

Introducing the IBM LinuxONE III Model LT2, the Linux platform that provides the cloud you want with the privacy and security you need

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At a glance

Announcing the IBM^(R) LinuxONE III Model LT2

IBM LinuxONE III Model LT2 can help you pursue digital transformation without sacrificing security. The new LinuxONE III LT2 server integrates numerous capabilities -- from the infrastructure up the stack -- to address your biggest challenges.

Cloud-native development

You can build a hybrid cloud ecosystem while ensuring availability, security, and accessibility with flexibility as you deliver timely and efficient new services for your digital business. The IBM LinuxONE III provides the availability required by your most mission-critical workloads and the security demanded by your most valuable data. The LinuxONE III LT2 delivers a cloud platform that can be the base for transforming your applications and infrastructure. It makes it easy for administrators, developers, and architects to deliver and deploy cloud-native container-based applications. IBM has a comprehensive portfolio of solutions to help you deploy and support your cloud environment, as well as expand access to it.

- Utilizing IBM CloudTM Paks for IBM Z^(R) and LinuxONE, built on Red Hat^(R) OpenShift^(R) Container Platform, to help you transform workloads and data for private cloud consumption and deployment, and allow you to access extraordinary levels of scalability, reliability, performance, and security protection. OpenShift includes Kubernetes and container technologies to enhance your applications and let them deliver microservices to your hybrid-cloud environments.
- Enabling IBM Cloud Infrastructure Center, designed to improve and simplify administrator productivity and simplify the lifecycle management of Linux^(R) virtual machines.
- Supporting various Linux distributions, including Red Hat, SUSE, and Ubuntu, alone or side by side with IBM z/VM^(R) environments on a single physical server. The IBM LinuxONE server can run various Linux workloads independently on a single server. As a result, you gain infrastructure benefits from tight collocation of data and applications, fast internal communications, and integrated high availability.

Encryption everywhere

IBM introduced pervasive encryption on the IBM LinuxONE Emperor II, which provided a consumable approach to enable extensive encryption of data in flight and at rest. This approach simplifies encryption while helping to reduce costs associated with protecting data and managing compliance mandates. IBM LinuxONE has taken the next step of the journey with the IBM LinuxONE III Model LT2 by extending this data protection throughout the enterprise.

- IBM Data Privacy Passports, in conjunction with IBM LinuxONE III Model LT2, and available via an IBM LinuxONE III only PID, is designed to enforce security and privacy protections to eligible data not only on LinuxONE, but across platforms. It is designed to provide a data-centric security solution that enables data protection that can span hybrid and multiparty computing environments. For more information about IBM Data Privacy Passports V1.0, see Software Announcement [220-062](#), dated March 10, 2020.
 - Note: Data Privacy Passports supports data sources that can be accessed through a JDBC connection.
- Hyper Protect Services protect your highly sensitive and confidential data and workloads with high levels of security.
- There is a new Crypto Express7S adapter introduced on the IBM LinuxONE III whose design and format have been driven by the adoption of blockchain and other highly secure applications.

Cyber resiliency

Help boost your virtualization performance and lower your total cost of ownership (TCO) with the power of the LinuxONE III LT2. More Integrated Facilities for Linux (IFLs), more memory, and powerful on-chip compression within the platform mean speedy data-serving. Robust RAS design makes the LinuxONE platform fast and reliable.

- IBM Secure Execution provides high levels of data confidentiality and integrity available for virtual machine and container workloads in the hybrid cloud.
- IBM LinuxONE III Model LT2 offers a new resilient dual-drawer option with 65 cores available for a wide range of workloads. It's available with five feature-based sizing options: Max4, Max13, Max21, Max31, and Max65.
- The system offers up to 40 LPARs, allowing for a variety of workloads to run on a single server.

Flexible compute

- Clients want to consume technology when and how they need it. They want the agility and flexibility it provides in order to expedite their time to market.
- IBM LinuxONE is available to businesses of all sizes, from start-ups to the largest enterprise. IBM LinuxONE provides a flexible approach to deploying compute resources, with the ability to make resources available on demand, and to be repurposed to meet specific requirements. Flexible consumption models are available with public, private, and hybrid cloud models as well as flexible packaging designed for cloud data centers, air cooling, purpose built for cloud and new lower entry points.
- The LinuxONE III is designed with integrated accelerators to offload general processors and reduce system overhead CPU cycles for application workload processing. The IBM Integrated Accelerator for z Enterprise Data Compression is provided on each processor chip and uses industry-standard compression formats for file compression that can enable reduction in the size of data which can save storage space and increase data transfer rates.
- The IBM LinuxONE III Model LT2 design incorporates two Central Processor Complex (CPC) drawers for the Max65. The second drawer enhances availability by allowing concurrent drawer repair, a feature previously not available on single-frame servers. This allows a single CPC drawer in a multidrawer server, if there is sufficient memory installed, to be removed, serviced, and reinstalled without bringing the system down.

- Up to 8 TB of Redundant Array of Independent Memory (RAIM) are orderable per CPC drawer and up to 16 TB total per LinuxONE III LT2, dependent on the configuration.
- Ready for the cloud data center, the IBM LinuxONE III is housed in a 19-inch frame that makes it ready for colocation and standardized facilities management.

LinuxONE provides powerful and flexible Linux environments that work in harmony with your existing workloads. It offers encryption everywhere, high availability and resiliency, and cloud-native development to provide modern solutions for your business challenges.

Overview

Today's workloads have a new set of challenges that require innovative solutions. Companies are adopting open architecture to drive such innovation; however, this comes at a risk. Security breaches are becoming more prevalent and increasingly strict regulations are demanding higher standards for businesses to protect client data. In addition, clients expect 24x7 availability while developers demand simplicity and flexibility. To meet these demands, LinuxONE III LT2 delivers encryption everywhere to protect you and your ecosystem, cloud-native development to accelerate application development and deployment, and simplify life for your developers, and high availability and resiliency to help reduce the impact of planned and unplanned downtime.

IBM LinuxONE III Model LT2 delivers the cloud you want with the privacy and security you need.

Feature exchange

Not applicable.

Key requirements

See the [Hardware requirements](#) and [Software requirements](#) sections of this announcement.

Planned availability date

May 15, 2020

New build systems:

- IBM LinuxONE III Model LT2
- Features and functions for the IBM LinuxONE III Model LT2

MES orders for IBM LinuxONE III Model LT2 that include the following features:

- Field-installed features and conversions on LinuxONE III LT2 that are delivered solely through a modification to the machine's Licensed Internal Code (LIC)
- HMC Table Top KMM (#0148) on LinuxONE III LT2
- HMC Rack Mount KMM (#0154) on LinuxONE III LT2
- Customer Supplied HMC KMM (#0188) on LinuxONE III LT2
- HMC Tower (#0062) on LinuxONE III LT2
- HMC Rack Mount (#0063) on LinuxONE III LT2
- TKE Rack Mount (#0087) on LinuxONE III LT2
- TKE (#0088) on LinuxONE III LT2

- TKE 9.2 LIC (#0881) on LinuxONE III LT2
- TKE Rack Mount KMM (#0156) on LinuxONE III LT2
- TKE Table Top KMM (#0157) on LinuxONE III LT2
- Customer Supplied TKE KMM (#0190) on LinuxONE III LT2
- Smart Card Reader (#0891) on LinuxONE III LT2
- Additional Smart Cards (#0900) on LinuxONE III LT2

September 17, 2020

- All remaining MES orders for LinuxONE III LT2

Description

Today's announcement extends IBM Z leadership with LinuxONE III LT2, offering:

