



# KVM for IBM z Systems, V1.1.2 delivers enhancements for the installation and management of the KVM hypervisor on IBM z Systems and IBM LinuxONE

## Table of contents

|   |   |
|---|---|
| <a href="#">2 Overview</a>                  | <a href="#">5 Publications</a>          |
| <a href="#">3 Key prerequisites</a>         | <a href="#">6 Technical information</a> |
| <a href="#">3 Planned availability date</a> | <a href="#">9 Ordering information</a>  |
| <a href="#">3 Description</a>               | <a href="#">10 Terms and conditions</a> |
| <a href="#">4 Product positioning</a>       | <a href="#">12 Prices</a>               |
| <a href="#">5 Program number</a>            | <a href="#">13 AP distribution</a>      |

## At a glance

KVM-based virtualization on z Systems™ and LinuxONE allows businesses to reduce costs by deploying fewer systems to run more workloads, sharing resources, and improving service levels to meet demand. KVM for IBM z Systems™ (KVM for IBM z™) V1.1.2 delivers the capabilities to:

- Boot a guest from a virtual CD or DVD to simplify the installation of guest operating systems.
- Dynamically add virtual CPUs (vCPUs) to a running guest with guest CPU Hotplug.
- Provide the same virt-manager application and virt-install tools to users of x86 KVM to configure and manage virtual servers.
- Help ensure high availability of critical resources with support for Pacemaker and Corosync.
- Provide a web browser-based Installer to simplify the installation of the KVM hypervisor and to provide accessibility features.
- Provide additional text-based installer options.
- Support user management, user activity logging, and system module functionalities that use the Kimchi tool.
- Manage IBM® software licensing entitlements with support for the IBM License Metric Tool.

KVM for IBM z, V1.1.1 was made available on IBM Shopz on March 18, 2016 and delivered:

- Simultaneous multithreading (SMT) exploitation for higher compute capacity and improved total cost of ownership (TCO)
- Updated Hypervisor Performance Management (HPM) for SMT exploitation to enhance policy-driven performance
- Exploitation of Transactional Execution when KVM is running on supported servers to help improve performance of multithreaded applications
- Ability of guests to exploit Single Instruction Multiple Data (SIMD), a vector processing model providing instruction-level parallelism to accelerate workloads, such as analytics and mathematical modeling
- Hypervisor enhancements including support for Internet Small Computer System Interface (iSCSI) and Network File System (NFS)
- Crypto exploitation to leverage hardware acceleration for cryptographic functions, to improve the TCO

- Enhanced reliability, availability, and serviceability (RAS) capabilities:
  - Improved first failure data capture (FFDC) for easier problem determination
  - Hypervisor and guest watchdog support for improved high availability configuration
  - Unattended installation capability of hypervisor for ease of installation
- Support for Canonical Ubuntu and SUSE for KVM on IBM z Systems and IBM LinuxONE™, providing another choice for a Linux™ distribution

---

## Overview

---

Organizations are challenged to drive new business opportunities while reducing budgets, managing increased IT complexity, and improving staff productivity. Although cost considerations are important, businesses are looking at other benefits of open source solutions, such as interoperability, flexibility, and access to the underlying code in their systems to address their challenges. KVM for IBM z Systems (KVM for IBM z) is a Kernel-based Virtual Machine (KVM) hypervisor for IBM z Systems and IBM LinuxONE that hosts Linux guest virtual machines. Because KVM is usable on z Systems and LinuxONE, IT organizations can unleash the power of Kernel-based Virtual Machine (KVM) open virtualization, to improve productivity, and to simplify administration and management for a quick start on their journey to a highly virtualized environment on IBM z Systems and IBM LinuxONE.

KVM for IBM z and Linux ONE servers provides simple, robust, and cost-effective server virtualization for Linux workloads running on the z Systems and LinuxONE platforms. KVM for IBM z and Linux ONE delivers server virtualization based on open source KVM Linux technology. KVM for IBM z and LinuxONE virtualization technology enables you to share real compute, memory, and I/O resources through server virtualization. KVM for IBM z is installed on z Systems and Linux ONE processors similar to an operating system and can coexist with z/VM<sup>(R)</sup> virtualization environments, Linux on z Systems, LinuxONE, z/OS<sup>(R)</sup>, z/VSE<sup>(R)</sup>, and z/TPF. KVM for IBM z is optimized for z Systems and Linux ONE architectures for scalability, performance, security, and resiliency and provides standard Linux and KVM interfaces for simplified operational control of the environment.

