

Preview: IBM z/VM V7.2

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At a glance

z/VM^(R) Version 7 Release 2.0 (V7.2) will provide:

- Timely, client-driven functions previously delivered in the service stream of z/VM V7.1
- Centralized service management, a simplified process for applying and deploying maintenance across multiple non-Single System Image (SSI) z/VM systems
- Even greater availability and data redundancy for GDPS^(R) environments and improved DASD scalability for clients exploiting Multi-Target Peer-to-Peer Remote Copy
- An enhanced test and debug environment provided by z/VM ADJUNCT support
- A new Architecture Level Set (ALS) that requires one of the following IBM Z^(R) servers, or later:
 - IBM z13^(R)
 - IBM z13s^(R)
 - IBM^(R) LinuxONE Emperor
 - IBM LinuxONE Rockhopper

Overview

z/VM V7.2 will provide IBM clients with the premier hypervisor for hosting enterprise-class virtual servers to exploit the IBM Z and IBM LinuxONE advantages in scalability, performance, high availability, and security.

While cloud computing has become the standard use model for IT services, an IT infrastructure continues to be the foundation for every IT service. Realizing the benefits of cloud computing requires an infrastructure that delivers availability, reliability, security, and performance, while also providing strong virtualization technology, such as z/VM.

Virtualization is fundamental to delivering infrastructure as a service (IaaS), the basic building block for cloud. IBM continues to invest in z/VM technology to provide leading-edge virtualization capabilities for enterprises using IBM Z and IBM LinuxONE platforms, evolving to meet the needs of IT organizations to deliver the foundation for user satisfaction. This progress can meet the needs of IT organizations to deliver the foundation for user satisfaction on both types of workloads:

- New microservices implementations using Red Hat^(R) OpenShift^(R) Container Platform for Linux^(R) on IBM Z and IBM LinuxONE
- Traditional monolithic workloads

With z/VM V7.2, IBM continues to deliver product enhancements to its z/VM advanced virtualization technology on IBM Z and LinuxONE servers using the z/VM Continuous Delivery (CD) model. This CD model for new functions offers clients timely support for new technology throughout the life of a z/VM release using a delivery mechanism that is familiar to clients and time tested. Because the z/VM CD model is not centered around a release date, it allows schedule flexibility as IBM partners with the z/VM community in the design, development, and delivery of new functions.

Key requirements

Operating environment

z/VM V7.2 is planned to support the following IBM Z servers:

- z15™ Models T01 and T02
- LinuxONE III Models LT1 and LT2
- z14 Models M01, M02, M03, M04, M05, and ZR1
- LinuxONE Emperor II
- LinuxONE Rockhopper II
- z13^(R)
- z13s^(R)
- LinuxONE Emperor
- LinuxONE Rockhopper

Planned availability date

Third quarter, 2020

Previews provide insight into IBM plans and direction. Availability, prices, ordering information, and terms and conditions will be provided when the product is announced.

Description

The objective of z/VM V7.2 is to enhance the proof points that support digital transformation, specifically those associated with scalability and efficiency. This is designed to enable the deployment of up to thousands of Linux servers on a single IBM Z or IBM LinuxONE server, including the IBM z15™ Models T01 and T02 and LinuxONE III Models LT1 and LT2 servers.

Enhancements planned for z/VM V7.2 include:

- Centralized service management for non-SSI environments
This function provides support to deploy service to multiple systems, regardless of geographic location, from a centralized primary location that manages distinct levels of service for a select group of traditional z/VM systems. One system will be designated as a principal system and will use the z/VM Shared File System (SFS) to manage service levels for a set of defined-managed systems, regardless of their geographic location. The principal system will build service levels using the new service management command, SERVMGR, and existing VMSES/E SERVICE commands. This centralized service process will keep track of available service levels and manage whatever files are needed to supply a customer-defined service level to a managed system.
- Multiple Subchannel Set (MSS) Multi-Target Peer-To-Peer Remote Copy (MT PPRC) support for the GDPS environment

This function enables a disk device to be the primary for up to three secondary devices in each of up to three alternate subchannel sets. MSS MT PPRC requires support for multiple subchannel sets that reflect the actual hardware configuration, specifically, subchannel sets 0, 1, 2, and 3. The devices currently in use by z/VM will be referred to as the ACTIVE configuration. Devices not in the ACTIVE configuration will be referred to as being in the STANDBY configuration.