- Sixty-five cores, more than two times the total system capacity as compared to the thirty cores on LinuxONE Rockhopper II for exceptional scale in a single footprint.
- Flexible configuration with an industry-standardized 19-inch frame taking up only two floor tiles of space.
- Up to 16 terabytes (TB) of available Redundant Array of Independent Memory (RAIM) real memory per server to help improve transaction response times, lower CPU costs, simplify capacity planning, enlarge in-memory buffer pools, and ease deploying memory-intensive workloads.
- IBM Data Privacy Passports, which is designed to protect eligible data not only on IBM LinuxONE, but across multicloud environments without application changes. For more information about IBM Data Privacy Passports V1.0, see Software Announcement [220-062](#), dated March 10, 2020.
 - Note: Data Privacy Passports supports data sources that can be accessed through a JDBC connection.
- Crypto Express7S adapter and cryptographic enhancements. This includes capacity for up to 40 HSMs.
- More on-chip cache per core, compared to Rockhopper II, to help minimize memory waits while maximizing the throughput of concurrent workloads -- perfectly optimized for data serving.
- A design for data protection and privacy allowing you to encrypt many new data sets transparently, which can help you to provide an envelope of protection around data placed on IBM LinuxONE. This includes cryptographic performance improvements with the Crypto Express7S (#0898 or #0899) and the IBM LinuxONE processor-based cryptography with the Central Processor Assist for Cryptographic Functions (CPACF) that helps enable the protection of data in flight or at rest.
- Hardware-accelerated encryption on every core with the CPACF feature.
- Economies of scale with next-generation multithreading (SMT) for Linux workloads.
- OSA-Express7S 25GbE SR (#0429).
- OSA-Express^(R) 6S GbE, 10 GbE, and 1000BASE-T (#0422, #0423, #0424, #0425, #0426).
- FICON Express16S+ LX, FICON Express16S+ SX (#0427, 0428), and FCP Express 32S (#0438, 0439) to help absorb large application and transaction spikes driven by large unpredictable analytic and mobile workloads.
- IBM Hardware Management Console (HMC) 2.15 with simplification updates to improve workspace and manage system time.
- IBM Z Hardware Management Appliance, which can be used to create isolated partitions to help protect data and applications from cybercriminals.
- Trusted Key Entry (TKE) 9.2 License Internal Code (LIC).

- IBM Dynamic Partition Manager enhancements that provide a simplified, consumable, enhanced experience, reducing the barriers of adoption for new and existing LinuxONE and z/VM clients.
- Non-raised-floor option, offering flexible possibilities for the data center.
- Optional top exit power and I/O cabling designed to provide increased flexibility.
- ASHRAE class A3 for robustness, data center flexibility, and energy savings.
- Ability to upgrade within the LinuxONE III family and into the IBM z15™.
- Non-Volatile Memory Express (NVMe), which offers a better price-performance advantage compared to externally attached storage servers.

The performance advantage

LinuxONE III LT2 is available with up to 65 configurable cores using commercial processors running at 4.5 GHz, for impressive performance and massive scaling.

Next-generation availability

The LinuxONE III merges the reliability, availability, and serviceability (RAS) characteristics from the performance-optimized z14 family with the 19-inch frame from the LinuxONE Rockhopper II.

- Processor and memory PU refresh, RAIM memory, and cache symbol ECC are designed to provide a robust computing platform.
- PU sparing, array macro sparing, micro-array masking integrated sparing, and expanded optics as a FRU are used to reduce repair actions.
- The wide use of redundancy in the power, cooling, and service network continues with the LinuxONE III family. A "power redundancy test" is provided so you can verify the server is power redundant before servicing power feeds.

Enterprise data protection

IBM LinuxONE III Model LT2 extends the IBM Rockhopper II pervasive encryption story throughout the enterprise to protect eligible data not only on IBM LinuxONE, but across multicloud environments. You can control access to eligible data shared with business partners and your ecosystem. This includes crypto enhancements and IBM Data Privacy Passports (requires additional software). For more information about IBM Data Privacy Passports, see Software Announcement [220-062](#), dated March 10, 2020.

Note: Data Privacy Passports supports data sources that can be accessed through a JDBC connection.

Cloud transformation

LinuxONE III LT2 enables your digital transformation through cloud-native application development, deployment, and management using containers and Kubernetes, supported by the underlying scalability, security, and reliability of LinuxONE.

Common Criteria Evaluation Assurance Level 5+ (EAL 5+) certification

The LinuxONE III LT2 is designed for Common Criteria Evaluation Assurance Level 5+ (EAL5+) certification for security of logical partitions. This means that the LinuxONE III is designed to prevent an application running on one operating system image on one LPAR from accessing application data running on a different operating system image on another LPAR on the server.

Common Cryptographic Architecture (CCA) enhancements

Enhancements with the LinuxONE III continue to deliver critical cryptographic capabilities that address the ever-changing security requirements across the globe around key management and distribution, data management and compliance, and protecting enterprise data. The Crypto Express7S is designed to meet the Federal Information Processing Standard (FIPS) 140-2 at Level 4 for cryptographic modules.

IBM's Common Cryptographic Architecture Release 7.0 (CCA 7.0) is designed to help meet the HSM requirements from the Payment Card Industry Security Standards Council (PCI-SSC). Its unique design eases migration of applications and keys and expands to add new cryptographic algorithm support. CCA 6.3 also meets the PCI-HSM requirements. CCA 7.0 includes the enhancements from the limited availability release CCA 6.3. The release adds an additional key distribution method by including callable services in support of ASC X9 Technical Report 34. TR-34 outlines an interoperable protocol for secure distribution of symmetric keys using asymmetric techniques. This protocol can be used to distribute symmetric keys from host systems to key-receiving devices such as ATMs or POS terminals. Using the protocol will allow clients to eliminate costs associated with manual key loading by two separate employees who must physically load keys into the ATM or other key-receiving device. This feature facilitates a secure and cost-effective method for remote-managed rotation of encryption keys.

The release enhancements include complete native support for X.509 certificates for RSA or ECC public keys. All CCA services that accept public keys have been enhanced to accept an X.509 certificate. The X.509 certificate is validated and may be optionally authenticated against the Public Key Infrastructure (PKI) managed internally to the CEX6S / CEX7S. The trust anchors that underpin the PKI are loaded using security from a Trusted Key Entry (TKE) workstation to help enable a secured management path. This expansion of X.509 certificate support includes the new X9 TR-34 services mentioned above.

The release has also been enhanced to create PCI-HSM compliant-tagged RSA and AES key tokens. A compliant-tagged key token is managed by CCA firmware according to the requirements of PCI-HSM compliance mode. A coprocessor in compliance mode must be available to use compliant-tagged key tokens. Also, compliance-based methods to check master keys have been added to CCA. The Key Test2 callable service can now be used to verify the value of a master key as defined in ANS X9.24 Part 1, using either the NIST SP 800-38B block cipher-based MAC algorithm, called CMAC, or the encrypt zeros method. This will prove useful during compliance audits.

Available with the CCA 7.1 release, the Crypto Express7S HSM on LinuxONE supports a lattice-based cryptography algorithm for generating and verifying digital signatures. This method can be used in conjunction with existing RSA and Elliptic Curve digital signature methods to support dual or hybrid digital signature schemes.

CCA 7.1 features Edwards Elliptic Curves Ed25519 and Ed448, which are added to secure key support for key management, digital signature creation, and verification. Protected key support is also enhanced for Elliptic curve, allowing NIST Prime curves P-256, P-384, and P-521 as well as the added Edwards Ed25519 and Ed448 curves. Private keys for these curves may be exported to the CPACF for accelerated performance. TR-31 key import and export is also enhanced with the addition of HMAC key support. Now CCA TR-31 import and export can process HMAC keys for exchange with partner organizations. A further TR-31 enhancement allows export of PIN Encryption keys that support encryption and decryption, allowing key interchange with certain payment networks.