KVM for IBM z and LinuxONE virtualization enables optimization through the over-commitment of resources like CPU and memory, providing superior resource usage, flexibility, and agility to help reduce costs through economies of scale. With KVM for IBM z and LinuxONE, you can move virtual servers and workloads using live migration without taking application downtime to help increase overall availability and flexibility to meet client demands. KVM for IBM z and LinuxONE is managed like other KVM platforms, with **libvirt**, OpenStack, and other open Linux tools. Standard KVM interfaces allow for simplicity and familiarity for non-z Systems Linux or LinuxONE users, reducing operational inefficiencies.

KVM for IBM z and LinuxONE supports several new capabilities. IBM is driving a more agile development approach with KVM for IBM z and LinuxONE to react faster to client and marketplace requirements.

KVM for IBM z and LinuxONE provides many features that enable open server virtualization:

- KVM hypervisor supports running multiple disparate Linux instances on a single system.
- Processor sharing supports the sharing of CPU resources by virtual servers.
- I/O virtualization enables sharing of I/O resources among virtual servers to enable better utilization.
- Live virtual server migration enables workload migration with minimal impact.
- Dynamic addition and deletion of virtual I/O devices help eliminate downtime to modify I/O device configurations for virtual servers.
- Thin-provisioned virtual servers support copy-on-write virtual disks, which saves on storage by not needing full disks until used.

- Support is provided for policy-based, goal-oriented monitoring and management of virtual server CPU resources.
- Installation and configuration tools are provided to install and configure KVM.

---

## Key prerequisites

---

KVM for IBM z requires one of the following IBM z Systems and LinuxONE servers:

- IBM z13™
- IBM z13s
- IBM zEnterprise<sup>(R)</sup> EC12
- IBM zEnterprise BC12
- IBM LinuxONE Emperor™
- IBM LinuxONE Rockhopper™

KVM for IBM z requires Linux on z Systems.

- In order to operate Linux on z Systems or LinuxONE as a guest of KVM for IBM z, a Linux distribution for z Systems or Linux ONE must be obtained from a Linux Distribution Partner. KVM for IBM z, V1.1.2 supports:
  - SUSE Linux Enterprise Server (SLES) 12 SP1, or later
  - Canonical Ubuntu 16.04 LTS, or later LTS releases

For any additional requirements, refer to the [Technical information](#) section.

---

## Planned availability date

---

October 28, 2016

---

## Description

---

KVM for IBM z is an open source virtualization technology that delivers enhancements to the installation and management of the KVM hypervisor. These enhancements simplify administration and operations of virtualized Linux servers running on IBM z Systems and LinuxONE. KVM for IBM z is a Kernel-based Virtual Machine (KVM) hypervisor for IBM z Systems and IBM LinuxONE that hosts Linux guest virtual machines. The KVM offering is optimized to exploit the z Systems and Linux ONE architecture for scalability, performance, security, and resiliency. It provides standard Linux and KVM interfaces for operational control of the environment.

Enhancements for KVM for IBM z V1.1.2 include:

### **Simplified installation of guest operating systems**

Enhancements to the KVM hypervisor enable the booting of a guest from a virtual CD or DVD to simplify the installation of guest operating systems.

### **Dynamic addition of virtual CPUs (vCPUs)**

Guest central processing unit (CPU) Hotplug can dynamically add vCPUs to a running guest.

### **Configuration and management of virtual servers**

The user interface for guest management (virtual machine manager) with KVM for IBM z provides users of x86 KVM the same virt-manager application and virt-install

tools to configure and manage virtual servers to help simplify administration of virtual servers.

### **Additional installation protocols**

Text-based installer options were added to support:

- Dynamic addition of DASD
- Encrypted page volumes to enhance security
- Additional installation protocols, such as HTTP, HTTPS, and NFS

### **Improved availability of critical resources**

Support for Pacemaker (cluster resource manager) and Corosync (cluster messaging layer) can help ensure high availability of critical resources. If a resource stops working or the server hosting a resource fails, the resource is moved to another server in the IBM z Systems or LinuxONE server to keep it running.