- Support for the z/VM ADJUNCT environment

The z/VM ADJUNCT support provides an environment that enables the manipulation of a guest operating system running in a primary configuration. The companion ADJUNCT environment can display and modify the primary's memory, making it useful for observing and manipulating a guest system that is running there.

- System default changes:

- TDISK clearing default has changed to Enabled. The default can be turned off with the FEATURES DISABLE CLEAR_TDISK configuration statement. This change will cause any residual data that might be otherwise left on a temporary disk after use to be purged by default, enabling z/VM to be more in line with modern security guidelines.
- z/VM Directory Maintenance (DirMaint) NEEDPASS default value has changed to No. Based on client feedback and guest service machine requirements, there is no longer a need for an extra layer of authentication. This change enables users and service machines to enter DirMaint commands without supplying passwords and eliminates the need to update specific configuration options.
- The default unparking model has changed from HIGH to MEDIUM. This reduces the tendency to use vertical-low (VL) logical cores and thereby has the potential to reduce the overhead induced in the PR/SM hypervisor and improve the use of processor cache.
- System Recovery Boost has been enabled by default, allowing z/VM to automatically take advantage of boosting sub-capacity processors to full capacity for a limited duration during startup and shutdown when running on the IBM z15.
- The PAGING63 IPL parameter and associated external interfaces have been removed. z/VM paging subsystem improvements include support for High Performance FICON[®], HyperPAV, encryption, and EAV, which are not available when the PAGING63 IPL parameter is specified.

This will satisfy the statement of direction from Hardware Announcement [AG19-0032](#), dated September 12, 2019.

- The Environmental Record Editing and Printing Program (EREP) licensed program will no longer be preinstalled with z/VM. Instead, EREP functional executables will be preinstalled and delivered as part of the z/VM V7.2 product and serviced via the CP component, simplifying the process for applying EREP service.

This will satisfy the statement of direction from Software Announcement [AP18-0295](#), dated August 7, 2018.

- Foundational support for future enhancements

z/VM exploitation of the CPU Measurement Facility sampler function will provide a means for a client to collect hardware samples, instead of requiring an IBM customer engineer to use the client's Support Element to collect field-mode samples.

- Support for the IBM z15 (Models T01 and T02) and LinuxONE III (Models LT1 and LT2) servers:

- Guest enablement to exploit the following functions:
 - Miscellaneous-Instruction-Extensions Facility 3
 - Vector Enhancements Facility 2
 - Vector Packed Decimal Enhancement Facility
 - Synchronous execution for on-chip data compression and deflate-conversion

- Message-Security-Assist Extension 9
- Crypto Express7S adapter shared and dedicated guest support

This support is available for z/VM V6.4 and V7.1 with the PTFs for APARs VM66248, VM66321, VM66332, and VM66325.

- Infrastructure support which must be installed on all members within a Single System Image (SSI) cluster before any member of the cluster is IPLed on an z15 or LinuxONE III server:
 - z/VM V7.2
 - z/VM V7.1 with the PTF for APAR VM66206
 - z/VM V6.4 with the PTFs for APARs VM65976 and VM66206
- Enhancements to the TCP/IP stack and NETSTAT OSAINFO command to provide support for:
 - OSA-Express7S GbE
 - OSA-Express7S 10GbE
 - OSA-Express7S 25GbE
 - OSA-Express7S 1000BASE-T

This support is available for z/VM V6.4 and V7.1 with the PTF for APAR PI99085.

- Installation of z/VM using a USB flash drive
- Support for the System Recovery Boost feature of the IBM z15 Models T01 and T02

This support enables z/VM to boost general-purpose processors running at sub-capacity to full capacity for up to 60 minutes during z/VM system initialization and workload bring-up and for up to 30 minutes during workload quiesce, system shutdown, and system abend processing. z/VM System Recovery Boost support primarily benefits z/VSE^(R) and z/TPF guest environments, though it will increase the processor resources available to the z/VM Control Program and any guest that is dispatched on general-purpose processors.

This support is available for z/VM V7.1 with the PTF for APAR VM66283.