Processor improvements include Message-Security-Assist extension 9 providing support for elliptic curve cryptography authentication of messages, the generation of elliptic curve keys, and scalar multiplication. This is accomplished through a new instruction (Compute Digital Signature Authentication (KDSA)), which supports the ECDSA and EdDSA algorithms using curves P-256, P-384, P-521, Ed25519, and Ed448 and is in compliance with the Digital Signature Standard (DSS), National Institute of Standards and Technology (NIST) July 2013.

In addition, features that support the use of the AES algorithm in banking applications have been enhanced. This includes a new method for formatting the PAN data for authenticated PAN change requests based on the ISO 9564-1 standard. The new method includes an AES-based key management feature that enforces special usage for authentication keys for translation of PINs in ISO-4 PIN blocks. This increases the protection over this sensitive operation by adding an additional measure of control.

Finally, two new callable services are added in support of the German Banking Industry Committee *Die Deutsche Kreditwirtschaft* (DK) financial services requirements.

IBM continues to add enhancements as finance industry standards are released or updated with support for AES-based methods and protocols.

Enterprise PKCS #11 enhancements

EP11 is specifically designed for clients seeking support for open standards and enhanced security.

The EP11 library provides an interface very similar to the industry-standard PKCS #11 API. Existing applications using PKCS #11 will benefit from using EP11 as they can be migrated easily to IBM Z and as a result benefit from enhanced security using secure key cryptography.

EP11 provides many interesting additions to the PKCS #11 with login sessions, attribute bound keys, and different operational modes.

EP11 (BSI-DSZ-CC-1094) is designed to meet the requirements of the BSI (Federal Office for Information Security in Germany) for conformance with common criteria in version 3.1 (rev. 4) with Evaluation Assurance Level (EAL) 4.

EP11 4.7 adds support for the Crypto Express7S adapter as well as support of the PKCS #11 v2.4 standard.

New functionality consists of support for SHA3, EdDSA (sign/verify with Ed25519 and Ed448), and EdDH (derive with C25519 and C448).

In addition, EP11 4.7 introduces support for EP11 key blobs (AES, TDES, and selected ECC) exportable to Central Processor Assist for Cryptographic Functions (CPACF) for use in protected mode encryption, authorized with respective key attributes. With protected mode WrapKey the secure EP11 key is returned to the host caller reenciphered under the CPACF wrapping key for direct usage in a CPACF encryption instruction. The clear key value of the operational key is never available in host storage.

Furthermore, it supports a lattice-based cryptography algorithm for generating and verifying digital signature.

Trusted Key Entry (TKE) 9.2 Licensed Internal Code (LIC): The TKE 9.2 level of LIC is designed to support the following functions:

- TKE 9.2 is required to manage the Crypto Express7S adapter running in Common Cryptographic Architecture (CCA) or IBM Enterprise PKCS #11 (EP11) mode if you manage your modules from the TKE. Remember, TKE is required to manage modules that run in EP11 mode or CCA domains in PCI-compliant mode.
- With TKE 9.2, you can use AT-TLS connections between the TKE workstation and the host that is running the TKE host transaction program. If you configure the TCP/IP port in the host transaction program to use AT-TLS, you must select the new check box in your TKE workstation host definition to specify you are using a TLS connection.
- TKE 9.2 can be used to exploit the following enhancements available in various releases of CCA firmware levels:
 - TKE 9.2 will allow you to create AES operational key parts with the PCI-compliant tag turned on. You can use these parts when you load your AES operational keys, if the CCA level supports the tag.
 - When you display Access Control Point (ACP) tracking information, tracking interval information will be included if the CCA firmware level returns the information. You will be able to tell when tracking was turned on, if and when tracking was turned off, and the number of times tracking was turned off and back on from the last time tracking data was cleared.

- When you display master key information, you will have new options for selecting how the verification pattern is calculated if the CCA firmware supports the ENC-0 and CMAC calculations.
- With TKE 9.2, you can now select the IBM Enterprise PKCS #11 Transport Wrapping Key Policy. This policy is used to select the EP11 transport wrapping key strength. Select this policy if you require the EP11 transport wrapping key to be a true 256-bit AES key. If the policy is selected, the transport wrapping key is derived using Diffie-Hellman Key Exchange of 521-bit Elliptic Curve (EC) public keys between the TKE and the host crypto module running IBM Enterprise PKCS #11 (EP11). You can select this policy only when:
 - All your EP11 smart cards are at the minimum part level 00RY790 (Blue smart cards).
 - All your EP11 smart cards are at the minimum applet version V0.6. (The minimum applet support first appeared in TKE 9.2.)
 - All your host IBM Enterprise PKCS #11 modules are at API version 6.02 or later.
- TKE 9.2 has new features that simplify existing management tasks:
 - You can configure your host definition so that it will automatically accept modules that are successfully authenticated. You can select the option to automatically accept modules when you create a host definition or add the option to existing host definitions through the change host function.
 - The utility that allows you to copy key parts in binary files onto smart cards will allow you to select more than one file at a time. This will simplify the process of moving from binary key part files to smart card key part management.
 - With any attempt to delete a role or authority from a Common Cryptographic Architecture (CCA) mode host crypto module from inside of a TKE domain group, the delete will be attempted on every module included in the group. Previously the operation would stop the first time the role or authority was not found on a module in the group.
 - When TKE 9.2 detects that a Linux host supports long user IDs you will be able to enter user IDs with up to 32 characters.
 - The TKE Workstation Logon Wizard includes a new step that encourages you remove excess authority from the DEFAULT role after your TKE Workstation administrator profiles have been created.
- The following are important notes about upgrading existing TKE workstations to TKE 9.2:
 - TKE workstations with feature codes 0847 and 0849 cannot be upgraded to TKE 9.2 LIC.
 - TKE workstations with feature code 0080, 0081, 0085, or 0086 can be upgraded to TKE 9.2 LIC only if the TKE Workstation feature is assigned to a z14 server or later.
 - You will have to buy a new local adapter crypto feature for the TKE if your TKE is at a pre-TKE 9.0 LIC level.

The zHPF protocol:

The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed.

The FCP protocol:

The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed.

The FCP protocol is supported by z/VM and Linux on IBM Z. See the [Software requirements](#) section.

Channel subsystem (CSS) scalability: The LinuxONE III LT2 server, like the IBM LinuxONE Rockhopper II and IBM LinuxONE Rockhopper servers, has support for three logical channel subsystems (LCSSs), which are required to support the 40 LPARs and three subchannel sets.

IBM Z Hardware Management Appliance

New with LinuxONE III, the Hardware Management Console (HMC) hardware will no longer have CD/DVD drives as part the HMC server hardware. A new optional IBM Z Hardware Management Appliance can be ordered with the LinuxONE III to provide HMC/SE functions within the CPC frame, eliminating the need for separate HMCs outside of the frame. Multiple new capabilities will be available on HMC 2.15.0, including:

- New user management controls for both HMC and SE tasks, resulting in a better user experience and providing the desired user task/object protection across the HMC/SE.
- A new option for audit support for remote syslog/Splunk support.
- An improved dashboard status overview visible when viewing tasks on all tabs, not just when viewing the home tab.

z/VM support for the LinuxONE III

Support for the IBM LinuxONE III LT2 includes:

- Guest enablement to exploit the following function on IBM LinuxONE III:
 - 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

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

- Enhancements to the TCP/IP stack and NETSTAT OSAINFO command to provide support for the OSA-Express7S 25GbE adapter

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

- Infrastructure support when any member of a Single System Image (SSI) cluster is run on a LinuxONE III server, which must be installed on all the members of an SSI cluster before any member is IPLed on the LinuxONE III servers:
 - z/VM 7.2.
 - z/VM 7.1 with the PTF for APAR VM66206.
 - z/VM V6.4 with the PTFs for APARs VM65976 and VM66206.
- Installation of z/VM using a USB flash drive is supported.
- For additional information on z/VM support, review the [z/VM web site](#) and the hardware PSP bucket 8562DEVICE z/VM subset.

z/VM new function portal:

The z/VM Continuous Delivery News [web page](#) will be the primary vehicle used by IBM to describe [new functions](#) that are planned for z/VM. It is the recommended way to keep track of future development and support plans for the z/VM product. z/VM clients should consider subscribing to this page. IBM recommends subscribing to this page to be notified of changes by clicking the "Notify me" link in the left-

side navigation bar. Additional instructions are included on the [VM Site File Change Notification](#) web page.

