solutions well suited for this environment are:

- Enterprise Linux Server for Analytics, providing a cost competitive platform for deploying enterprise-wide analytics
- IBM Signature Solutions: Anti-Fraud, Waste, and Abuse for Tax Analytics, using advanced analytics to detect suspicious transactions prior to payment, minimize loss from overpayments, and recommend a method of intervention
- IBM zEnterprise Smarter Analytics for Banking, providing predictive analytics to help financial institutions efficiently predict, detect, and manage the threat of money laundering and support regulatory mandates
- Intelligent Operations Center for Smarter Cities™ , providing integrated city management with maximum flexibility and scalability on zEnterprise
- IBM Smarter Infrastructure for Social Services, ensuring protection for citizen information with a single source of secure data and flexibility in deployment
- IBM IT Asset Management for Government, helping government agencies improve the productivity and efficiency of their critical assets
- IBM Curam Solution for Care Management, enabling health and social program providers to quickly and efficiently identify a citizen's need, assess the magnitude of the need, respond to the need with programs and resources, manage the need with a citizen care plan, and measure the case outcome

For the most current information on z/VM V6.3, refer to the z/VM website at

http://www.ibm.com/vm/zvm630/

Key prerequisites

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

Planned availability date

July 26, 2013

Description

Virtualization technology and Linux enablement

z/VM V6.3 includes extensions to z/VM virtualization technology in support of Linux on System z , z/OS® , and other guests.

IPL changes for NSS in a Linux dump

The IPL command function has been enhanced to provide the capability to retain the contents of a named saved system (NSS) in guest memory if one is in use. This enhancement allows stand-alone dump tools, such as those used with the Linux operating system, to include the contents of the NSS in a stand-alone dump.

Technology exploitation

z/VM V6.3 includes support for the newest IBM System z hardware technologies.

Note: Support and exploitation of hardware functions depend on hardware level and availability. For detailed information on hardware capabilities, requirements, and availability, see the appropriate Hardware Announcement materials. Also refer to the hardware Preventive Service Planning (PSP) buckets at IBM Resource Link®

http://www.ibm.com/servers/resourcelink/

A Resource Link user ID and password are required.

IBM zEnterprise EC12 and IBM zEnterprise BC12

z/VM supports the IBM zEnterprise EC12 (zEC12) and IBM zEnterprise BC12 (zBC12) and enables guests to exploit selected new features.

z/VM support for the zEC12 and zBC12 includes support for:

- Crypto Express4S

  z/VM provides guest support for the Crypto Express4S feature, which is exclusive to the zEC12 and zBC12, for z/Architecture® guests.

  The Crypto Express4S can be configured in one of three ways using the Hardware Management Console (HMC) panels:

- IBM Common Cryptographic Architecture (CCA) coprocessor
- IBM Enterprise Public Key Cryptography Standards (PKCS) #11 (EP11) coprocessor
- Accelerator

  The new EP11 coprocessor is designed to provide open industry standard cryptographic services. It provides enhanced firmware capabilities that are designed to meet the rigorous FIPS 140-2 Level 4 and Common Criteria EAL4+ certifications.

  EP11 provides enhanced security qualities when using PKCS #11 functions. EP11 supports secure PKCS #11 keys that never leave the secure boundary of the coprocessor unencrypted. With EP11, keys can now be generated and securely wrapped under the EP11 Master Key, all within the bounds of the coprocessor.

  z/Architecture guests can be authorized in the z/VM directory for shared or dedicated access to the Crypto Express4S. When Crypto Express4S is configured as an accelerator or a CCA coprocessor, z/VM supports the device for shared or dedicated use. When Crypto Express4S is configured as an EP11 coprocessor, z/VM supports the device for dedicated use only.

- CPU-Measurement Counter Facility enhancement

  The CPU-Measurement Counter Facility has been expanded. Code was added to z/VM to support current variations of the new version numbers when collecting the counters and when putting them into the monitor record (Domain 5 Record 13).

- New subchannel measurement block fields

  The Interrupt-Delay Time and I/O-Priority-Delay Time fields have been added to the subchannel measurement block.

- OSA-Express5S

  OSA-Express5S is the next generation of devices in the OSA family. It contains a technology update compared with the OSA-Express4S, with similar performance characteristics.

Fibre Channel Protocol Data Router support

Fibre Channel Protocol (FCP) QEBSM support has been enhanced to allow guest exploitation of the Data Router facility to directly transfer data from guest memory to an FCP device.

FICON® DS8000® Series new functions

z/VM supports the following functions on IBM System Storage® DS8700 and later devices:

- **Storage Controller Health Message**

  This new attention message will be generated from the hardware, one per corresponding Logical Storage System (LSS), to alert the operating system of a condition that in the past would have surfaced as a general Equipment Check. This message will give more details and is intended to reduce the number of false HyperSwap® events that have occurred with the less descriptive Equipment Check.

- **Peer-to-Peer Remote Copy (PPRC) Summary Unit Check**

  When a PPRC suspend condition existed in the past, a corresponding state change interrupt would be presented to each affected DASD in the LSS. When there are a large number of DASD involved, the amount of processing, time, and memory needed by the operating system to process each state change interrupt can accumulate. For clients with large numbers of DASD, this state change processing can cause timeouts to occur in Geographically Dispersed Parallel Sysplex™ (GDPS®) HyperSwap scenarios, because a PPRC suspend occurs on every DASD under HyperSwap control. To prevent these timeouts, a new Summary Unit Check has been created that gives only one interrupt per affected LSS.

This support is intended to reduce the amount of false HyperSwap events by GDPS and reduce the amount of processing required to handle PPRC suspend events, which previously came via state change interrupts. This is particularly useful for clients with large sets of DASD under GDPS PPRC control.

This satisfies the statement of direction made in IBM Software Announcement 211-409, dated October 12, 2011 .

HiperSockets™ completion queue guest exploitation support

z/VM provides guest support for asynchronous HiperSockets data transmission provided by completion queues when deploying a HiperSockets network in a virtualized environment. Completion queues perform requests asynchronously to improve performance for peak workload intervals.

This satisfies the statement of direction made in IBM Software Announcement 211-409, dated October 12, 2011 .

Multiple Subchannel Set support for mirrored DASD

The Multiple Subchannel Set (MSS) support for mirrored DASD provides a subset of host support for the MSS facility to allow using an alternate subchannel set for Peer-to-Peer Remote Copy (PPRC) secondary volumes.

This satisfies the statement of direction made in IBM Software Announcement 211-409, dated October 12, 2011 .

z/VM HiperDispatch

z/VM HiperDispatch is intended to improve efficiency in the use of CPU resources. This enhancement can help to improve performance and allow you to get more business value from your existing IBM System z servers, perhaps by consolidating z/VM workloads into fewer (larger) z/VM LPARs.

z/VM HiperDispatch improves CPU efficiency by causing the Control Program to run work in a manner that recognizes and exploits System z machine topology to increase the effectiveness of physical machine memory cache. This includes:

- Requesting the LPAR hypervisor to handle the partition's logical processors in a manner that exploits physical machine topology
- Dispatching virtual servers in a manner that tends to reduce their movement within the partition's topology
- Dispatching multiprocessor virtual servers in a manner that tends to keep the server's virtual CPUs logically close to one another within the partition's topology

z/VM HiperDispatch can also improve CPU efficiency by automatically tuning the LPAR's use of its logical CPUs to try to reduce multiprocessor effects. This includes:

- Sensing and forecasting key indicators of workload intensity and of elevated multiprocessor effect
- Autonomically tuning the z/VM system to reduce multiprocessor effects when it is determined that z/VM HiperDispatch can help to improve CPU efficiency

The supported processors limit for z/VM V6.3 remains 32, but with improved multiprocessor efficiency.

Systems management

z/VM V6.3 includes systems management improvements that help to provide self-configuring, self-managing, and self-optimization facilities

z/VM V6.3, OpenStack and zManager

IBM zEnterprise Unified Resource Manager (zManager) is designed to provide systems management capabilities across the multi-architecture environment of zEnterprise . Many of you are planning to exploit these system management capabilities to deploy a framework for a heterogeneous cloud environment, thereby providing an effective means to help deliver IT services. To accelerate the delivery of its cloud offerings, IBM recently announced plans to base all of its cloud services and software on open architecture and standards, including OpenStack.

OpenStack is an infrastructure as a service (IaaS) cloud computing open source project. IBM joined the project in 2012 and in support of System z is making contributions to the OpenStack project that are designed to enable z/VM V6.3 to be the first System z operating environment that can be managed with these open cloud architecture-based interfaces.