- IBM Fibre Channel Endpoint Security between an IBM z15 Model T01 or LinuxONE III Model LT1 and the DS8900F by providing the following functions:
 - Display the encryption status of target worldwide port names (WWPNs) associated with a Fibre Channel Protocol (FCP) device via the QUERY FCP command.
 - Display the encryption and authentication capability of a channel path via the QUERY PATHS command.
 - Track encryption state changes by recognizing Store Event Information channel report data.
 - Create an event monitor record for each state change.

This support is available for z/VM V6.4 and V7.1 with the PTF for APAR VM66242.

IBM Fibre Channel Endpoint Security requires a minimum driver D41C bundle level. For further details, see the IBM Support - Preventive Service Planning bucket:

- [Upgrade 8561DEVICE, Subset 8561/ZVM](#)

For further information on z/VM support of the IBM z15 and LinuxONE III servers, see the IBM [z/VM Continuous Delivery News](#) webpage and the IBM Support - Preventive Service Planning buckets:

- [Upgrade 8561DEVICE, Subset 8561/ZVM](#)
- [Upgrade 8562DEVICE, Subset 8562/ZVM](#)

For additional information on the IBM z15 and LinuxONE III capabilities, see the Hardware Announcements for these servers in the [Reference information](#) section.

- z/VM Continuous Delivery model
IBM will deliver most new z/VM V7.2 functions as Small Programming Enhancements (SPEs) in the service stream. When z/VM V7.2 becomes available, z/VM V7.1 will, with a few exceptions, receive only corrective service. Similarly, when a new release is introduced after z/VM V7.2, SPEs will be delivered on that release going forward and V7.2 will receive mostly corrective service only. For additional information on the z/VM Continuous Delivery model, see the z/VM V7.1 Software Announcement [AP18-0295](#), dated August 7, 2018.
- New Architecture Level Set
z/VM V7.2 will include an ALS and will require an IBM Z server listed in the [Key requirements](#) section. This will satisfy the statement of direction from Software Announcement [AP18-0295](#), dated August 7, 2018.
- Interaction with the z/VM community
IBM has a long history of working with clients to deliver capabilities to improve z/VM. IBM will continue this interaction by continuing to:
 - Enlist z/VM clients as "Sponsor Users" to advise IBM throughout the design process for many z/VM development projects. These clients may also test early versions of the new support prior to its delivery to the marketplace to ensure the user experience matches their expectations.
 - Solicit clients to become involved with the z/VM Continuous Delivery process. IBM finds the Sponsor User relationship to be beneficial to delivering new function for z/VM and continues to encourage z/VM clients to participate in the Continuous Delivery process. To learn more about the z/VM Sponsor User program, see the [z/VM Sponsor User program](#) webpage. For details on z/VM client communication and collaboration, see the [z/VM Council](#) webpage.
 - Publish information about many of its z/VM development projects as they unfold in order to help users decide if they want to volunteer as Sponsor Users for selected development projects and help the community at large plan for the introduction of new z/VM functions. This level of communication between IBM and the z/VM user community facilitates discussion regarding implications of the planned support, such as operational incompatibilities, software vendor impacts, and changes to system behavior.

These plans are posted and updated on the [z/VM](#) website.

- Recent capabilities delivered as z/VM V7.1 service:
 - VSwitch Priority Queueing
New support provides exploitation for the OSA-Express^(R) Priority Queuing when it is available on a VSwitch's Uplink Port. Without this support, all VSwitch outbound traffic to the external network is transmitted at the same priority. When VSwitch Priority Queueing is enabled, z/VM establishes multiple OSA QDIO Output queues, and transmits data to the external network at different priorities based on client-defined guest NIC importance.

This support is available for z/VM V7.1 with the PTFs for APARs VM66219, VM66223, and PH04703.
 - Extended Address Volume (EAV) paging
Support for z/VM paging space located anywhere on EAVs enables clients to define enough paging capacity for z/VM partitions with large memory sizes while reducing the burden of managing a larger number of smaller paging devices. As systems continue to grow, their need for paging space has

increased. This z/VM support allows allocation and use of paging space on ECKD devices above cylinder 65520 up to 1 TB (1,182,006 cylinders).

This support is available for z/VM V7.1 with the PTF for APAR VM66263.