Additional z/VM V7.1 enhancements:

The following enhancements for z/VM V7.1 have been provided in the service stream:

- **Dynamic Crypto:** With the PTF for APAR VM66266, z/VM provides Dynamic Crypto support, which enables dynamic changes to the AP Cryptographic (crypto) environment on a z/VM system, allowing the addition or removal of crypto hardware to be less disruptive to the system and its guests.
- **VSwitch Priority Queuing support:** With the PTFs for APARs VM66219, VM66223, and PH04703, z/VM exploits OSA-Express Priority Queuing when it is available on a VSwitch's uplink port; currently all VSwitch outbound traffic to the external network is transmitted at the same priority. When VSwitch Priority Queuing is enabled, z/VM will establish multiple OSA QDIO output queues, and transmit data to the external network at different priorities.
- **Support for 80 logical processors:** With the available PTFs for APARs VM66265 and VM66296, z/VM supports 80 logical processors on LinuxONE III, LinuxONE Emperor II, and LinuxONE Rockhopper II servers. This relieves the previous limitation of 64 logical processors per LPAR allowing clients 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 will allow defining more logical processors for running workload on each LPAR, possibly requiring fewer LPARs to support the same workload.
- **EAV paging:** With the available PTFs for APARs VM66263 and VM66297, z/VM supports paging space located anywhere on Extended Address Volumes, allowing clients to define sufficient 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, the 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 the 1 TB (1,182,006 cylinder) limit.
- **Fast minidisk erase:** With the PTFs for APARs VM65784, VM66288, and PH14249, the CPFMTXA utility has been enhanced to erase data on minidisks quickly, and 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.
- **RACF^(R) Multi-Factor Authentication (MFA):** With the PTF for APAR VM66338, Multi-Factor Authentication (MFA) support within RACF provides 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.
- **TLS Certificate Verification:** With the PTFs for APARs PH18435 (TCP/IP), VM66348 (CMS), and VM66349 (LE), the TCP/IP TLS/SSL server has been enhanced to 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 it has been signed by a certificate authority that 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 within 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.

STP enhancements for Precision Time Protocol: IBM LinuxONE III and LinuxONE III LT2 introduce a new external time source option for STP, called Precision Time Protocol (PTP), which is the subject of the IEEE 1588 standard. PTP provides much better time accuracy for systems than was possible when using Network Time Protocol (NTP) alone as a time source. The use of PTP is most important for customers facing regulatory issues, such as in the financial industry, where tight synchronization to a Universal Coordinated Time time source is demanded by new regulations. IBM LinuxONE today can achieve excellent time accuracy where NTP together with Pulse Per Second are used as a time source, but IBM LinuxONE is likely just one part of your processing environment. Pulse Per Second is not an option for much of the other equipment in your data center, and it can be complicated to have to manage multiple timing protocols. The use of a PTP time source offers you an opportunity to begin to migrate to a single timing protocol that will meet all of your needs, and help to meet the regulations. Precision Time Protocol (PTP) does not alleviate the need to also use Pulse Per Second to meet the regulations for this particular generation of IBM Z. Pulse Per Second can be used in conjunction with PTP to achieve higher time accuracy than PTP alone. This limitation is planned to be removed with future systems, as noted in the Statement of Direction released with IBM z15™ on September 12, 2019. This is a first step toward our goal of simplifying your data center time management needs.

Hardware Management Console and Support Element (HMC/SE): The LinuxONE III Hardware Management Console and Support Element supports:

- **HMC security audit enhancement: Remote Syslog/Splunk support**
 - The HMC 2.15.0 release provides a new option for audit support. Previously, the HMC users could use the Audit and Log Management task or Scheduled Operations to offload xml and html formatted logs. New HMC support is available to offload Security Logs, Audit Logs, Console Events, Hardware Messages, and SNMP and WebServices Automation Logs using a Remote SysLog Consolidation Server (for example, Splunk). In addition, SNMP API support was also added for offloading Audit Logs and Console Events while previously supporting Security Logs.
- **HMC dashboard/status overview**
 - The HMC 2.15.0 was enhanced to address the viewing of the Status Overview, Exceptions, Operating System Messages, and Hardware Messages indicator area in the Tabbed Workspace environment. That indicator area is now presented so that it is visible when viewing tasks on all tabs, not just when viewing the home tab. There is now a Compact Masthead Status Bar display along with "Docked" and "Expanded" display areas.
- **HMC remote browser window sizing**
 - When using a remote browser connection into the HMC, there are now controls to persist the window size for subsequent browser connections into the HMC. Prior to HMC 2.15.0, the HMC browser connection into the HMC always launched a full-screen window, and while this could be resized, any subsequent initial HMC invocations would be a full-screen window size.
- **HMC/SE no DVD support**
 - New-build HMCs shipped with the HMC 2.15.0 level no longer have CD/DVD drives as part of the HMC server hardware. The HMC now provides two main options for functional and service operations: USB media or electronic. Solutions are provided for:
 - Firmware required for the HMC or Support Element/CPC
 - eBoD (eBusiness on Demand) records (for example, On Off Capacity on Demand, Capacity Backup Unit (Disaster Recovery))

- Operating system code (used for Load from Removable Media or Server task)
- USB Flash Memory Drive solutions are available, but if USB Flash Memory Drive is not acceptable for a client environment, there are electronic network options to address those client environments.
- If the client requires a non-USB solution, that client should order feature code 0846 (No Physical Media Option). This will then provide instructions on how to electronically deliver the required content via the network using various options: zRSF (Z Remote Support Facility), IBM Resource Link^(R), and FTP/SFTP/FTPS Server connections from the HMC. Note that for an electronic-only delivery environment, there is a requirement that there are two HMCs on every unique network subnet where a Hardware Management Console, Support Element, or Trusted Key Entry workstation is connected.
- If USB is acceptable, generally the appropriate USB Flash Memory Drive media will be shipped with whatever feature is being delivered. There are also two feature codes available for USB Flash Memory Drive Media, which can be ordered if required:
 - Feature code 0843: USB Load media which can be used for IBM Z operating system code
 - Feature code 0848: USB Backup media which can be used for HMC or SE Critical Data Backup task
- **HMC user management controls include HMC and SE tasks**
 - Prior to HMC 2.15.0, there were a moderate number of client tasks that were available directly on the HMC, but were available only by using the Single Object Operations task to launch those tasks indirectly from the SE (Support Element). In addition, most clients don't create unique users for the SE environment, but only create users for the HMC. When SE-only tasks are launched via Single Object Operations, the user authority from User Management is inherited from default user roles on the SE (for example, SYSPROG, OPERATOR, and so on) rather than based on user controls for unique user roles on the HMC.
 - With HMC 2.15.0, most SE-only client tasks (for example, Channel Problem Determination, Crypto Config/Mgmt, Advanced Facilities, Perform Model Conversion (On/Off Capacity on Demand, Capacity Backup Unit, and so on)) are available directly on the HMC without having to utilize Single Object Operations. This also includes physical channel objects (PCHIDs) being available directly on the HMC.
 - HMC 2.15.0 also provides user management controls for both HMC and SE tasks based on HMC User Management definitions, and those HMC/SE user and object access controls can be replicated across all HMCs using the HMC Data Replication task. These two major enhancements are designed to result in a better user experience as well as provide the desired user task/object protection across the HMC/SE that the clients require for all their uniquely defined users.
- **HMC Integrated 3270 Console performance enhancements**
 - For security reasons it is recommended to use the HMC Integrated 3270 Console rather than HMC Operating System Messages when managing IBM Z operating system environments via an HMC console window.
 - In HMC 2.15.0 further enhancements were made for the HMC Integrated 3270 Console which provide significant performance responsiveness for that task. These enhancements are present in the HMC 2.15.0 and will be effective not only when managing IBM LinuxONE III and z15 LPARs, but also for LinuxONE Rockhopper II, LinuxONE Emperor II, IBM z14^(R), LinuxONE Rockhopper, LinuxONE Emperor, IBM z13^(R), and IBM z13s^(R) LPARs.
- **HMC n-2 legacy system support**
 - HMC 2.15.0 supports only two previous generations of systems (LinuxONE Rockhopper II, LinuxONE Emperor II, IBM z14, LinuxONE Rockhopper, LinuxONE Emperor, IBM z13, and IBM z13s^(R)) while also supporting IBM LinuxONE III LT2, IBM LinuxONE III, and IBM z15. This change will improve the number and extent of new features and functions that are able to be pretested and maintained in a given release with IBM's continued high-

reliability qualification procedures. This change is also in alignment with the n-2 support strategy for sysplex timing.