### **Additional support for Kimchi**

Kimchi is a user management and system module management tool supported by KVM on IBM z. Kimchi is a new open source project aimed at providing an easy on-ramp for those who would like to start using KVM but are concerned they don't have experience with Linux or don't have the skills to install a management server, or simply don't have time to invest in Linux administration. Kimchi offers a familiar user interface for virtualization management that helps remove the barriers to using KVM for IBM z.

### **Management of IBM software licensing entitlements**

KVM for IBM z is enabled for the IBM License Metric Tool, which is a no-charge utility that determines processor value unit (PVU) licensing requirements. IBM License Metric Tool helps IBM Passport Advantage<sup>(R)</sup> customers determine their full and sub-capacity PVU licensing requirements. It helps calculate the number of PVUs available to installed Passport Advantage PVU-based software, including supported virtualized servers.

For more information on KVM for IBM z V1.1.1, refer to Hardware Announcement [JG16-0002](#), dated February 16, 2016, or see [IBM Knowledge Center](#).

### **Accessibility by people with disabilities**

---

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be found on the [IBM Accessibility](#) website.

---

## **Product positioning**

---

IBM has four strategic virtualization platforms:

- KVM for IBM z
- IBM z/VM
- IBM PR/SM<sup>TM</sup>
- IBM Dynamic Partition Manager (DPM)

KVM for IBM z is an open virtualization alternative for z Systems and Linux ONE, built on Linux and KVM. This open source solution for running virtual servers on z Systems servers enables cloud deployments and big data solutions, while reducing complexity and cost. This offering is an ideal choice for clients who want open virtualization while taking advantage of the robustness, scalability, and security of the z Systems and Linux ONE platforms. KVM delivers a Linux-familiar administrator experience that can enable simplified virtualization management and operation. The standard interfaces that it provides allow for easy integration into existing

infrastructure and cloud offerings. Using the combination of KVM virtualization and z Systems or Linux ONE, you have the performance and flexibility to address the requirements of multiple, differing Linux workloads.

---

## Reference information

---

For information about IBM KVM on z Systems, refer to Software Announcement [JG16-0002](#), dated February 16, 2016, and Software Announcement [JP15-0356](#), dated August 17, 2015.

IBM announced two new offerings for IBM Blockchain to enable clients to begin building the next generation of business applications. For additional information on IBM Blockchain, refer to Software Announcements:

- [JP16-0615](#), dated October 18, 2016
- [JP16-0607](#), dated October 18, 2016

For information about the LinuxONE servers, refer to Software Announcement [JG16-0002](#), dated February 16, 2016.

For information about the IBM z Systems servers, refer to:

- IBM z13 Software Announcements [JG16-0002](#), dated February 16, 2016, and [JG15-0001](#), dated January 14, 2015
- IBM z13s Hardware Announcement [JG16-0002](#), dated February 16, 2016
- IBM zEnterprise EC12 Hardware Announcements [JG13-0202](#), dated July 23, 2013, and [JG12-0145](#), dated August 28, 2012
- IBM zEnterprise BC12 Hardware Announcement [JG13-0205](#), dated July 23, 2013

---

## Program number

---

| Program number | VRM   | Program name          |
|----------------|-------|-----------------------|
| 5648-KVM       | 1.1.2 | KVM for IBM z Systems |

---

### Product identification number

---

KVM for IBM z Systems

| Program PID number | Subscription and Support PID number |
|--------------------|-------------------------------------|
| 5648-KVM           | 5648-KVS                            |

---

## Education support

---

IBM training provides education to support many IBM offerings. Descriptions of courses for IT professionals and managers can be found on the [IBM Training and Skills](#) website. Specific courses for KVM and Linux can also be found on the [IBM Training and Skills](#) website.

Contact your IBM representative for course information.

---

## Offering Information

---

Product information is available on the [IBM Offering Information](#) website.