The management of z/VM environments in zManager is now stabilized as part of the evolution of the IBM cloud strategy and adoption of OpenStack. Accordingly, zManager does not provide systems management support for z/VM V6.3. However, zManager will continue to play a distinct and significant role in the management of virtualized environments created by zEnterprise integrated firmware hypervisors - PR/SM™ , PowerVM™ , and x hypervisor based on Kernel-based Virtual Machine (KVM).

Looking ahead, IBM will continue to enable OpenStack to provide heterogeneous systems management across zEnterprise , z/VM , and distributed platforms, which in turn can be exploited by subsequent IBM SmartCloud™ offerings. These offerings are designed to provide you enablement for enterprise-wide cloud deployments and greater flexibility by removing the need to develop specific interfaces for different cloud services.

Enhanced Performance Toolkit

The Performance Toolkit for VM, function level 630, includes new and updated reports containing the following information:

- CP memory management

- z/VM HiperDispatch
- High Performance FICON
- HiperSockets Bridge
- SSI Live Guest Relocation

Enhanced z/VM systems management application programming interface (SMAPI)

SMAPI enhancements include:

- Several new APIs are added, and existing APIs are updated, to support the zEC12 and system changes included in this release, and to satisfy the requirements of IBM clients. In addition, several previously unpublished APIs are externalized in this release.
  - The LOHCOST Data Base, used to cache directory and metadata, is now available for use in all SMAPI installations.
  - A new First Failure Data Capture tool (both an API version and a stand-alone version) are added for gathering information to assist in problem determination.

Extending zBX connectivity options to Layer-2

Customer experience with the IBM zEnterprise BladeCenter® Extension (zBX) has led IBM to depart from its original requirement to exclusively support Layer-3 connectivity between the external data network and the intraensemble data network (IEDN) top-of-rack (TOR) switches in the zBX. With this change, a z/VM Virtual Switch can be used to provide a Layer 2 connection through the IEDN TOR switch using an OSD, thus extending IEDN connectivity to z/VM guests without requiring an OSX and without requiring z/VM to participate in an Ensemble.

A Redpaper is now available, illustrating a set of pre-tested configuration examples in support of both Layer-2 and Layer-3 connectivity. The Redpaper, *IBM zEnterprise BladeCenter Extension: Network Connectivity Options* (REDP-5036), includes a description of limitations and trade-offs when deploying Layer-2 versus Layer-3 connectivity.

The Redpaper can be accessed at the following website

  http://www.redbooks.ibm.com/

Network virtualization

z/VM V6.3 includes enhancements to z/VM network virtualization.

Virtual switch HiperSockets bridge

The z/VM virtual switch is enhanced to transparently bridge a guest virtual machine network connection on a HiperSockets LAN segment. This bridge allows a single HiperSockets guest virtual machine network connection to also directly communicate with the following:

- Other guest virtual machines on the virtual switch
- External network hosts through the virtual switch OSA UPLINK port

Live Guest Relocation support for port-based virtual switches

This support builds on the existing Live Guest Relocation framework to:

- Allow relocation of a port-based interface
- Prevent relocation of an interface that will clearly be unable to establish network connectivity
- Adjust the destination virtual switch configuration (when possible) by inheriting virtual switch authorization from the origin

The support adds the checks that are needed to safely relocate a guest with a port-based virtual switch interface. Eligibility tests are performed before relocation to determine if the destination network is equivalent.

The support improves the preexisting base network eligibility test by testing other attributes that would prevent the guest from establishing connectivity. Without the improved checks, if you accidentally mislabel two networks as equivalent, a guest might be relocated to the destination node but find it impossible to establish network connectivity, and the reason for the loss of connectivity might not be clear.

MPROUTE upgrade

The MPROUTE server has been upgraded to provide functional equivalency to z/OS V1.13 OMPROUTE.

Virtual switch recovery stall prevention

A new SET VSWITCH UPLINK SWITCHOVER command provides a fast mechanism to switch an uplink port's network connection from its current device to one of its configured backup devices. The use of this new command is less disruptive to virtual switch external network connectivity when there is a need to apply service to an OSA-Express feature.

Additionally, support is added to automatically enable or disable the z/VM Missing Interruption Handler (MIH) function for an OSA-Express or HiperSockets read, write, and data uplink device. MIH is used to detect and recover (failover) from network connectivity problems due to unresponsive or broken hardware.

Virtual switch support for VEPA

The z/VM virtual switch has been enhanced to support Virtual Edge Port Aggregator (VEPA) mode, which allows advanced access, traffic, and security controls to be performed on network traffic.

VEPA is part of the IEEE 802.1Qbg standardization effort and is designed to reduce the complexities associated with highly virtualized deployments such as hypervisor virtual switches bridging many virtual machines. VEPA provides the capability to take all virtual machine traffic sent by the server and send it to an adjacent network switch. This mode of operation moves all frame relay switching from the hypervisor virtual switch to the (external) adjacent switch. With the adjacent switch handling the frame relay for virtual switch guest port to guest port communications, imbedded network-based appliances in the adjacent switch, such as firewalls, Access Control Lists (ACLs), Quality of Service (QoS), port Quality of Service (QoS), and port mirroring, are available to be deployed for this guest port to guest port switching. VEPA eliminates the need to provide and support these network-based appliances in the hypervisors or LPARs. VEPA mode is supported on OSA-Express3 and later on IBM zEnterprise EC12 and later.

Scalability

z/VM V6.3 includes scalability enhancements that can help support increased workloads on z/VM .

Memory management

The z/VM memory management algorithms are redesigned to enable support for real memory up to 1 TB. These enhancements are intended to improve efficiency for the overcommitment of virtual to real memory for guests and to improve performance. Some benefits of these memory management changes are:

- Improved efficiency in the management of memory overcommitment
- Less need to use multiple LPARs by supporting more virtual machines in a single image and larger virtual machines in a single image, reducing system management complexity

Preparing for the increased memory scalability will depend on your current hardware configuration for memory and CPUs. Depending on the workload you plan to run, you might need to add capacity to take full advantage of the 1 TB support provided with z/VM V6.3. This might mean adding memory and CPUs to your existing configuration, adding books or drawers to your system, or reconfiguring XSTORE and DASD paging space.

- To assist with planning for z/VM V6.3, additional information can be found at IBM : z/VM V6.3 Resources

  http://www.ibm.com/vm/zvm630/
- For XSTORE and DASD configuration guidelines, see IBM : VM Performance Resources

  http://www.ibm.com/vm/perf/
- For guidelines on calculating the required paging space, see z/VM : CP Planning and Administration.

Enhanced dump support

z/VM dump capabilities have been enhanced:

- The stand-alone dump utility has been rewritten. The new stand-alone dump creates a CP hard abend format dump, which is usually much smaller than a storage dump, and the dump is written to either ECKD™ or SCSI DASD.
- Larger memory sizes are supported, up to a maximum of 1 TB. The support includes stand-alone dump, hard abend dump, SNAPDUMP, DUMPLD2, and VM Dump Tool.
- Hard abend dump processing has been enhanced by writing out more than one page of the CP Frame Table per I/O. The CP Frame Table accounts for a significant portion of the dump on large storage systems. Compared with the previous version, on a system with the same amount of real storage and using the same DASD devices, the amount of time to create a hard abend dump or SNAPDUMP will decrease.

  The PTF for APAR VM65126 'FIXES TO FCP DUMP SIMULATION' is required on first level systems where the new stand-alone dump program (SDINST) is going to be used to dump second level systems. The PTF is included on V540 RSU1202, V610 RSU1301, and V620 RSU1202. It is important for the first level system to have this fix, or various abends or incorrect operation of the new stand-alone dump program could occur.

Security

z/VM V6.3 includes enhancements to the security characteristics of z/VM .

System z Security Portal

IBM urges all z/VM users to register for the System z Security Portal and to keep current with security and system integrity fixes.

Many security experts agree that, in today's world of heightened cybersecurity concerns, it is more important than ever to track and install critical security and system integrity fixes as part of your overall enterprise security policy to mitigate risk. IBM recommends that users of the z/VM operating system validate the currency of security and system integrity service and take prompt action to install all security and integrity PTFs. Security and system integrity fixes are included in Recommended Service Upgrades (RSUs), and maintaining RSU currency can help you minimize exposure to security and integrity issues.