- LinuxONE Rockhopper II and LinuxONE Emperor II HMC level 2.14.1 or earlier levels will continue to maintain support for n-4 systems, and can be used to support systems prior to z13s.
- **Removal of System (Sysplex) Time task**
 - The HMC 2.15.0 no longer supports the System (Sysplex) Time task on the Support Element. The System (Sysplex) Time task was replaced by the "Manage System Time" task on the Hardware Management Console 2.14.0 release as announced in Hardware Announcement [117-044](#), dated July 17, 2017. There are significant enhancements in the Manage System Time task which clients should utilize as part of their time management activities. More information on Manage System Time can be found in z14 Model ZR1 publications as well as in YouTube video education modules on the [HMC YouTube launching page](#).
- **IBM Z Hardware Management Appliance**
 - IBM Z Hardware Management Appliance feature code 0100 can be ordered to provide the HMC/SE functionality to be contained within redundant physical servers inside the CPC frame. When you order the IBM Z Hardware Management Appliance feature, this will provide logically a Primary and Alternate Support Element and two peer Hardware Management Consoles on two physical servers in the CPC frame. This eliminates the need for having to manage a separate physical server or servers for one or more HMCs outside of the frame. For the User Interface experience you must use remote browsing controls from your own workstation into HMC within the IBM Z Hardware Management Appliance.
 - If you have multiple systems, you don't need to order the Hardware Management Appliance feature for all systems. The recommendation is that you consider having the IBM Z Hardware Management Appliance features on one or two CPCs, but the rest of the CPCs don't need to include Hardware Management Appliance features. (Those CPCs would have redundant Support Elements.)
 - The IBM Z Hardware Management Appliance feature is optional. Physical HMCs (both Mini Tower and rack mounted) are still available features to be used.

Alternate System Door Locking Latches

Similar to predecessor offerings, the IBM LinuxONE III Model LT2 is provided with a key operated locking latch assembly to physically secure each system door. Based on the growing needs and requests for enhanced system physical security as well as to satisfy the evolving controlled accessibility, monitoring, and auditability associated with IT equipment, IBM recognizes that customers may wish to deploy other locking mechanisms. One solution that can provide these functions is available from SouthCo. If desired, Door Locking Security Kits may be procured directly from SouthCo. These kits are provided on a per system frame basis and may require some additional hardware (such as electrical wiring) to connect to a facilities security infrastructure. Note that the customer adds this non-IBM hardware at their own risk, but installation of the kit does not require any permanent alteration to the system doors. If installation assistance is desired, contact the manufacturer or their suggested installation providers for additional information. You can also contact IBM GTS who will assist in installing the SouthCo key operating locking latch. Note, if this alteration is completed, the following restrictions apply:

1. The electronic locking latches and any additional enabling hardware (for example, junction box, door sensors, associated wire and cabling, and so on) shall be removed and the originally supplied door latches be reinstalled prior to returning the system to IBM as part of a Technology Exchange or a System MES.
2. The supporting TSS team member must be notified of this system alteration and the appropriate provisions enabled to ensure any contracted accessibility to the system is provided. Should this not be done, then a delay in system serviceability may be witnessed.
3. The additional aftermarket hardware provided by SouthCo has not been included in the compliance certifications that cover the IBM LinuxONE III.

IBM z Systems^(R) hardware family generations concurrent with the general availability of the LinuxONE III LT2:

Full name	Short name	Machine type	CMP machine generation
IBM LinuxONE III LT2	LinuxONE III LT2	8562	N
IBM LinuxONE III	LinuxONE III	8561	N
IBM LinuxONE Emperor II	LinuxONE Emperor II	3906	N-1
IBM LinuxONE Rockhopper II	LinuxONE Rockhopper II	3907	N-1
IBM LinuxONE Emperor	LinuxONE Emperor	2964	N-2
LinuxONE Rockhopper	LinuxONE Rockhopper	2965	N-2
IBM zEnterprise ^(R) EC12	zEC12	2827	N-3
IBM zEnterprise BC12	zBC12	2828	N-3
IBM zEnterprise 196	z196	2817	N-4
IBM zEnterprise 114	z114	2818	N-4

Concurrent with the general availability of the LinuxONE III LT2, the zEC12 and zBC12 machines will be designated as previously eligible CMP machines.

Clients are not eligible to create a Multiplex until machines that are older than generation N-2 are upgraded, or that workload is transferred to eligible machines. Once a client establishes a Multiplex they may keep the machines originally included in their Multiplex indefinitely, including any machines subsequently designated as previously eligible. Going forward, any machine to be added to an existing Multiplex must conform to the machine types that satisfy the generation N, N-1, and N-2 criteria at the time that machine is added.

Section 508 of the US Rehabilitation Act

IBM LinuxONE III servers are capable on delivery, when used in accordance with IBM's associated documentation, of satisfying the applicable requirements of Section 508 of the Rehabilitation Act of 1973, 29 U.S.C. Section 794d, as implemented by 36 C.F.R. Part 1194, provided that any assistive technology used with the product properly interoperates with it.

IBM makes no representation about the Section 508 status of third-party products included in this offering. Contact the vendor for specific, current information on the Section 508 status of these products.

Product positioning

Today's workloads have a new set of challenges that require innovative solutions. Companies are adopting open architecture to drive such innovation; however, this comes at a risk. Security breaches are becoming more prevalent and increasingly strict regulations are demanding higher standards for businesses to protect client data. In addition, clients expect 24x7 availability while developers demand simplicity and flexibility. Fortunately, the IBM LinuxONE III Model LT2 delivers encryption everywhere to help protect you and your ecosystem, and cloud-native development to simplify life for your developers.

All of these together can help to provide the cloud you want with the privacy and security you need. The IBM LinuxONE III Model LT2 is the newest model in the IBM

LinuxONE family of servers. It delivers a single-frame, efficient design with a low entry cost that can easily coexist with other platforms in a cloud data center.

Introduced on IBM Rockhopper II, pervasive encryption easily encrypts all data associated with an application, database, or cloud service -- whether on premises or in the cloud, at rest or in flight. IBM LinuxONE has taken the next step of the journey on the IBM LinuxONE III by extending this data protection throughout the enterprise. The goal is protection of data beyond the platform and into distributed and hybrid cloud environments.

IBM Data Privacy Passports, used in conjunction with the IBM LinuxONE III, provides a data-centric security model for the protection of eligible data throughout its lifecycle. As a result, only the authorized application or user can view subsections of the data. Pervasive encryption is not mandatory, but complementary. This technology is intended to be implemented on the IBM LinuxONE III to enable protection for eligible

Note: Data Privacy Passports supports data sources that can be accessed through a JDBC connection.