---

## Publications

---

The KVM for IBM z product information includes eight publications in Adobe™ PDF format and one license information DVD:

| <b>Title</b>  | <b>Order number</b> |
|---|---------------------|
| KVM for IBM z Systems: License Information  | GI13-3465           |
| KVM for IBM z Systems: Planning and Installation Guide                              | SC27-8236           |
| KVM for IBM z Systems: System Administration Guide                                  | SC27-8237           |
| KVM Virtual Server Management Tools   | SC34-2763           |
| Linux on z Systems: Virtual Server Management                                       | SC34-2752           |
| Linux on z Systems: Virtual Server Quick Start                                      | SC34-2753           |
| Linux on z Systems: Device Drivers, Features, and Commands for Linux as a KVM Guest | SC34-2754           |
| Installing SUSE Linux Enterprise Server 12 as a KVM Guest                           | SC34-2755           |

One copy of the license information DVD (KVM for IBM z Systems V1.1.1 Agreements and License Information, LC27-8238) is supplied with KVM for IBM z Systems when physical media is ordered. When ordering KVM from Shopz, the license information can also be viewed or downloaded from Shopz.

KVM documentation can be found on [IBM Knowledge Center](#).

The KVM for IBM z publications in PDF format can be obtained from the [IBM Publications Center](#).

You can view a PDF file using the Adobe Reader, which is available free from the [Adobe](#) website.

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

### **KVM for IBM z product page**

For current information on KVM and for related resources, refer to the following websites:

- [IBM z Systems virtualization](#)
- [KVM for IBM z Systems](#)

IBM Redbooks<sup>(R)</sup> and Redpapers<sup>(TM)</sup> 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 IBM technical professionals, IBM Business Partners, clients, and the marketplace in general.

They can be found on the [IBM Redbooks](#) website.

---

## **Technical information**

---

### **Specified operating environment**

---

#### **Hardware requirements**

KVM for IBM z requires one of the following IBM z Systems servers and LinuxONE servers:

- z13<sup>TM</sup>
- z13s
- zEnterprise EC12

- zEnterprise BC12
- LinuxONE Emperor
- LinuxONE Rockhopper

For additional information on IBM LinuxONE, refer to the [IBM LinuxONE](#) website.

Prior to installing, refer to the following Preventive Service Planning (PSP) buckets for the minimum MCL level and any required updates or PTFs:

- [Upgrade 2964DEVICE, Subset 2964/ZKVM for the z13 and LinuxONE Emperor](#)
- [Upgrade 2965DEVICE, Subset 2965/ZKVM for the z13s and LinuxONE Rockhopper](#)
- [Upgrade 2827DEVICE, Subset 2827/ZKVM for the zEnterprise EC12 \(zEC12\)](#)
- [Upgrade 2828DEVICE, Subset 2828/ZKVM for the zEnterprise BC12 \(zBC12\)](#)

The following networking features are supported:

- IBM OSA-Express5S.
- IBM OSA-Express4S.
- IBM OSA-Express3 (zEC12 and zBC12 only) - OSA-Express3S in KVM for IBM z does not support using VLANs or flat networks together with OpenVSwitch.

**Note:** Refer to the PSP bucket for your particular z Systems server for the required microcode level for IBM OSA-Express5S and IBM OSA-Express4S.

The following storage devices are supported.

ECKD™ DASD, FICON<sup>(R)</sup> or High Performance FICON (HPF) attached:

- IBM DS8000<sup>(R)</sup> family:
  - DS8870
  - DS8880

HyperPAV technology is supported.

- FCP-attached SCSI disks:
  - IBM DS8000 family:
    - DS8870
    - DS8880
  - XIV<sup>(R)</sup> Gen3
  - IBM Storwize<sup>(R)</sup> family:
    - V3500
    - V3700
    - V5000
    - V5010
    - V5030
    - V7000
  - IBM SAN Volume Controller
  - IBM FlashSystem<sup>(R)</sup>:
    - V840/V9000
    - A9000
    - A9000R

## Notes

- iSCSI (client initiators only) is supported for use only as additional file system space.
- IBM network-attached storage (NAS) is supported for use only as additional file system space.

For additional information, see the [IBM System Storage<sup>®</sup> Interoperation Center \(SSIC\)](#).

Refer to the *KVM for IBM z Systems: Planning and Installation Guide*, (SC27-8236) for the most current information.

### **Software requirements**

KVM for IBM z requires Linux on z Systems.

- In order to operate Linux on z Systems or LinuxONE as a guest of KVM for IBM z, a Linux on z Systems or Linux ONE distribution must be obtained from a Linux Distribution Partner. KVM for IBM z and LinuxONE supports:
  - SUSE Linux Enterprise Server (SLES) 12 SP1, or later
  - Canonical Ubuntu 16.04 LTS, or later LTS releases

Refer to the *KVM for IBM z Systems: Planning and Installation Guide*, (SC27-8236) for the most current information.