The System z Security Portal is intended to help you stay current with security and system integrity. The System z Security Portal now provides Associated Common Vulnerability Scoring System (CVSS) V2 ratings for new APARs.[1] Because widespread specifics about a vulnerability could increase the likelihood that an attacker could successfully exploit it, and in response to many customer requests to maintain the

confidentiality of any vulnerability information reported to IBM , this information is available only to registered z/VM customers who agree not to distribute it to others. IBM recommends that you visit the System z Security Portal site to get the information you need to be registered as an authorized user of this information. Visit

http://www-03.ibm.com/systems/z/advantages/security/integrity_zvm.html

Also, questions can be directed to: syszsec@us.ibm.com

[1]

According to the Forum of Incident Response and Security Teams (FIRST), the Common Vulnerability Scoring System (CVSS) is an "industry open standard designed to convey vulnerability severity and help to determine urgency and priority of response." IBM PROVIDES THE CVSS SCORES "AS IS" WITHOUT WARRANTY OF ANY KIND, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. CUSTOMERS ARE RESPONSIBLE FOR ASSESSING THE IMPACT OF ANY ACTUAL OR POTENTIAL SECURITY VULNERABILITY IN THEIR SPECIFIC ENVIRONMENT.

IBM DOES NOT PROVIDE A CVSS ENVIRONMENT SCORE. THE CVSS ENVIRONMENT SCORE IS CUSTOMER ENVIRONMENT SPECIFIC AND WILL IMPACT THE OVERALL CVSS SCORE. CUSTOMERS SHOULD EVALUATE THE IMPACT OF ANY ACTUAL OR POTENTIAL SECURITY VULNERABILITY AND CAN CALCULATE A CVSS ENVIRONMENT SCORE.

Crypto Express4S

z/VM provides guest support for the Crypto Express4S feature, which is exclusive to the zEC12 and zBC12, for z/Architecture guests.

The Crypto Express4S can be configured in one of three ways using the Hardware Management Console (HMC) panels:

- IBM Common Cryptographic Architecture (CCA) coprocessor
- IBM Enterprise Public Key Cryptography Standards (PKCS) #11 (EP11) coprocessor
- Accelerator

The new EP11 coprocessor is designed to provide open industry standard cryptographic services. It provides enhanced firmware capabilities that are designed to meet the rigorous FIPS 140-2 Level 4 and Common Criteria EAL4+ certifications.

EP11 provides enhanced security qualities when using PKCS #11 functions. EP11 supports secure PKCS #11 keys that never leave the secure boundary of the coprocessor unencrypted. With EP11, keys can now be generated and securely wrapped under the EP11 Master Key, all within the bounds of the coprocessor.

z/Architecture guests can be authorized in the z/VM directory for shared or dedicated access to the Crypto Express4S. When Crypto Express4S is configured as an accelerator or a CCA coprocessor, z/VM supports the device for shared or dedicated use. When Crypto Express4S is configured as an EP11 coprocessor, z/VM supports the device for dedicated use only.

SSL server upgrade and TLS 1.2 support

The z/VM SSL server has been upgraded to z/OS V1.13 equivalency. This upgrade includes support for Transport Layer Security (TLS) protocol, version 1.2, which provides support for SHA-256 certificates. A new PROTOCOL operand on the VMSSL command allows the system administrator to enable and disable SSL and TLS protocols for cryptographic use in the operation of the SSL server.

The z/VM SSL server also has been enhanced to support secure IPv6 SSL connections. The following servers and clients have added support for secure IPv6 connections:

- TELNET server and client
- FTP server and client
- SMTP server

Furthermore, NETSTAT IDENT SSL and SSLADMIN have been enhanced to display secure IPv6 connections.

Application enablement

z/VM V6.3 includes enhancements to support application development and deployment on z/VM .

Program Management Binder upgrade

The Program Management Binder for CMS has been upgraded to z/OS V1.13 equivalency. The new level of the Binder includes the following enhancements:

- COMPAT option of the BIND command includes a new ZOSV1R13 parameter.
- The STRIPSEC option of the BIND command includes a new PRIV parameter.
- Support is added for RLD conditional sequential resolution.

Installation, serviceability, and packaging

z/VM V6.3 includes enhanced functions and processes to improve the installation and serviceability of z/VM .

Upgrade installation technique

With z/VM V6.3, a new installation technique called upgrade installation is introduced (for upgrading from z/VM V6.2 only). In a traditional installation, the new release is installed on a separate set of volumes, after which the users and data from the current running system are migrated to the system running the new release. In an upgrade installation, a new release system to be used as a temporary work system is installed as a second-level guest of the current release system that you wish to upgrade. The new level of code from the work system is then moved to your current system with minimal impact to your current running system. This current running system can be a non-SSI system, the only member of a single-member SSI cluster, or any member of a multimember SSI cluster. In a multimember SSI cluster, you will upgrade one member at a time so that there is minimal impact to the other members.

An upgrade installation is performed using a two-stage approach, with two separate sets of changes being defined and then made on your current system. The first set of changes, STAGE 1, can be made to your current system without disrupting your production workload. After the STAGE 1 changes have been made you must stop all normal production work on your current system or move that work to another system. In an SSI cluster environment, you can relocate production Linux workloads from your current system to other members of your cluster before performing STAGE 2 activities.

Once you have relocated or stopped your workloads, you should create a backup of the system you are upgrading using your normal backup procedures. You are then ready to proceed to STAGE 2. When the STAGE 2 changes are complete you will IPL your current system and restart your normal workloads.

In an SSI environment you can run multiple levels of z/VM on the members of the SSI cluster. This allows you to upgrade one member at a time and thoroughly test your current workloads on the new level of z/VM before upgrading additional members.

Cross-system highest level program handling

In an SSI cluster in which members have different levels of z/VM installed, certain programs that manage shared resources are required to be at the highest release level that is running in the cluster. These programs must be on all members in the cluster regardless of the release level running on each member. Handling the highest release level program is accomplished by having a common test/production build disk set, where programs that must be at the highest release level are shipped

and maintained. These disks are on the common volume and are owned by the PMAINT user ID. When a z/VM release which supersedes all other releases running on the members in an SSI cluster is installed on a member of the cluster, the z/VM installation processing places these programs from the superseding release on the SSI system common disk, replacing all programs from the superseded release.

Service enhancements

z/VM includes the following service enhancements:

- The VMVFIEW EXEC has been updated to accommodate VMSES/E program-specific tracing output.
- Console data excluded from the SERVICE $CONS by the SERVICE EXEC is spooled to the reader as a file called SERVICE $CONXCLD.

xCAT appliance packaged with z/VM V6.3

The Extreme Cloud Administration Toolkit (xCAT) appliance is packaged with z/VM V6.3. xCAT is an open source scalable distributed computing management and provisioning tool that provides a unified interface for hardware control, discovery, and OS diskful/diskfree deployment. The toolkit is configured to be ready for use with no modification.

z/VM license information provided on DVD

License information for z/VM V6.3 is provided on a DVD supplied with the z/VM product:

- z/VM V6.3 Agreements and License Information, LC27-5378-00

The DVD includes the following documents:

- International Program License Agreement (PDF)
- z/VM : License Information (PDF)
- International Agreement for the Acquisition of Software Maintenance (PDF)
- Third-party notices (HTML)

Withdrawal of support

With z/VM V6.3, IBM has withdrawn support for the following functions:

- **A220 and CLAW device drivers.**

  This satisfies the statement of direction made in IBM Software Announcement 211-409, dated October 12, 2011 .

- **z/VM Dynamic Host Configuration Protocol Daemon (DHCPD).**

  This satisfies the statement of direction made in IBM Software Announcement 211-409, dated October 12, 2011 .

- **z/VM Line Printer Daemon (LPD).**

  This satisfies the statement of direction made in IBM Software Announcement 211-409, dated October 12, 2011 .

  The Line Printer Daemon (LPD) protocol is still supported using non-z/VM LPD servers, and LPD related tools are still shipped for this purpose. An LPD link driver is still provided in the z/VM RSCS feature.

- **OVERRIDE utility and the user class restructure (UCR) function.**

  This satisfies the statement of direction made in IBM Software Announcement 211-409, dated October 12, 2011 .

- **Cross System Extensions (CSE).**

  z/VM Single System Image (SSI) clusters provide the new technology for clustering z/VM systems. This satisfies the statement of direction made in IBM Software Announcement 211-409, dated October 12, 2011 .

  The cross-system link (XLINK) function that was formerly included in CSE is still supported for non-SSI systems.

IBM Systems Lab Services and Training

IBM Systems Lab Services and Training ("Lab Services") provides leading-edge consulting, custom solutions, support services, and proofs-of-concept to meet your business requirements now and to support your strategic initiatives in the future. Lab Services can leverage the worldwide intellectual and technical resources of IBM product development labs to assist you in taking advantage of emerging technologies on z/VM and Linux , explaining these innovative solutions and delivering the training needed to use them. And, sometimes, you just need a helping hand. Lab Services can provide the help you need, including such services as:

- **New technology exploitation**

  IBM System z regularly delivers new technology to solve business problems in new, innovative ways. Lab Services can help you understand and accelerate your exploitation of these emerging technologies, and educate you on their configuration, use, and problem determination.