The new Secure Execution for Linux capability fortifies and protects data when running multiple workloads in the same environment. Providing service isolation and data protection from internal and external threats, Secure Execution for Linux allows clients to build a secure, multitenant hosting solution for their hybrid multicloud.

The LinuxONE III LT2 twelve-core processor chip leverages the density and efficiency of 14 nm silicon-on-insulator technology to deliver a new 98 MIPS entry point and 156 capacity options available for a wide range of workloads. The IBM LinuxONE III Model LT2 is available with five feature-based sizing options: Max4, Max13, Max21, Max31, and Max65.

With a Max65, you have the option for two CPC drawers to add another layer of inherent resiliency/HA, allowing air-cooled single-frame clients to take advantage of concurrent drawer repairs for the first time. The LinuxONE III LT2 also has the option of single- or three-phase power to accommodate data center requirements. There is up to 16 TB of Redundant Array of Independent Memory (RAIM) per LinuxONE III LT2 to drive transaction throughput with up to 8 TB of RAIM orderable per CPC drawer. The Integrated Accelerator for zEDC replaces the IBM zEDC Express^(R) adapter on earlier LinuxONE servers. The LinuxONE III LT2 integrates new file compression capabilities with an on-chip compression coprocessor.

The Integrated Accelerator for zEDC can help reduce data storage requirements and costs, as well as help clients manage the massive amounts of data that is being generated, updated, shared, and stored every day. It increases data transfer rates to boost throughput without adversely impacting response times. The Integrated Accelerator for zEDC interoperates compatibly with the zEDC compression used on previous platforms and with industry-standard compression used on other platforms. The processor chip provides a new hardware-accelerated approach using a new coprocessor designed to reduce elapsed and CPU times for many Db2^(R) batch workloads. (Results may vary by client based on individual workload, configuration, and software levels.)

In addition, there are a number of processors, not part of the general processor count, that are dedicated to I/O processing as compared to having the general processor base having to provide the I/O processing on other platforms. This massively reduces the processing costs from the general processors. On x86 this work is done with standard processors that drive incremental hardware, software, and administrative costs.

The IBM LinuxONE III Model LT2 is designed for resiliency across your hybrid multicloud platform. To achieve this, IBM offers initial program load (IPL), multiple solid state drives (SSDs) per logical partition (LPAR), and base Dynamic Partition Manager (DPM) -- without the need of external storage.

On premises or in the cloud, IBM LinuxONE III Model LT2 helps to avoid or recover from failures. It helps to minimize business disruptions with component reliability,

redundancy, and features that assist in providing fault avoidance and tolerance. LinuxONE III LT2 resiliency is the ability to adapt to planned or unplanned events while keeping services and operations running continuously.

The IBM LinuxONE III Model LT2 supports IBM's new Cloud Paks and Red Hat OpenShift. This will unlock business value and drive modernization, as well as delivering automation to develop, deploy, and manage cloud-native applications. And blending hardware platform DevOps with this extended deployment flexibility opens a buffet of digital transformation possibilities. Red Hat OpenShift includes Kubernetes and container technologies to enhance your applications and let them deliver microservices to your hybrid-cloud environments.

The IBM LinuxONE III Model LT2 can support various Linux distributions, including Red Hat, SUSE, and Ubuntu, alone or side-by-side with z/VM environments on a single physical server using an Integrated Facility for Linux (IFL). The IBM LinuxONE III Model LT2 can have up to 65 IFLs, which allows for easy integration of various Linux workloads on a single server, resulting in infrastructure benefits from tight data and application colocation, fast internal communications, and integrated high availability.

IBM has been committed to Linux for decades and continues to invest in the Linux ecosystem. LinuxONE III provides a unique platform for any Linux solution requiring high availability, security, or scalability and supports a wealth of new open source products such as Go, Python, Scala, Node.js, Docker, Spark, MongoDB, PostgreSQL, MariaDB, and many more. LinuxONE III adds to the IBM commitment by allowing clients to take advantage of transformative technologies like blockchain, gain cognitive insights through the use of Spark analytics, scale vertically with unmatched speed, provide highly secure data-serving capabilities, and leverage the use of APIs to help create and deliver innovative, new customer services.

The IBM LinuxONE III Model LT2 is the all-in-one Linux variant allowing you to run everything on a 19-inch box. It provides powerful and flexible Linux environments that work in harmony with your existing workloads. It offers encryption everywhere, availability and resiliency, and cloud-native development to provide a myriad of solutions for any challenge to your workload.

Statement of general direction

Prepaid token expiration: Beginning with IBM LinuxONE III Model LT2, prepaid tokens for On/Off Capacity on Demand (On/Off CoD) will expire 5 years after the LICCC expiration date.

Future HMC hardware: IBM LinuxONE III is planned to be the last LinuxONE server to offer the ability to order stand-alone Hardware Management Console (HMC) hardware. For future systems, new HMC hardware can be ordered only in the form of the Hardware Management Appliance feature (#0100), which was introduced on IBM LinuxONE III. The Hardware Management Appliance feature provides redundant HMCs and Support Elements (SEs) that reside inside the Central Processor Complex (CPC) frame, and the ability to eliminate stand-alone HMC hardware (tower or rack mounted) outside the CPC frame. Stand-alone HMC hardware (tower or rack mounted) can still be ordered and used with IBM LinuxONE III.

Boot Support from NVMe: In the future, the IBM LinuxONE III Model LT2 server is designed for resiliency across your hybrid multicloud platform. To achieve this goal, the new server supports booting from integrated Non-Volatile Memory Express (NVMe) storage -- without needing external storage.

Reserved space for DS8910F: In the future, IBM plans to test a co-located DS8910F solution that can be utilized in the 16U Reserved space for single phase power LinuxONE III LT2 model. Clients must consider leaving enough room for the reserved space and staying with the single phase power option, if they would like to consider configuring this option and co-locating their storage in the future.

Reserved space for FS9200/FS7200: In the future, IBM plans to test a co-located FS9200/FS7200 plus Fibre Channel switch infrastructure solution that can be utilized in the 8U Reserved Space for the single phase power LinuxONE III LT2 model. Clients must consider leaving enough room for the reserved space and staying with the single phase power option, if they would like to consider configuring this option and co-locating their storage in the future.

Statements by IBM regarding its plans, directions, and intent are subject to change or withdrawal without notice at the sole discretion of IBM. Information regarding potential future products is intended to outline general product direction and 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 IBM products remain at the sole discretion of IBM.

Reference information

For more information about z/VM V7.2, see Software Announcement [120-013](#), dated April 14, 2020.

For more information about IBM z15™, see Hardware Announcement [119-027](#), dated September 12, 2019.

For more information about IBM LinuxONE III, see Hardware Announcement [119-012](#), dated September 12, 2019.

For more information about IBM Wave for z/VM V1.2, see Software Announcement [219-413](#), dated September 12, 2019.

For more information about IBM Data Privacy Passports V1.0, see Software Announcement [219-452](#), dated September 12, 2019.

For more information about the IBM z14^(R) Model ZR1, see Hardware Announcement [118-018](#), dated April 10, 2018.

For more information about the IBM LinuxONE Rockhopper II, see Hardware Announcement [118-019](#), dated April 10, 2018.