For current promotional pricing for Linux distributions, see the [Linux OS on IBM z Systems](#) website.

For guest installation information, see documentation listed in the [Publications](#) section.

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

### **Limitations**

Additional information can be found in the License Information documents found on the [IBM Software License Agreement](#) website.

## **Planning information**

---

### **Customer responsibilities**

If you want the level of service provided under the IBM ICA license agreement with z Systems and LinuxONE, you are strongly encouraged to order the program number for KVM for IBM z Systems Subscription and Support (S&S), 5648-KVS. 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. KVM for IBM z Systems S&S will be automatically added to your order. If you do not want the S&S license for KVM for IBM z Systems, you must take specific action to decline this support.

### **Packaging**

#### **KVM for IBM z**

The KVM for IBM z product package is distributed with the following:

- License information on DVD (LY27-8238)
- Basic machine-readable material on one DVD (LCD7-6700)

## Security, auditability, and control

---

The announced product uses the security and auditability features and functions of host hardware, host software, and application software.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

---

## Ordering information

---

### Charge metric

---

#### Pricing metric description

| Program name              | Program number | Pricing metric description |
|---------------------------|----------------|----------------------------|
| KVM for IBM z Systems     | 5648-KVM       | Per Engine                 |
| KVM for IBM z Systems S&S | 5648-KVS       | Per Engine                 |

The product in this announcement is also available with IBM Software On/Off Capacity on Demand (On/Off CoD). If you are running On/Off CoD on your IBM servers, you can also pay for KVM for IBM z on a processor per-day basis during your peak periods. However, for additional information on how effectively KVM can exploit On/Off CoD, see the [KVM for IBM z Systems Frequently Asked Questions \(FAQ\)](#) document.

### Engine

Engine is a unit of measure by which the Program can be licensed. An Engine is a central processor or an Integrated Facility for Linux (IFL) processor, configured for use on a server. Licensee must obtain sufficient entitlements to cover the total number of Engines by each varying type of Engine where the Program will run. If the Program runs on IFL processors, Licensee must obtain entitlements to cover the total number of IFL processors on Licensee's servers. If the Program runs on central processors, Licensee must obtain sufficient entitlements to cover the total number of central processors on Licensee's servers.

### Basic license

---

Ordering information for KVM for IBM z remains unchanged from the previous announcement. Refer to Software Announcement [JP15-0356](#), dated August 17, 2015.

### Subscription and Support

To receive voice technical support via telephone and future releases and versions at no additional charge, Subscription and Support must be ordered. The capacity of Subscription and Support (Value Units) must be the same as the capacity ordered for the product licenses.

To order, specify the Subscription and Support program number (PID) referenced above and the appropriate license or charge option.

IBM is also providing Subscription and Support for these products via a separately purchased offering under the terms of the IBM International Agreement for Acquisition of Software Maintenance. This offering:

- Includes and extends the support services provided in the base support to include technical support via telephone.
- Entitles you to future releases and versions, at no additional charge. Note that you are not entitled to new products.

When Subscription and Support is ordered, the charges will automatically renew annually unless cancelled by you.

The combined effect of the IPLA license and the Agreement for Acquisition of Software Maintenance gives you rights and support services comparable to those under the traditional ICA S/390<sup>(R)</sup> and z Systems license or its equivalent. To ensure that you continue to enjoy the level of support you are used to in the ICA business model, you must order **both** the license for the program **and** the support for the selected programs at the same Engine Unit quantities.

### **On/Off CoD**

KVM for IBM z is eligible for On/Off CoD with a temporary use charge calculated based on processor-per-day usage. However, for additional information on how effectively KVM can exploit On/Off CoD, see the [KVM for IBM z Systems Frequently Asked Questions \(FAQ\)](#) document.

Ordering information for the KVM for IBM z Systems Temporary Use Charge is unchanged. Refer to Software Announcement [JP15-0356](#), dated August 17, 2015.

---

## **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<sup>(R)</sup> Agreement, and the IBM Agreement for Acquisition of Software Maintenance.