- 80 logical processors

Support for 80 logical processors on z15, LinuxONE III, z14, LinuxONE Emperor II, and LinuxONE Rockhopper II servers relieves the previous limitation of 64 logical processors per LPAR. This gives clients the ability to run more workload on z/VM by increasing the number of supported logical processors, which is especially important when multithreading is enabled. From a client's perspective, this allows defining more logical processors for running workload on an LPAR, possibly requiring fewer LPARs to support the same workload.

This support is available for z/VM V7.1 with the PTF for APAR VM66265.

- Dynamic crypto

Support for dynamic changes to the AP Cryptographic (crypto) environment on a z/VM system allows the addition, removal, or reassignment of crypto hardware to be less disruptive to the system and its guests.

This support is available for z/VM V7.1 with the PTF for APAR VM66266.

- Fast minidisk erase

Enhancements to the CPFMTXA utility enable users to erase data on minidisks more quickly. In addition, the Directory Maintenance Facility (DirMaint) is enhanced to use this new support in CPFMTXA. This can be especially beneficial when DirMaint is used to delete a user ID and its minidisks.

This support is available for z/VM V7.1 with the PTFs for APARs VM66288, VM65784, and PH14249.

- RACF^(R) Multi-Factor Authentication (MFA)

Enhancements within RACF provide for the establishment of a user's identity by utilizing more than one type of authentication. This provides greater security by requiring an additional form of proof to help avoid an exposure if one token (for example, a password) becomes compromised. Previously, authentication of identity during the logon process could be met only by using a password or passphrase. MFA enables support for an external service to authenticate tokens that have been generated after a successful Multi-Factor Authentication.

This support is planned for z/VM V7.1 with the PTFs for APARs VM66324 and VM66338.

- Transport Layer Security (TLS) certificate verification

Enhancements within the TCP/IP TLS/SSL server allow authentication of client certificates, host name validation, and extraction of fields from a certificate.

Client certificate authentication support allows a server to verify a client by examining the certificate it presents to ensure that it has been signed by a certificate authority the server trusts and that it has not expired. The client authentication support that was previously added to dynamically secured Telnet connections has been expanded to the z/VM FTP and SMTP servers. Additionally, the PORT statement in the TCPIP configuration file has been updated to allow client certificate authentication for statically secured connections.

Host name validation support allows a client to verify the identity of a server by passing a string containing a host name, domain name, or IP address on the handshake request. The string will be compared to fields in the server certificate. If the string is not contained in the server certificate, the client may decide to fail the handshake.

In addition to the above support, new APIs extract fields from a client or server certificate.

This support is planned for z/VM V7.1 with the PTFs for APARs PH18435, VM66348, and VM66349.

- z/VM new function portal

The [z/VM Continuous Delivery News](#) webpage will be the primary vehicle used by IBM to describe new functions that are planned for z/VM. It is the recommended way to be aware of future development and support plans for z/VM. IBM recommends subscribing to this page to be notified of changes. To subscribe, click the Notify Me link in the left-side navigation bar. Additional instructions are included on the [VM Site File Change Notification](#) webpage.

For a detailed description of z/VM capabilities, see the [z/VM](#) website.

- National language support
 - Messages and Help files are no longer translated into Japanese Kanji. The Kanji language and Help infrastructure will be removed in z/VM V7.2.
 - American English and Uppercase English are the supported languages.

Product positioning

Because virtualization is the entry point to cloud and infrastructure as a service (IaaS), the hypervisor choice you make heavily influences your implementations of IaaS and cloud throughout the stack. IBM continues to offer IBM Z and IBM LinuxONE servers as the core of trusted digital experiences, and z/VM as the foundation for cloud computing and large-scale Linux deployments. IBM will continue to make changes and improvements to z/VM that provide competitive advantages and benefits to clients.

The z/VM hypervisor extends the capabilities of the hardware from the standpoint of sharing hardware, virtualization, and communication resources. Together with IBM Wave for z/VM (IBM Wave), the comprehensive management solution for z/VM-based, virtual Linux server environments, the z/VM hypervisor makes it easy to extract the maximum value from IBM Z hardware capabilities:

- Virtualization savings
- Operational efficiency
- Power savings
- Optimal qualities of service

This virtualization technology is designed to enable organizations to run hundreds to thousands of Linux servers on a single mainframe and can run beside other IBM Z operating systems, such as z/OS^(R), z/VSE, and z/TPF, or as a large-scale enterprise LinuxONE server solution.