Product number

Description	Machine Type	Model	Feature Number
IBM LinuxONE III	8562	LT2	
RFID Tag			0035
Description	Machine Type	Model	Feature Number
IBM LinuxONE III	8562	LT2	
US TAA Compliance Indicator			0983
Description	Machine Type	Model	Feature Number
IBM LinuxONE III	8562	LT2	
MTU 1 - D			0001
MTU 100 -D			0002
MTU 1 -V			0003
MTU 100 -V			0004
GTU 1 - D			0005
GTU 100 - D			0006
GTU 1 -V			0007
GTU 100 -V			0008

Description	Machine Type	Model	Feature Number
GTU 1000 - D			0009
GTU 1000 - V			0010
HW for DPM			0016
Non RSF On/Off CoD			0032
Serv Docs Optional Print			0033
HMC			0062
HMC Rack Mount			0063
TKE Rack Mount			0087
TKE			0088
OEM Generic Indicator			0093
WWPN Persistence			0099
IBM Z HW Mgmt Appliance			0100
Linux Hosting Foundation			0103
Container Hosting Foundation			0104
Secure Execution for Linux			0115
1 CPE Capacity Unit-IFL			0119
100 CPE Capacity Unit-IFL			0120
1 CPE Capacity Unit-SAP			0127
100 CPE Capacity Unit-SAP			0128
Fanout Airflow PCIe			0137
HMC Table Top KMM			0148
HMC Rack Keybd/ Monitor/Mouse			0154
TKE Rack Keybd/ Monitor/Mouse			0156
TKE Table Top KMM			0157
PCIe+ Fanout			0175
Client Must Provide HMC KMM			0188
Client Must Provide TKE KMM			0190
2965 w/o TEIO & w/o HtR			0196
2965 w/o TEIO & w/HtR			0197
2965 w/TEIO & w/ o HtR			0198
2965 w/TEIO & w/ HtR			0199
3907 w/o Ht Reduction			0205
3907 w/Ht Reduction			0206
US English			0235
France			0236
German/Austrian			0237
LA Spanish			0238

Description	Machine Type	Model	Feature Number
Spain			0239
Italian			0240
French Canadian			0241
Portuguese			0242
UK English			0243
Norwegian			0244
Sweden Finland			0245
Netherlands			0246
Belgian French			0247
Denmark			0248
Swiss French/ German			0249
PCIe+ Interconnect Gen3			0421
OSA-Express6S GbE LX			0422
OSA-Express6S GbE SX			0423
OSA-Express6S 10 GbE LR			0424
OSA-Express6S 10 GbE SR			0425
OSA-Express6S 1000BASE-T			0426
FICON Express16S + LX			0427
FICON Express16S + SX			0428
OSA-Express7S 25 GbE SR			0429
10 GbE RoCE Express2.1			0432
FCP Express32S LX			0438
FCP Express32S SX			0439
IBM Adapter for NVMe1.1			0448
25 GbE RoCE Express2.1			0450
Model LT2			0506
200-208V 60/30A 3Ph PDU			0629
380-415V 32A, 3Ph WYE PDU			0630
Ethernet Switch			0631
IBM Virtual Flash Memory			0643
Max4			0649
Max13			0650
Max21			0651
Max31			0652
Max65			0653
CPC PSU			0666
32GB USB Load Media			0843
No Physical Media			0846
32GB USB Backup Media			0848
TKE 9.2 LIC			0881

Description	Machine Type	Model	Feature Number
TKE Smart Card Reader			0891
Crypto Express7S (2 port)			0898
Crypto Express7S (1 port)			0899
TKE addl smart cards			0900
UID Label for DoD			0998
STP Enablement			1021
EMEA Special Operations			1022
64 GB Memory			1500
72 GB Memory			1501
80 GB Memory			1502
88 GB Memory			1503
96 GB Memory			1504
128 GB Memory			1505
160 GB Memory			1506
192 GB Memory			1507
224 GB Memory			1508
256 GB Memory			1509
288 GB Memory			1510
320 GB Memory			1511
352 GB Memory			1512
384 GB Memory			1602
416 GB Memory			1513
448 GB Memory			1604
480 GB Memory			1514
512 GB Memory			1515
576 GB Memory			1516
640 GB Memory			1517
704 GB Memory			1518
768 GB Memory			1519
896 GB Memory			1520
1024 GB Memory			1521
1152 GB Memory			1522
1280 GB Memory			1523
1408 GB Memory			1524
1536 GB Memory			1525
1664 GB Memory			1526
1792 GB Memory			1527
1920 GB Memory			1528
2048 GB Memory			1529
2304 GB Memory			1530
2560 GB Memory			1531
2816 GB Memory			1532
3072 GB Memory			1533
3328 GB Memory			1534
3584 GB Memory			1535
3840 GB Memory			1536
4352 GB Memory			1537
4864 GB Memory			1538
5376 GB Memory			1539
5888 GB Memory			1540
6400 GB Memory			1541

Description	Machine Type	Model	Feature Number
6912 GB Memory			1542
7424 GB Memory			1543
7936 GB Memory			1544
8448 GB Memory			1545
8960 GB Memory			1546
9472 GB Memory			1547
9984 GB Memory			1548
10496 GB Memory			1549
11008 GB Memory			1550
11520 GB Memory			1551
12032 GB Memory			1552
12544 GB Memory			1553
13056 GB Memory			1554
13568 GB Memory			1555
14080 GB Memory			1556
14592 GB Memory			1557
15104 GB Memory			1558
15616 GB Memory			1559
16128 GB Memory			1560
32 GB Mem DIMM (5/feat)			1642
64 GB Mem DIMM (5/feat)			1643
128 GB Mem DIMM (5/feat)			1644
256 GB Mem DIMM (5/feat)			1645
512 GB Mem DIMM (5/feat)			1646
LICCC Ship Via Net Ind			1750
IFL			1945
Unassigned IFL			1948
SAP (optional)			1949
8GB Memory Cap Incr			1981
16GB Memory Cap Incr			1982
128GB Memory Cap Incr			1983
CPC1 Reserve			2271
Lift Tool Kit			3100
Extension Ladder			3101
MSS Sales Flag D			3666
MSS Sales Flag C			3667
CPACF Enablement			3863
PCIe+ I/O Drawer			4021
A Frame Air			4039
CP-A			4800
CP-C			4802
0-Way Processor A00			4826
1-Way Processor C01			4829
A00 Capacity Marker			4983
C01 Capacity Marker			4986

Description	Machine Type	Model	Feature Number
Additional CBU Test			6805
Total CBU Years Ordered			6817
CBU Records Ordered			6818
Single CBU IFL Year			6822
25 CBU IFL Year			6823
Single CBU SAP Year			6830
25 CBU SAP Year			6831
CBU Replenishment			6832
Capacity for Planned Event			6833
OPO Sales Flag			6835
OPO Sales Flag - Alteration			6836
30A/208V 14ft w/ TwistLock			7892
30A/208V 14ft w/ Russelstoll			7893
32A/250V Cord EMEA & AP			7894
32A/250V Cord Aus & NZ			7895
32A/250V Cord Korea			7896
32A/250V LSZH Cord			7897
Top Exit Cabling			7917
Top Exit Cabling w/Top Hat			7898
Bottom Exit Cabling			7919
Bottom Exit Cabling			7919
Top Exit Cabling w/o TopHat			7928
30A/208V 14ft w/ TwistLock			7937
30A/208V 14ft w/ Russelstoll			7938
32A/250V Cord EMEA & AP			7939
32A/250V Cord Aus & NZ			7940
32A/250V Cord Korea			7941
32A/250V LSZH Cord			7943
30A/400V 3Ph Wye w/Hubbell			7946
32A/380-415V 3Ph Wye			7947
32A/380-415V 3Ph Wye LSZH			7948
30A/250V 3Ph w/ Hubbell			7952
30A/250V 3Ph w/ Cut End			7953

Description	Machine Type	Model	Feature Number
FQC Bracket & Mounting Hdw			7960
LC Duplex 6.6ft Harness			7961
Non Raised Floor Support			7998
LC Duplex 8.5ft Harness			7999
19in Earthquake Kit, RF			8010
19in Earthquake Kit, NRF			8011
Multi Order Ship Flag			9000
Multi Order Rec Only Flag NB			9001
Multi Order Rec Only Flag MES			9002
RPO Action Flag			9003
Downgraded PUs Per Request			9004
On Off CoD Act 100 IFL Days			9874
On Off CoD Act 100 SAP Days			9878
On Off CoD Act IFL Days			9888
On Off COD authorization			9896
Perm upgr authorization			9898
CIU Activation (Flag)			9899
On-Line CoD Buying (Flag)			9900
On Off CoD Act. SAP Days			9909
CBU authorization			9910
CPE authorizaiaon			9912
OPO Sales Authorization			9913
1 MSU day			9917
100 MSU days			9918
10000 MSU days			9919
1 IFL day			9920
100 IFL days			9921
1 SAP day			9928
100 SAP days			9929
Height Reduce Ship			9975
Height Reduce for Return			9976
Description	Machine Type	Model	Feature Number
IBM z15	8561	LT1	
Secure Execution for Linux			0115
LC Duplex 8.5ft Harness			7999
Description	Machine Type	Model	Feature Number
IBM z14	3906	LM1	

Description	Machine Type	Model	Feature Number
		LM2	
		LM3	
		LM4	
		LM5	
32GB USB Load Media			0843
IBM z14	3907	LR1	
32GB USB Load Media			0843
LC Duplex 8.5ft Harness			7925

Model conversions

From Machine Type	From Model	To Machine Type	To Model	
8562	LT2	8562	T02	(*)

(*) Parts removed as a result of a model conversion become the property of IBM.