- **Currency and migration**

  Lab Services will assist you with planning or performing upgrades to your System z environment. We can help you replace your IBM System z server, change your I/O configuration, or upgrade or apply maintenance to z/VM or Linux on System z operating systems. Our experts will use their experience to help you develop a methodology to keep your System z servers and operating systems current.

- **Security and compliance**

  Lab Services provides you with an in-depth analysis of your z/VM and Linux on System z servers to help identify areas that could be better secured, or that may raise possible compliance or vulnerability concerns. Where applicable, we will help you understand how to take advantage of the security features and management software on these systems.

- **z/VM Single System Image and Live Guest Relocation**

  Lab Services can help you to implement a z/VM Single System Image (SSI) cluster. It's ideal for clients who want to accelerate their use of Live Guest Relocation (LGR) in order to increase the availability of their Linux on System z servers, but who don't have the time to learn all of the technical details.

To learn more about our offerings, visit

  http://www.ibm.com/systems/services/labservices

To discover what IBM System Lab Services and Training can do for you, contact us at systemz@us.ibm.com.

Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

  http://www.ibm.com/able/product_accessibility/index.html

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 V6.3 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

Today's announcement strengthens the scalability of z/VM with support for 1 TB of real memory. This provides relief for large workloads, for example Oracle database servers that consume 256 GB of memory today. In addition, with the support for 1 TB of real memory the capability exists to consolidate considerably more virtual machines into a single LPAR, depending on workload characteristics, especially if you assume the same characteristics and resource requirements as the existing workload and with a comparable increase in other resources such as CPU, I/O, network, paging, and spooling resources.

z/VM HiperDispatch support improves performance through more efficient use of processor cache. This will most benefit the performance of memory-intensive workloads running on a large number (16 to 32) of physical processors.

z/VM V6.3 operates on all servers starting with IBM System z10® and newer including the latest IBM System zEC12 and zBC12 servers announced today.

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 V6.3 provides additional support and exploitation opportunities for many users who have built enterprise-wide automation and infrastructure enhancements on the z/VM platform in support of their applications, database systems, and on-demand business solutions. For example, upgrade in place provides a more attractive, lower cost, and quicker release upgrade for migrating from z/VM V6.2 than that available in previous releases.

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 more virtual servers than any other platform in a single footprint and now with a 4x increase in the real memory limit supported, z/VM V6.3 supports larger workloads while continuing to maintain greater than 90% resource utilization.

Statement of direction

- **Security Evaluation of z/VM V6.3**

  IBM intends to evaluate z/VM V6.3 with the RACF Security Server feature, including labeled security, 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+).

- **FIPS Certification of z/VM V6.3**

  IBM intends to pursue an evaluation of the Federal Information Processing Standard (FIPS) 140-2 using National Institute of Standards and Technology's (NIST) Cryptographic Module Validation Program (CMVP) for the System SSL implementation utilized by z/VM V6.3.

- **Support of the 10GbE RoCE Express® feature**

  In a future z/VM deliverable IBM plans to offer support for guest exploitation of the 10GbE RoCE Express feature (#0411) on the IBM zEnterprise EC12 and IBM zEnterprise BC12 systems. This is to allow guests to utilize Remote Direct Memory Access over Converged Ethernet (RoCE) for optimized networking.

- **Support of the zEDC Express feature**

  In a future z/VM deliverable IBM plans to offer z/VM support for guest exploitation of the IBM zEnterprise Data Compression (zEDC) Express feature (#0420) on the IBM zEnterprise EC12 and IBM zEnterprise BC12 systems.

- **IBM SmartCloud support**

  IBM currently provides a Cloud Ready for Linux on System z solution. IBM intends to add additional Linux on System z Cloud support built on z/VM V6.3 and OpenStack, including SmartCloud Orchestrator and SmartCloud Provisioning.

- **Stabilization of VM z/V5.4 support**

  The IBM zEnterprise EC12 and IBM zEnterprise BC12 are planned to be the last System z servers supported by z/VM V5.4 and the last System z servers that will support z/VM V5.4 running as a guest (second level). z/VM V5.4 will continue to be supported until December 31, 2014, or until the IBM System z9® EC and IBM System z9 BC are withdrawn from support, whichever is later. Refer to Withdrawal Announcement 912-144, dated August 07, 2012 .

- **Withdrawal of support for Expanded Storage**

  z/VM V6.3 will be the last release to support expanded storage (XSTOR) as part of the paging configuration. With the enhanced memory management support added in z/VM V6.3, expanded storage is no longer recommended as part of the paging configuration. z/VM can run efficiently in a configuration using only central storage.

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 remain at our sole discretion.

Reference information

For information about the IBM zEnterprise , refer to:

- Hardware Announcement 112-155, dated August 28, 2012 , IBM zEnterprise EC12 - proven hybrid computing designed to manage multiple workloads, with the simplicity of a single system
- Hardware Announcement 113-119, dated July 23, 2013 , IBM zEnterprise EC12 enhancements enable data, cloud, and security-ready capabilities
- Hardware Announcement 113-121, dated July 23, 2013 , IBM zEnterprise BC12 (zBC12) extends modern mainframe capabilities for enterprises of all sizes to help cut costs, improve service, and fuel innovation for business growth

For IBM zEnterprise z114 hardware capabilities, refer to:

- Hardware Announcement 111-136, dated July 12, 2011

For IBM zEnterprise 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

Program number

```
Program                              Program
name                                 number

z/VM Version 6 (V6.3)                5741-A07
z/VM Version 6 SDO (V6.3)            5741-A08
z/VM Subscription & Support (V1.1)   5741-SNS
```

Note: z/VM V6.3 and the optional features must be ordered using the z/VM V6.3 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).

   https://www.ibm.com/partnerworld/mem/sla.jsp?num=213-297

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

The z/VM V6.3 product information is provided in the z/VM V6.3 Information Center. The z/VM V6.3 publications are also available as Adobe™ PDF files.

z/VM V6.3 Information Center

The z/VM information center provides z/VM information through the IBM User Interface Help System built on Eclipse. The z/VM information center includes documentation for the z/VM base product and optional features, the prerequisite IBM products, and some optional IBM products and facilities.

An information center offers the following advantages:

- Content is indexed by Google and other internet search engines to help locate information more easily.
- Custom searches can be created that include only the information you need for a particular task or job role.

The z/VM V6.3 Information Center is available:

- On an IBM website at

   http://publib.boulder.ibm.com/infocenter/zvm/v6r3/index.jsp
- On a downloadable DVD image, SK5T-7098. This .zip file includes the IBM User Interface Help System framework, which allows you to install the information center on a workstation or intranet. The .zip file can be obtained from the IBM Publications Center.

Adobe PDF files

The z/VM publications are also available as Adobe PDF files, which are included in the z/VM information center. The PDF files are also included on the *IBM Online Library: z/VM Collection* and are available from the IBM Publications Center.

You can view a PDF file using the Adobe Reader, which 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.

z/VM V6.3 Agreements and License Information

License information for z/VM V6.3 is provided on the *z/VM V6.3 Agreements and License Information* DVD, LC27-5378. The DVD is supplied with z/VM and includes the following documents:

- International Program License Agreement (PDF)
- z/VM : License Information (PDF)
- International Agreement for the Acquisition of Software Maintenance (PDF)
- Third-party notices (HTML)

IBM Online Library: z/VM Collection

The *IBM Online Library: z/VM Collection,* SK5T-7054, includes product information libraries for z/VM and current IBM licensed programs that run on z/VM . The z/VM Collection is available as a downloadable .zip file that can be obtained from the IBM Publications Center.

z/VM Internet Library

The z/VM Internet Library is the Library page of the z/VM product website

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

The z/VM Internet Library provides links to various online z/VM information resources, such as:

- z/VM information centers
- Updated editions of z/VM publications not included in the z/VM Information center or the *IBM Online Library: z/VM Collection*
- z/VM program directories
- z/VM data areas, control blocks, and monitor records
- IBM Redbooks® publications
- White papers, consultant reports, and performance reports
- Data sheets and brochures
- Reference guides
- Journals, bulletins, and newsletters

IBM Publications Center

z/VM publications can be obtained separately from IBM using the specific publication numbers through the IBM Publication Center at

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

The IBM 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. A large number of publications are available online in various languages and file formats, and they can be downloaded by all countries, free of charge. Payment options for orders of physical media are via credit card (in the USA) or customer number for 20 countries.