While cloud computing, which includes hybrid cloud-native applications with Red Hat OpenShift Container Platform on Linux on z/VM, has become the standard use model, an IT infrastructure continues to be the foundation for every IT service. Realizing the benefits of cloud computing requires an infrastructure that delivers availability, reliability, security, and performance, while also providing strong virtualization technology, such as z/VM. Virtualization is foundational to delivering IaaS, the basic building block for cloud. IBM CloudTM Infrastructure Center can help cloud administrators and cloud development teams on the journey to cloud with the integration to higher-level cloud automation tools, such as IBM Cloud Automation Manager or VMware vRealize Automation or vRealize Orchestration. IBM continues to expand z/VM to be the leading platform virtualization product of the IBM Z and IBM LinuxONE platforms, evolving to meet the needs of IT organizations to deliver the foundation for user satisfaction.

With z/VM and its management of the infrastructure for Linux, clients can reduce the time between deciding on the acquisition of new servers and implementing them, because new servers can be easily deployed in a matter of minutes. With this powerful capability, clients can launch new products and services without the need for exhaustive planning for, purchasing, installing, and configuring new hardware and software that can be associated with conventional discrete hardware servers. Development groups that need test environments, which are built and rebuilt rapidly to enable them to efficiently deliver their projects while handling change management in the process, can also benefit from this unique advantage.

Key strengths of IBM Z or LinuxONE servers and z/VM include:

- Virtualization capabilities are more mature and robust than for other combinations of hardware and hypervisor.
- z/VM Single System Image (SSI) support allows users to share all system resources with high levels of resource utilization. This extends the pool of resources that can be managed by administering multiple instances of z/VM as if they were one integrated system.
- Live Guest Relocation allows movement of a running Linux guest from one member of an SSI cluster to another without the need to shut down the server. This allows maintenance of the z/VM hypervisor or the underlying server hardware without having to shut down Linux servers, which extends the availability of IBM Z and LinuxONE servers in the z/VM environment.
- Exploiting z/VM Virtual Switch technologies can help make Linux networking simpler and reduce the physical resource requirements.
- Support for the GDPS environment with HyperSwap^(R) provides clients with high availability service levels for storage and data center site recovery.
- Full-volume disk backup enables complete disaster recovery when another data center is available.
- z/VM is easy to customize at the base installation level with only a relatively small number of configuration files. When z/VM is configured properly, longer periods of time between planned outages may be achieved.

Advanced virtualization features like Live Guest Relocation with IBM Z, LinuxONE, z/VM, and Linux on IBM Z or LinuxONE help to provide an efficient infrastructure for deploying private clouds to support workloads that scale both horizontally and vertically.

With the z/VM and IBM Z or LinuxONE security-rich environment, clients' most valuable information can be protected. This helps to reduce organizational and reputational risk. Designed to work with IBM Z and LinuxONE servers, z/VM provides advanced security features that can deliver client value. The security certification of z/VM helps assure the protection and privacy of sensitive data and business transactions with appropriate isolation between virtual machines.

To help ensure data at rest and in flight stays safe and secure, z/VM supports the use of the IBM Full Disk Encryption (FDE) feature of the IBM DS8000^(R) and Endpoint Security of the IBM DS8900F. z/VM also supports the ability of guests to use encrypted tape and encrypted paging. Ciphering will occur as data moves between active memory and a paging volume owned by CP. Encrypted paging can be enabled and disabled dynamically.

The TCP/IP for z/VM TLS/SSL server facilitates security-rich and private conversations between z/VM servers and external clients. With z/VM support for TLS 1.2 and SHA-2 hashing, a z/VM server can use industry-standard cryptographic protocols in a FIPS 140-2 compliant mode to communicate in a secure fashion with a client without a change to the server itself.

z/VM enables Crypto Express features, which are tamper-resistant cryptographic coprocessors, available to guests with either dedicated access, for use in both secure-key or clear-key operations, or shared access for clear-key operations. z/VM can virtualize IBM Z cryptographic devices so they can be shared by many Linux systems and supports the z13, z14, and z15 limit of more than 16 Crypto Express feature domains. With shared access, z/VM can also balance the workload across

multiple cryptographic devices. Should one device fail or be brought offline, z/VM can transparently shift Linux systems using that device to an alternate one without user intervention. The z/VM environment is further extended with dynamic crypto support enabling changes to the AP Cryptographic (crypto) environment on a z/VM system dynamically, allowing the addition, removal, or reassignment of crypto hardware to be less disruptive to the system and its guests.