### **Licensing**

---

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

### **Agreement for Acquisition of Software Maintenance**

---

The following agreement applies for Software Subscription and Support Software Maintenance):

- IBM Agreement for Acquisition of Software Maintenance (JNTC-6011)
- IBM Agreement for Acquisition of Software Maintenance ( IAAS305 or others)
- Exhibit for IBM Agreement for Acquisition of Software Maintenance (IAAS400)

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 number**

---

GI13-3465-02

See the [License Information documents](#) page on the IBM Software License Agreement website for more information.

### **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, see the [IBM Software 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

---

**Software Subscription and Support applies**

---

Yes. During the Software Subscription and Support period, for the unmodified portion of a program, and to the extent problems can be recreated in the specified operating environment, IBM will provide the following:

- Defect correction information, a restriction, or a bypass.
- Program updates: Periodic releases of collections of code corrections, fixes, functional enhancements and new versions and releases to the program and documentation.
- Technical assistance: A reasonable amount of remote assistance by telephone or electronically to address suspected program defects. Technical assistance is available from the IBM support center in the organization's geography.

Additional details regarding Technical Assistance, which includes IBM contact information, are provided in the [IBM Software 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
- Failures caused by products for which IBM is not responsible under the IBM Agreement for Acquisition of Software Maintenance.

Software Subscription and Support is provided only if the program is within its support timeframe as specified in the Software Support Lifecycle policy for the program.

---

**System i Software Maintenance applies**

---

No

---

**Variable charges apply**

---

No

---

**Educational allowance available**

---

Not applicable.

---

**On/Off 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 z Systems On/Off Capacity on Demand (JNTC-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 lawful, comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products, or services to be most effective.

**Important:** IBM does not warrant that any systems, products, or services are immune from, or will make your enterprise immune from, the malicious or illegal conduct of any party.

---

**Prices**

---

For all local charges, contact your IBM representative.

---

**IBM Global Financing**

---

IBM Global Financing offers competitive financing to credit-qualified customers to assist them in acquiring IT solutions. Offerings include financing for IT acquisition, including hardware, software, and services, from both IBM and other manufacturers or vendors. Offerings (for all customer segments: small, medium, and large enterprise), rates, terms, and availability can vary by country. Contact your local

IBM Global Financing organization or go to the [IBM Global Financing](#) website for more information.

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

Financing from IBM Global Financing helps you preserve cash and credit lines, enables more technology acquisition within current budget limits, permits accelerated implementation of economically attractive new technologies, offers payment and term flexibility, and can help match project costs to projected benefits. Financing is available worldwide for credit-qualified customers.

---

## AP distribution

---

| Country/Region             | Announced |
|----------------------------|-----------|
| AP IOT                     |           |
| ASEAN *                    | Yes       |
| India/South Asia **        | Yes       |
| Australia                  | Yes       |
| Hong Kong                  | Yes       |
| Macao SAR of the PRC       | Yes       |
| Mongolia                   | Yes       |
| New Zealand                | Yes       |
| People's Republic of China | Yes       |
| South Korea                | Yes       |
| Taiwan                     | Yes       |
| Japan IOT                  |           |
| Japan                      | Yes       |

\* Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, and Vietnam

\*\* Bangladesh, Bhutan, India, Maldives, Nepal, and Sri Lanka

### Trademarks

IBM z Systems, IBM LinuxONE, z Systems, IBM z, IBM z13, IBM LinuxONE Emperor, IBM LinuxONE Rockhopper, PR/SM, Redpapers, z13 and ECKD are trademarks of IBM Corporation in the United States, other countries, or both.

IBM, z/VM, z/OS, z/VSE, zEnterprise, S/390, Passport Advantage, System i, Redbooks, FICON, DS8000, XIV, Storwize, IBM FlashSystem, System Storage and System z are registered trademarks of IBM Corporation in the United States, other countries, or both.

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

Adobe is a trademark of Adobe Systems Incorporated in the United States, and/or other countries.

Other company, product, and service names may be trademarks or service marks of others.

### Terms of use

IBM products and services which are announced and available in your country can be ordered under the applicable standard agreements, terms, conditions, and prices in effect at the time. IBM reserves the right to modify or withdraw this announcement at any time without notice. This announcement is provided for your information only. Additional terms of use are located at:

[Terms of use](#)

For the most current information regarding IBM products, consult your IBM representative or reseller, or visit the IBM worldwide contacts page

[IBM Japan](#)