Documentation supplied with z/VM

The following documentation is supplied with z/VM V6.3:

- One copy of the *z/VM V6.3 Agreements and License Information* DVD
- One printed copy of the *z/VM : Installation Guide*
- z/VM help files (included in the z/VM system image)

z/VM V6.3 publications

All new edition and unchanged publications for z/VM V6.3 are listed below. All publications are planned to be available from the z/VM V6.3 Information Center and the IBM Publications Center on July 26, 2013.

z/VM base product publications -- new editions

- z/VM : CMS and REXX/VM Messages and Codes, GC24-6161
- z/VM : CMS Callable Services Reference, SC24-6165
- z/VM : CMS Commands and Utilities Reference, SC24-6166
- z/VM : CMS Planning and Administration, SC24-6171
- z/VM : CMS User's Guide, SC24-6173
- z/VM : Connectivity, SC24-6174
- z/VM : CP Commands and Utilities Reference, SC24-6175
- z/VM : CP Exit Customization, SC24-6176
- z/VM : CP Messages and Codes, GC24-6177
- z/VM : CP Planning and Administration, SC24-6178
- z/VM : CP Programming Services, SC24-6179
- z/VM : Diagnosis Guide, GC24-6187
- z/VM : General Information, GC24-6193
- z/VM : Getting Started with Linux on System z , SC24-6194
- z/VM : Glossary, GC24-6195
- z/VM : Group Control System, SC24-6196
- z/VM : Installation Guide, GC24-6246
- z/VM : License Information, GC24-6200
- z/VM : Migration Guide, GC24-6201
- z/VM : Other Components Messages and Codes, GC24-6207
- z/VM : Performance, SC24-6208
- z/VM : Program Management Binder for CMS, SC24-6211
- z/VM : Reusable Server Kernel Programmer's Guide and Reference, SC24-6220
- z/VM : Saved Segments Planning and Administration, SC24-6229
- z/VM : Secure Configuration Guide, SC24-6230
- z/VM : Service Guide, GC24-6247
- z/VM : System Operation, SC24-6233
- z/VM : Systems Management Application Programming, SC24-6234
- z/VM : TCP/IP Diagnosis Guide, GC24-6235
- z/VM : TCP/IP LDAP Administration Guide, SC24-6236
- z/VM : TCP/IP Messages and Codes, GC24-6237
- z/VM : TCP/IP Planning and Customization, SC24-6238
- z/VM : TCP/IP Programmer's Reference, SC24-6239
- z/VM : TCP/IP User's Guide, SC24-6240
- z/VM : Virtual Machine Operation, SC24-6241
- z/VM : VM Dump Tool, GC24-6242
- z/VM : VMSES/E Introduction and Reference, GC24-6243

z/VM : General Information, z/VM : Installation Guide, and *z/VM : License Information* are not included in the *z/VM V6.3 Information Center* or the *IBM Online Library: z/VM Collection.* PDF files are available from the z/VM Internet Library and the IBM Publications Center. A printed copy of *z/VM : Installation Guide* is provided with the z/VM product. *z/VM : License Information* is included on the *z/VM V6.3 Agreements and License Information* DVD provided with the z/VM product.

z/VM base product publications - unchanged editions

- z/VM : CMS Application Development Guide, SC24-6162
- z/VM : CMS Application Development Guide for Assembler, SC24-6163

- z/VM : CMS Application Multitasking, SC24-6164
- z/VM : CMS File Pool Planning, Administration, and Operation, SC24-6167
- z/VM : CMS Macros and Functions Reference, SC24-6168
- z/VM : CMS Pipelines Reference, SC24-6169
- z/VM : CMS Pipelines User's Guide, SC24-6170
- z/VM : CMS Primer, SC24-6172
- z/VM : CPI Communications User's Guide, SC24-6180
- z/VM : Dump Viewing Facility, GC24-6191
- z/VM : Enterprise Systems Architecture/Extended Configuration Principles of Operation, SC24-6192
- z/VM : I/O Configuration, SC24-6198
- z/VM : Language Environment® User's Guide, SC24-6199
- z/VM : OpenExtensions Advanced Application Programming Tools, SC24-6202
- z/VM : OpenExtensions Callable Services Reference, SC24-6203
- z/VM : OpenExtensions Commands Reference, SC24-6204
- z/VM : OpenExtensions POSIX Conformance Document, GC24-6205
- z/VM : OpenExtensions User's Guide, SC24-6206
- z/VM : REXX/VM Reference, SC24-6221
- z/VM : REXX/VM User's Guide, SC24-6222
- z/VM : Running Guest Operating Systems, SC24-6228
- z/VM : XEDIT Commands and Macros Reference, SC24-6244
- z/VM : XEDIT User's Guide, SC24-6245

Optional DFSMS/VM feature publications - unchanged editions

- z/VM : DFSMS/VM Customization, SC24-6181
- z/VM : DFSMS/VM Diagnosis Guide, GC24-6182
- z/VM : DFSMS/VM Messages and Codes, GC24-6183
- z/VM : DFSMS/VM Planning Guide, SC24-6184
- z/VM : DFSMS/VM Removable Media Services, SC24-6185
- z/VM : DFSMS/VM Storage Administration, SC24-6186

Optional z/VM Directory Maintenance Facility feature publications - new editions

- z/VM : Directory Maintenance Facility Commands Reference, SC24-6188
- z/VM : Directory Maintenance Facility Messages, GC24-6189
- z/VM : Directory Maintenance Facility Tailoring and Administration Guide, SC24-6190

Optional Performance Toolkit for VM feature publications - new editions

- z/VM : Performance Toolkit Guide, SC24-6209
- z/VM : Performance Toolkit Reference, SC24-6210

Optional RACF Security Server feature publications - new editions

- z/VM : RACF Security Server Messages and Codes, GC24-6217
- z/VM : RACF Security Server Security Administrator's Guide, SC24-6218
- z/VM : RACF Security Server System Programmer's Guide, SC24-6219

Optional RACF Security Server feature publications - unchanged editions

- z/VM : RACF Security Server Auditor's Guide, SC24-6212

- z/VM : RACF Security Server Command Language Reference, SC24-6213
- z/VM : RACF Security Server Diagnosis Guide, GC24-6214
- z/VM : RACF Security Server General User's Guide, SC24-6215
- z/VM : RACF Security Server Macros and Interfaces, SC24-6216
- z/VM : Security Server RACROUTE Macro Reference, SC24-6231

Optional RSCS Networking feature publications - new editions

- z/VM : RSCS Networking Planning and Configuration, SC24-6227

Optional RSCS Networking feature publications - unchanged editions

- z/VM : RSCS Networking Diagnosis, GC24-6223
- z/VM : RSCS Networking Exit Customization, SC24-6224
- z/VM : RSCS Networking Messages and Codes, GC24-6225
- z/VM : RSCS Networking Operation and Use, SC24-6226

Other publications - new editions

- z/OS : MVS™ Program Management: Advanced Facilities, SA22-7644
- z/OS : MVS Program Management: User's Guide and Reference, SA22-7643

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

Other publications - unchanged editions

- Device Support Facilities: User's Guide and Reference, GC35-0033
- z/OS and z/VM : Hardware Configuration Definition Messages, SC33-7986
- z/OS and z/VM : Hardware Configuration Manager User's Guide, SC33-7989
- Network Job Entry: Formats and Protocols, SA22-7539
- z/OS : Language Environment Concepts Guide, SA22-7567
- z/OS : Language Environment Debugging Guide, GA22-7560
- z/OS : Language Environment Programming Guide, SA22-7561
- z/OS : Language Environment Programming Reference, SA22-7562
- z/OS : Language Environment Run-Time Messages, SA22-7566
- z/OS : Language Environment Writing Interlanguage Communication Applications, SA22-7563
- z/OS : IBM Tivoli® Directory Server Plug-in Reference for z/OS , SA76-0148
- zEnterprise System, System z10 , System z9 and eServer™ zSeries : Open Systems Adapter-Express Customer's Guide and Reference, SA22-7935
- System z9 and eServer zSeries 890 and 990: Open Systems Adapter-Express Integrated Console Controller User's Guide, SA22-7990
- System z : Open Systems Adapter-Express Integrated Console Controller 3215 Support, SA23-2247
- System z10 : Open Systems Adapter-Express3 Integrated Console Controller Dual-Port User's Guide, SA23-2266
- Common Programming Interface Communications Reference, SC26-4399
- Common Programming Interface Resource Recovery Reference, SC31-6821
- Environmental Record Editing and Printing Program (EREP): Reference, GC35-0152
- Environmental Record Editing and Printing Program (EREP): User's Guide, GC35-0151

Note: *Common Programming Interface Resource Recovery Reference* is available only in BookManager® format and printed.