Statement of general direction

Security evaluation of z/VM V7.2

IBM intends to pursue an evaluation of z/VM V7.2 with the RACF Security Server and Single System Image features. This includes labeled security, for conformance to the Virtualization Protection Profile (VPP) and Server Virtualization Extended Package of the Common Criteria standard for IT security, ISO/IEC 15408, at Evaluation Assurance Level 4 (EAL4+).

FIPS certification of z/VM V7.2

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 V7.2.

Removal of RACF for z/VM support for RACF database sharing between z/VM and z/OS

z/VM V7.2 is intended to be the last z/VM release to support sharing RACF databases between z/VM and z/OS systems. While databases may remain compatible, sharing between operating systems is discouraged due to the distinct security and administration requirements of different platforms. A future z/VM release will be updated to detect whether a database is flagged as a z/OS database and reject its use if so marked. Sharing of databases between z/VM systems, whether in a Single System Image cluster or in stand-alone z/VM systems, is not affected by this statement.

Removal of line edit support during LOGON

z/VM V7.2 intends to remove support for performing line editing of data entered during LOGON, such as user ID, password, or command, when a z/VM External Security Manager (ESM) is not configured and active. This excludes honoring the system default line-end character to identify guest console input data in a LOGON command entered on the LOGON panel or in responses to prompts issued before LOGON completes. When an ESM is configured, it will control these aspects of system behavior.

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Reference information

For information about z/VM V7.1, see the following Software Announcements:

- Software Announcement [AP18-0514](#), dated October 16, 2018
- Software Announcement [AP18-0295](#), dated August 7, 2018

- Software Announcement [AP18-0142](#), dated April 10, 2018

For information on z/VM V6.4, see the following Software Announcements:

- Software Announcement [AP17-0502](#), dated October 10, 2017
- Software Announcement [AP17-0259](#), dated July 17, 2017
- Software Announcement [AP16-0073](#), dated October 25, 2016

For information about IBM Cloud Infrastructure Center, see the following Software Announcements:

- Software Announcement [AP20-0137](#), dated April 14, 2020
- Software Announcement [AP19-0509](#), dated December 3, 2019

For information about IBM z/VSE V6.2, see Software Announcement [AP20-0114](#), dated April 14, 2020.

For information about the z15, see the following Hardware Announcements:

- Hardware Announcement [AG20-0006](#), dated April 14, 2020
- Hardware Announcement [AG20-0013](#), dated January 14, 2020
- Hardware Announcement [AG19-0094](#), dated November 26, 2019
- Hardware Announcement [AG19-0032](#), dated September 12, 2019

For information about the LinuxONE III, see the following Hardware Announcements:

- Hardware Announcement [AG20-0014](#), dated April 14, 2020
- Hardware Announcement [AG20-0013](#), dated January 14, 2020
- Hardware Announcement [AG19-0015](#), dated September 12, 2019

For information about the z14 Model ZR1, see Hardware Announcement [AG18-0018](#), dated April 10, 2018.

For information about the LinuxONE Rockhopper II, see Hardware Announcement [AG18-0019](#), dated April 10, 2018.

For information about the z14, see the following Hardware Announcements:

- Hardware Announcement [AG17-0093](#), dated November 28, 2017
- Hardware Announcement [AG17-0044](#), dated July 17, 2017

For information about the Emperor II, see the following Hardware Announcements:

- Hardware Announcement [AG17-0093](#), dated November 28, 2017
- Hardware Announcement [AG17-0065](#), dated September 12, 2017

For information about the z13, see the following Hardware Announcements:

- Hardware Announcement [AG19-0045](#), dated May 7, 2019
- Hardware Announcement [AG19-0017](#), dated February 12, 2019
- Hardware Announcement [AG16-0058](#), dated June 7, 2016
- Hardware Announcement [AG15-0060](#), dated March 3, 2015
- Hardware Announcement [AG15-0001](#), dated January 14, 2015

For information about the z13s, see the following Hardware Announcements:

- Hardware Announcement [AG16-0058](#), dated June 7, 2016
- Hardware Announcement [AG16-0002](#), dated February 16, 2016

Statement of good security practices

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AP distribution

Country/Region	Announced
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

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