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.

Technical information

Specified operating environment

Hardware requirements

z/VM V6.3 does not require a new Architecture Level Set (ALS). It will run on the same ALS that is available for z/VM V6.2 as described on the z/VM website at

http://www.ibm.com/vm/zvm630/architecture/

- zBC12 zEnterprise BC 12

    Refer to the DEVICE2828 Preventive Service Planning (PSP) bucket for the minimum MCL level and any required updates or PTFs.

- zEnterprise EC12

    Refer to the DEVICE2827 Preventive Service Planning (PSP) bucket for the minimum MCL level and any required updates or PTFs.

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

Software requirements

Prerequisite requirements

PTFs for the following APARs are required for the z/VM base components in V6.2. These APARs provide support for maintaining the highest level of common parts in a mixed release z/VM Single System Image.

- VM65317
- VM65318
- VM65319
- VM65320
- EREP VM (5654-260) V3.5.0.
    - The following PTFs have been applied to the z/VM V6.3 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 EC.

-- PTF for APAR VM64475 provides the necessary support for the System z10 Business Class.

-- PTF for APAR VM64807 provides support for the z196 server.

-- PTF for APAR VM64928 provides support for the z114 server.

-- PTF for APAR VM65130 provides support for the zEC12 server.

The PTF for APAR VM65279 provides support for the zBC12 server. This has NOT been applied. It is necessary to order and apply the PTF for this APAR.

- 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 V6.3 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 V6.3, 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 Preinstalled products and features section for additional information on ordering EREP and ICKDSF.

Optional product/feature requirements

- IOCP additional program requirements

  The following APAR needs to be applied to provide IOCP support:

  – APAR VM65278 provides support for the zEC12 server (driver D15F) and the zBC12 server.

- 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 V6.3 if the minidisk management function is needed.

  – RACF Security Server for z/VM optional feature of z/VM V6.3 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 V6.3 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 FL630 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.

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

  - – The required support for the System z10 and zEnterprise 196 and 114 has been applied to HCD/HCM supplied with z/VM V6.3.

    - -- APAR VM65047 provides HCD support for the zEC12 server.
    - -- APAR VM65239 provides HCD support for the zEC12 server (driver D15F) and the zBC12 server.
    - -- APAR VM65236 provides HCM support for the zEC12 server (driver D15F) and the zBC12 server.

- 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, FS2SFSER, 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 language
    - -- Assemble any CP modules
    - -- Assemble exit routines for CP

  - – The High Level Assembler requires the PTF for APAR PM49761 to support the zEC12 instruction set.
  - – 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 .
  - – APAR PM49761 provides support for new instructions provided with the zEC12 and zBC12 servers.

    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

- z/VM books are available as Adobe Portable Document Format (PDF) files. To open and view PDF books on your workstation, the Adobe Reader is required. You can also use the Adobe Reader to print PDF books or sections of PDF books. The Adobe Reader is available free from Adobe

    http://www.adobe.com

- 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 FL630 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 FL630.
    - Group Control Subsystem (GCS) must be configured and activated.

- Shared-DASD Complex 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 is required to support the shared-DASD complex:

    - DirMaint , Function Level 630 (FL630)

        Within the shared-DASD complex, all z/VM systems must be running the same DirMaint FL630 service level. Therefore, you must be licensed for the DirMaint FL630 feature on any z/VM V6.3 system in the complex.

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

OSA/SF V4.4.0 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 V6.3 environment, OSA/SF requires TCP/IP for z/VM V6.3. 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 V6.3 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.
- The PTF for APAR OA38418 is required for OSA/SF to support OSA on the IBM zEnterprise EC12 (zEC12).
- The PTFs for APARs OA37060 and OA38418 provide support for the OSA-Express4S and OSA-Express5S on the zEC12 and zBC12 servers.

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

TCP/IP for z/VM V6.3 program requirements

TCP/IP for z/VM V6.3 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 on System z

In order to operate Linux on System z as a guest of z/VM , a Linux on System z distribution 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

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).

For additional information, refer to Usage restriction in the Terms and conditions section of this announcement, or to the license information document that is available on the IBM Software License Agreement website

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

Performance considerations

System performance depends on the hardware resources allocated to z/VM V6.3 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.

IBM Electronic Support

The IBM Support Portal is your gateway to technical support. This includes IBM Electronic Support tools and resources, for software and hardware, to help save time and simplify support. The Electronic Support tools can help you find answers to questions, download fixes, troubleshoot, automate data collection, submit and track problems through the Service Request online tool, and build skills. All these tools are made available through your IBM support agreement, at no additional charge.

Read about the Electronic Support portfolio of tools
http://ibm.com/electronicsupport
Access the IBM Support Portal
http://ibm.com/support

Access the online Service Request tool
http://ibm.com/support/servicerequest

User group and customer 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 and customer requirements satisfied with this announcement:

```
Requirement
number          Requirement description

MR0513111155    Improve duplicate IP address handling on VSWITCH
MR063011175     Keep in-use zLinux guest pages in real storage when
                running under z/VM
MR1019112549    Support Greater Than 256Gig
MR0426125518    DIRMAP's UNSORT File Should Contain SUBCONFIG and
                Member Data
MR0907111236    Standalone Dump without Tape
MR1220054748    Able to direct standalone dump outoup to DASD
MR0809063354    SADUMP
MR0110082559    Standalone dump load from DVD/CD DASD
MR0216102445    z/VM support SA DUMP on SCSI
MR0825111220    Improve VSwitch Failover & MIH Detection
MR061112320     PRIROUTER configuration failure enhancement
```

Planning information

Customer responsibilities

z/VM V6.3 Subscription and Support (S&S)

To order z/VM V6.3, 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 V6.3

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 FL630 feature**
- **RSCS FL630 feature**
- **RACF Security Server FL630 feature**
- **Performance Toolkit for VM FL630 feature**
- **Single System Image FL630 feature (VMSSI)**

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

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

If you do not have a license for 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 quotation (PRPQ). A PRPQ must be submitted to purchase the High Level Assembler for Linux on System z (5799-TCQ) and for its annual Subscription and 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 IBM Service for assistance.

Direct customer support

For technical support or assistance, go to

    http://www.ibm.com/support

or contact your IBM representative for additional assistance.

Packaging

z/VM V6.3

The z/VM V6.3 product package is distributed with the following:

- License Information Document (LID) on DVD (LC27-5378).
- 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 Recommended Service Updates (RSUs) 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 format.
- If ordering to install from electronic delivery:
  - Binaries from DVD for installation to SCSI disk, provided in a compressed file.
  - Binaries from DVD for installation to 3390 DASD, provided in a compressed file.
  - RSU DVD containing required service, provided in a compressed file.

  Note: Electronic delivery provided as binary images from DVD are provided as compressed files.
- One IBM Online Library: z/VM Collection.
- Publications:
  - z/VM : Installation Guide (GC24-6246)

  Note: *IBM Online Library: z/VM Collection* is no longer shipped with z/VM orders, but is available from the Publications Website.
- Memo to Users for VM/SDO, the priced preinstalled features, if ordered.

  Note: Program Directories for z/VM and the preinstalled products can be found at

  http://www.ibm.com/vm/progdir/

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 V6.3 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 as 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

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, you can quickly generate orders for the z/VM 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 V6.3 base operating system and SDO licensed products are eligible for Internet delivery using the Shopz website and are planned to be available at the general availability of z/VM V6.3.

Note: Secure z/VM software delivery in Shopz.

IBM plans to remove support for unsecured connections used for z/VM software and service delivery. It is planned that z/VM software (products and service) downloads from Shopz will require the use of Download Director with encryption or the currently available HTTPS method. No change is required for Download Director with encryption; however, you can verify Download Director with the Connectivity Test at

https://www14.software.ibm.com/webapp/iwm/web/preLogin.do?source=cbct

ServiceLink plans to provide similar capability. Details will be provided a later date.

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 their 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 V6.3.

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 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      S&S
program   program   Program
number    number    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 clients are running On/Off CoD on their IBM servers, they 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.

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:

```
                     Engines   Engines   Value Units
Level                minimum   maximum   per engine

From 1 to 3          1         3         10
From 4 to 6          4         6         9
From 7 to 9          7         9         8
From 10 to 12        10        12        7
From 13 to 16        13        16        6
From 17 to 20        17        20        5
From 21 to 25        21        25        4
For more than 25     26        +         3
```

Licensing for z/VM V6.3

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        SDO        S&S
program     program    program    Program
number      number     number     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 V6.3 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 V6.3 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      Standard   Maximum
processors processors 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)

   101       101       101      zEnterprise EC12 (2827)
    13         6        13      zEnterprise BC12 (2828)
```

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 will ship a Memo to Users 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.

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. 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 V6.3 (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 Use-based OTC, Per Value Unit
             for VM Feature
 S016SX7    z/VM Single System Use-based OTC, Per Value Unit
             Image Feature
```

z/VM V6.3 Base SDO (5741-A08) - S015HT5

```
Orderable supply ID    Language        Distribution medium

S016VLH                US English      3590 Tape
S016VLJ                US English      3592 Tape
```

z/VM V6.3 Base SDO (5741-A08) - S015HTF

```
Orderable supply ID    Language        Distribution medium

S016VLK                US English      DVD
```

Optional Features of z/VM V6.3 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) - S016SX7

```
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
 S016VRV    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

S0111HJ    US English z/VM V6.3 3390 Sys DDR
                      (Support for 5741-A07)
```

```
z/VM Base S&S (5741-SNS) - S0111HK

Orderable
supply ID  Language   Description

S0111HL    US English z/VM V6.3 DVD Sys Image
                       (Support for 5741-A07)

z/VM Base S&S (5741-SNS) - S0111H7

Orderable
supply ID  Language   Description

S0111H8    US English DirMaint Feature (Support for 5741-A07)

z/VM Base S&S (5741-SNS) - S013T6C

Orderable
supply ID  Language   Description

S013T6D    US English RSCS Feature (Support for 5741-A07)

z/VM Base S&S (5741-SNS) - S0111HC

Orderable
supply ID  Language   Description

S0111HD    US English RACF Security Server
                       Feature (Support for 5741-A07)

z/VM Base S&S (5741-SNS) - S0111HF

Orderable
supply ID  Language   Description

S0111HG    US English Performance Toolkit
                       for VM feature (Support for 5741-A07)

z/VM Base S&S (5741-SNS) - S016VKN

Orderable
supply ID  Language   Description

S016VKT    US English Single System Image
                       feature (Support for 5741-A07)

z/VM Base S&S (5741-SNS) - S0111H9
Orderable
supply ID   Language  Description

S0111HB  US English  z/VM V6.3 DFSMS/VM
                       feature (Support for 5741-A07)
```

Ordering z/VM V6.3 using the VM/SDO

Orders for z/VM V6.3 will be accepted beginning July 23, 2013. When placing an
order, if you wish to have that order fulfilled with z/VM V6.3, you will need to specify
a customer requested arrival date (CRAD) of July 26, 2013, or later. Orders for
V6.3 may not be scheduled to ship prior to July 26, 2013. z/VM V6.2 and its priced,
optional features of SSI, RSCS, DirMaint , RACF , and the Performance Toolkit for VM
will be withdrawn from marketing on July 23, 2013, and will be supported until April
30, 2015.

Orders for z/VM V6.3 and the optional features must use the z/VM V6.3 VM/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 V6.3, you will receive a system deliverable tape, DVD, or electronic media image containing the program code for z/VM V6.3, an IPLA and LID on DVD, and one copy of each publication available for z/VM V6.3 as listed in the Planning information, 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 V6.3

Program Name: z/VM Subscription and 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 V6.3 or the optional features. If a 5741-SNS order is declined, you will only be entitled to support under the basic warranty for z/VM V6.3 (5741-A07).

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

Central service for z/VM V6.3 (5741-A07) is planned to be available by IBM until April 30, 2017.

IBM announced its intention to discontinue service support for z/VM V5.4 (5741-A05) to be effective December 31, 2014, in Withdrawal Announcement 912-144, dated August 07, 2012 .

The date planned for discontinuing service support for z/VM V5.4 has been extended. z/VM V5.4 will continue to be supported until December 31, 2014, or until the IBM System z9 EC and IBM System z9 BC are withdrawn from support, whichever is later. Refer to Withdrawal Announcement 912-144, dated August 07, 2012 .

The z/VM S&S provides:

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

National language translation

When you order z/VM V6.3, 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 V6.3 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 V6.3 SDO optional licensed products

Program Name: z/VM V6.3 SDO

Program Number: 5741-A08

The following table provides the orderable supply features for the optional licensed products with z/VM V6.3. These optional products may be ordered for delivery on tape (3590 or 3592) or DVD, as well as Internet delivery from Shopz in countries where Shopz product ordering is offered.

Note: There is no media delivered for the preinstalled base product options. Preinstalled base product options require a license. Enablement instructions for these options are provided when these supply features (DirMaint , RSCS, RACF , VMSSI, and Performance Toolkit for VM) are ordered.

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
S01788T    US English   DVD         5741-A07 DVD  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
S017823     US English  DVD         5684-042 DVD  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
S017824     US English  DVD         5686-065 DVD  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
S017825     US English  DVD         5654-010 DVD  ACF/VTAM – VM
S015TDJ     US English  3590 Tape   5654-260 EREP VM
S015TDK     US English  3592 Tape   5654-260 EREP VM
S017826     US English  DVD         5654-260 EREP VM

S015TDL     US English  3590 Tape   5668-801 3590 GDDM/IMD V2
S015TDM     US English  3592 Tape   5668-801 3592 GDDM/IMD V2
S017B3W     US English  DVD         5668-801 DVD  GDDM® IMD V2
S015TDN     US English  3590 Tape   5668-723 3590 GDDM/IVU V1
S015TDP     US English  3592 Tape   5668-723 3592 GDDM/IVU V1
S017B3V     US English  DVD         5668-723 DVD  GDDM IVU V1
S015TDT     US English  3590 Tape   5668-812 3590 GDDM/PGF V2
S015TDV     US English  3592 Tape   5668-812 3592 GDDM/PGF V2
S017B3T     US English  DVD         5668-812 DVD  GDDM PGF V2
S015TDW     US English  3590 Tape   5684-168 3590 GDDM/VM   V3
S015TDX     US English  3592 Tape   5684-168 3592 GDDM/VM   V3
S017B3S     US English  DVD         5684-168 DVD  GDDM/VM   V3

S015TBZ     US English  3590 Tape   5695-013 REXX/370 Compiler
S015TC0     US English  3592 Tape   5695-013 REXX/370 Compiler
S017827     US English  DVD         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
S017828     US English  DVD         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
S017829     US English  DVD         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
S01782B     US English  DVD         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
S01782C     US English  DVD         5654-A22 3592 XL C/C++ for z/VM
S015TD8     US English  3590 Tape   5654-A23 3590 Debug Tool
S015TD9     US English  3592 Tape   5654-A23 3592 Debug Tool
S01782D     US English  DVD         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
S01782F     US English  DVD         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
S01782G     US English  DVD         5697-F42 3592 DB2 Client for VM
S015TCH     US English  3590 Tape   5697-F42 3590 DB2 Control Ctr
S015TCJ     US English  3592 Tape   5697-F42 3592 DB2 Control Ctr
S01728H     US English  DVD         5697-F42 3592 DB2 Control Ctr
S015TCX     US English  3590 Tape   5697-F42 3590 DB2 Data Res
S015TCZ     US English  3592 Tape   5697-F42 3592 DB2 Data Res
S01782J     US English  DVD         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
S01782K     US English  DVD         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
S01782V     US English  DVD         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
S01782L     US English  DVD         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
S01782M     US English  DVD         5697-J05 3592 Archive Manager z/VM
S015T9X     US English  3590 Tape   5697-J06 3590 Backup/Restore
```

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S015T9Z   US English   3592 Tape   5697-J06 3592 Backup/Restore
S01782N   US English   DVD         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
S01782P   US English   DVD         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
S01782R   US English   DVD         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
S01782S   US English   DVD         5698-A36 3592 OMEGAMON XE
S015KBX   US English   3590 Tape   5684-043 3590 ISPF V3 ENU
S015KC5   US English   3592 Tape   5684-043 3592 ISPF V3 ENU
S01782T   US English   DVD         5684-043 3592 ISPF V3 ENU
S015KCH   US English   3590 Tape   5684-123 3590 ISPF/PDF V3
S015KCF   US English   3592 Tape   5684-123 3592 ISPF/PDF V3
S01788S   US English   DVD         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 V6.3, at the same
  level as was packaged with 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 V6.3, enabled for use, and is
  available at no additional charge. The level of code for HCD and HCM is the same
  as was provided in V6.2.

  The PTFs for the following APARs need to be applied to provide support for the
  new hardware. HCD APAR VM65239 and HCM APAR VM65236 provide support for
  zEC12 and zBC12.

- **OpenExtensions Shell and Utilities**

  OpenExtensions Shell and Utilities is included in z/VM V6.3 with no licensing or
  billing requirements.

- **CMS Utilities**

  CMS Utilities is included in z/VM V6.3 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 V6.3 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 V6.3

  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 the features 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 V6.3 is eligible for On/Off CoD with a temporary use charge calculated based on processor-per-day use.

z/VM V6.3 (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   On/Off CoD, Per Processor-day TUC
               for VM Feature
 S016SX7     VM Single System      On/Off CoD, Per Processor-day TUC
               Image Feature
```

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.

This software license includes Software Subscription and Support (also referred to as Software Maintenance).

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 3 operates on the IBM zEnterprise EC12 and BC12, IBM System z10 Enterprise Class (z10 EC) and IBM System z10 Business Class (z10 BC), and IBM 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, see 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 3 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 3 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 3 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 applies

Yes. All distributed software licenses include Software Subscription and Support (also referred to as Software Maintenance) for a period of 12 months from the date of acquisition, providing a streamlined way to acquire IBM software and assure technical support coverage for all licenses. Extending coverage for a total of three years from date of acquisition may be elected.

While your Software Subscription and Support is in effect, IBM provides you assistance for your routine, short-duration installation and usage (how-to) questions, and code-related questions. IBM provides assistance via telephone and, if available, electronic access, only to your information systems (IS) technical support personnel during the normal business hours (published prime shift hours) of your IBM support center. (This assistance is not available to your end users.) IBM provides Severity 1 assistance 24 hours a day, every day of the year. For additional details, consult your *IBM Software Support Handbook* at

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

Software Subscription and Support does not include assistance for the design and development of applications, your use of programs in other than their specified operating environment, or failures caused by products for which IBM is not responsible under this agreement.

For more information about the Passport Advantage Agreement, visit the Passport Advantage website at

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

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 applicable only 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 V6.3 to be eligible.

```
   Replaced program                Replacement program
Program      Program              Program          Program
number       name                 number           name

5654-A17 z/VM Version 3           5741-A07 z/VM V6.3
5654-030 VM/ESA Version 2         5741-A07 z/VM V6.3
5684-112 VM/ESA Version 1         5741-A07 z/VM V6.3
5664-167 VM/SP                    5741-A07 z/VM V6.3
5664-173 VM/SP HPO                5741-A07 z/VM V6.3
5664-301 VM/IS Base (Core)        5741-A07 z/VM V6.3
5664-308 VM/XA SP                 5741-A07 z/VM V6.3

5735-FAL TCP/IP Version 2         5741-A07 z/VM V6.3
5798-FAL TCP/IP Version 1         5741-A07 z/VM V6.3

5796-PNA VM Realtime Monitor      5741-A07 z/VM V6.3
5664-191 VMMAP                    5741-A07 z/VM V6.3
5798-DWD RealTime Monitor VM/ESA  5741-A07 z/VM V6.3

5684-073 VMPRF                    5741-A07 z/VM V6.3

5748-XE4 DirMaint                 5741-A07 z/VM V6.3

5740-XXH RACF                     5741-A07 z/VM V6.3

5664-188 RSCS V2                  5741-A07 z/VM V6.3
5684-096 RSCS V3                  5741-A07 z/VM V6.3

5688-198 Language Environment/370 5741-A07 z/VM V6.3

5706-116 DFSMS/VM                 5741-A07 z/VM V6.3

5668-911 OS/PL/I V2 Library       5741-A07 z/VM V6.3
5734-LM4 OS PL/I Resident Library 5741-A07 z/VM V6.3
5734-LM5 OS PL/I Transient Library 5741-A07 z/VM V6.3

5688-022 VS COBOL II Library Only 5741-A07 z/VM V6.3
5668-940 VS COBOL II Library Only 5741-A07 z/VM V6.3
5740-LM1 OS/VS COBOL Library Only 5741-A07 z/VM V6.3
```

Products eligible for Single Version Charging (SVC)

On/Off Capacity on Demand (CoD)

To be eligible for On/Off CoD pricing, you must be enabled for temporary capacity on the corresponding hardware, and the required contract, Attachment for IBM System z On/Off Capacity on Demand (Z125-7883), must be signed prior to use.

Statement of good security practices

IT system security involves protecting systems and information through prevention, detection, and response to improper access from within and outside your enterprise. Improper access can result in information being altered, destroyed, or misappropriated, or can result in misuse of your systems to attack others. Without a comprehensive approach to security, no IT system or product should be considered completely secure and no single product or security measure can be completely effective in preventing improper access. IBM systems and products are designed to be part of a comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products, or services to be most effective. IBM does not warrant that systems and products are immune from the malicious or illegal conduct of any party.

IBM Electronic Services

Electronic Service Agent™ and the IBM Electronic Support web portal are dedicated to providing fast, exceptional support to IBM Systems customers. The IBM Electronic Service Agent tool is a no-additional-charge tool that proactively monitors and reports hardware events, such as system errors, performance issues, and inventory. The Electronic Service Agent tool can help you stay focused on your company's strategic business initiatives, save time, and spend less effort managing day-to-day IT maintenance issues. Servers enabled with this tool can be monitored remotely around the clock by IBM Support all at no additional cost to you.

Now integrated into the base operating system of AIX® 5.3, AIX 6.1, and AIX 7.1, Electronic Service Agent is designed to automatically and electronically report system failures and utilization issues to IBM , which can result in faster problem resolution and increased availability. System configuration and inventory information collected by the Electronic Service Agent tool also can be viewed on the secure Electronic Support web portal, and used to improve problem determination and resolution by you and the IBM support team. To access the tool main menu, simply type "smitty esa_main", and select "Configure Electronic Service Agent ." In addition, ESA now includes a powerful web user interface, giving the administrator easy access to status, tool settings, problem information, and filters. For more information and documentation on how to configure and use Electronic Service Agent , refer to

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

The IBM Electronic Support portal is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. This portal enables you to gain easier access to IBM resources for assistance in resolving technical problems. The My Systems and Premium Search functions make it even easier for Electronic Service Agent tool-enabled customers to track system inventory and find pertinent fixes.

Benefits

Increased uptime: The Electronic Service Agent tool is designed to enhance the Warranty or Maintenance Agreement by providing faster hardware error reporting

and uploading system information to IBM Support. This can translate to less wasted time monitoring the "symptoms," diagnosing the error, and manually calling IBM Support to open a problem record. Its 24x7 monitoring and reporting mean no more dependence on human intervention or off-hours customer personnel when errors are encountered in the middle of the night.

Security: The Electronic Service Agent tool is designed to be secure in monitoring, reporting, and storing the data at IBM . The Electronic Service Agent tool securely transmits via either the Internet (HTTPS or VPN) or modem, and can be configured to communicate securely through gateways to provide customers a single point of exit from their site. Communication is one way. Activating Electronic Service Agent does not enable IBM to call into a customer's system. System inventory information is stored in a secure database, which is protected behind IBM firewalls. It is viewable only by the customer and IBM . The customer's business applications or business data is never transmitted to IBM .

More accurate reporting: Since system information and error logs are automatically uploaded to the IBM Support center in conjunction with the service request, customers are not required to find and send system information, decreasing the risk of misreported or misdiagnosed errors. Once inside IBM , problem error data is run through a data knowledge management system and knowledge articles are appended to the problem record.

Customized support: Using the IBM ID entered during activation, customers can view system and support information in the "My Systems" and "Premium Search" sections of the Electronic Support website at

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

My Systems provides valuable reports of installed hardware and software using information collected from the systems by Electronic Service Agent . Reports are available for any system associated with the customer's IBM ID. Premium Search combines the function of search and the value of Electronic Service Agent information, providing advanced search of the technical support knowledgebase. Using Premium Search and the Electronic Service Agent information that has been collected from their system, customers are able to see search results that apply specifically to their systems.

For more information on how to utilize the power of IBM Electronic Services, contact your IBM Systems Services Representative, or visit

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

Prices

Information on charges is available at

http://www.ibm.com/support

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 V6.3 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 3

Program Number: 5741-A07

Entitlement                      License option/
identifier    Description        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 Use-based OTC, Per Value Unit
                      for VM Feature    On/Off CoD, Per Processor-day TUC
       S016SX6      Single System Image Use-based OTC, Per Value Unit
                      Feature           On/Off CoD, Per Processor-day TUC


       Subscription and Support PID  5741-SNS

       Entitlement                   License option/
       identifier  Description       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 Basic ASC, per Value Unit SW S&S
                      for VM Feature    No charge, decline SW S&S
                                     No-charge, SW S&S Registration
       S016VKN     Single System Image Basic ASC, per Value Unit SW S&S
                      Feature           No charge, decline SW S&S
                                     No-charge, SW S&S Registration
```

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