Feature conversions

From M/T	From F/C	To M/T	To F/C	Description
8562	1945	8562	1949	(*) IFL to SAP(opt)
8562	1945	8562	1948	(*) IFL to uIFL
8562	1949	8562	1945	(*) SAP(opt) to IFL
8562	1949	8562	1948	(*) SAP(opt) to uIFL
8562	1948	8562	1945	(*) uIFL to IFL
8562	1948	8562	1949	(*) uIFL to SAP(opt)
8562	0506	8562	0503	(*) LT2 to T02
8562	0649	8562	0650	(*) Max4 to Max13
8562	0649	8562	0651	(*) Max4 to Max21
8562	0649	8562	0652	(*) Max4 to Max31
8562	0649	8562	0653	(*) Max4 to Max65
8562	0650	8562	0651	(*) Max13 to Max21
8562	0650	8562	0652	(*) Max13 to Max31
8562	0650	8562	0653	(*) Max13 to Max65
8562	0651	8562	0652	(*) Max21 to Max31
8562	0651	8562	0653	(*) Max21 to Max65
8562	0652	8562	0653	(*) Max31 to Max65
8562	4826	8562	4829	(*) A00 to C01

From		To	F/C	Description
M/T	F/C	M/T		
8562	4829	8562	4826	(*) C01 to A00
8562	0103	8562	0104	(*) Linux Hst Fndtn to Cont Hst Fndtn

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 IBMid).

[BP Attachment for Announcement Letter 120-014](#)

Publications

The following publications are available now in the "Library" section of Resource Link^(R):

Title	Order Number
IBM 8562 Installation Manual for Physical Planning (IMPP)	GC28-7011
IBM 8562 Installation Manual for Physical Planning (IMPP) -- Russian version	GC28-7008
PR/SM Planning Guide	SB10-7175
IOCP User's Guide for ICP IOCP	SB10-7172
Planning for Fiber Optic Links (FICON ^(R) /FCP, OSA, and zHyperLink Express)	GA23-1408

The following publications are shipped with the product and will be available at planned availability in the "Library" section of Resource Link:

Title	Order Number
IBM 8562 Installation Manual	GC28-7009
IBM 8562 Service Guide	GC28-7010
IBM 8562 Safety Inspection	GC28-7007
Service Guide for TKE Workstations (Version 7.0)	GC28-6980
Systems Safety Notices	G229-9054
IBM Important Notices	G229-9056
IBM Z Statement of Limited Warranty	GC28-6979
License Agreement for Machine Code	SC28-6872
License Agreement for Machine Code Addendum for Cryptography	GC27-2635
Systems Environmental Notices and User Guide	Z125-5823

The following publications will be available at planned availability in the "Library" section of Resource Link:

Title	Order Number
IBM 8562 Parts Catalog	GC28-7012
Service Guide for 2461 Hardware Management Console	GC28-6990
Service Guide for 2461 Support Element	GC28-6991
SNMP Application Programming Interfaces	SB10-7171
Capacity on Demand User's Guide	SC28-6985
CHPID Mapping Tool User's Guide	GC28-6984

Title	Order Number
Hardware Management Console Web Services API (V2.15.0)	SC27-2638
IBM Dynamic Partition Manager (DPM) Guide	SB10-7176
Secure Service Container User's Guide	SC28-7005
Stand-Alone IOCP User's Guide	SB10-7173
FICON CTC Reference	SB10-7174
Maintenance Information for Fiber Optics (FICON/FCP, OSA, and zHyperLink Express)	SY27-7696
Integrating the HMC's Broadband RSF into your Enterprise	SC28-6986
Hardware Management Console Security	SC28-6987
SCSI IPL -- Machine Loader Messages	SC28-7006
OSA-Express Customer's Guide and Reference	SA22-7935
OSA/SF on the Hardware Management Console	SC14-7580
OSA Integrated Console Controller User's Guide	SC27-9003

Resource Link: Publications for IBM Z can be obtained at the [Resource Link](#) website.

Using the instructions on the Resource Link panels, obtain a user ID and password. Resource Link has been designed for easy access and navigation.

HMC and SE console documentation

At planned availability, the Hardware Management Console (HMC) and Support Element (SE) console documentation (Version 2.15.0) will be available from IBM Resource Link and the consoles.

You can also find HMC videos at the [IBM Z Hardware Management Console Videos](#) website.

To access the IBM Publications Center Portal, go to the IBM Publications Center website.

The following publications are available. To order, contact your IBM representative.

Title	Order Number
Technical Introduction	SG24-8850-01
IBM Z Functional Matrix	REDP-5157-05

To download these Redbooks^(R) publications, go to the [IBM Z Redbooks](#) website.

For other IBM Redbooks publications, go to the main [IBM Redbooks](#) website.

The IBM Knowledge Center provides you with a single point of reference where you can access product documentation for IBM operating systems and server software. Through a consistent framework, you can efficiently find information and personalize your access by going to [IBM Knowledge Center](#) for all your product information needs.

To access the IBM Publications Center Portal, go to the IBM Publications Center website.

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided. A large number of publications are available online in various file formats, which can currently be downloaded.

Services

IBM Systems Lab Services

IBM Systems Lab Services offers a wide array of services available for your enterprise. It brings expertise on the latest technologies from the IBM development community and can help with your most difficult technical challenges.

IBM Systems Lab Services exists to help you successfully implement emerging technologies so as to accelerate your return on investment and improve your satisfaction with your IBM systems and solutions. Services examples include initial implementation, integration, migration, and skills transfer on IBM systems solution capabilities and recommended practices. IBM Systems Lab Services is one of the service organizations of IBM's world-renowned IBM Systems Group development labs.

For details on available services, contact your IBM representative or go to the [Lab Services](#) website.

Global Technology Services

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure to be an on-demand business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or go to the [IBM Global Technology Services^{\(R\)}](#) website.

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or go to the [Resiliency Services](#) website.

Details on education offerings related to specific products can be found on the IBM authorized training website.

Technical information

Specified operating environment

Physical specifications

The physical specifications for IBM LinuxONE III Model LT2 are now available in the "Library" section of Resource Link in the *Installation Manual for Physical Planning* (IMPP).

This information can be obtained at [Resource Link](#).

Using the instructions on the Resource Link panels, obtain a user ID and password.

Resource Link has been designed for easy access and navigation.

Operating environment

The operating environment information for IBM LinuxONE III Model LT2 is now available in the "Library" section of Resource Link in the *Installation Manual for Physical Planning* (IMPP).

This information can be obtained at [Resource Link](#).

Using the instructions on the Resource Link panels, obtain a user ID and password.

Resource Link has been designed for easy access and navigation.

Hardware requirements

The hardware requirements for the IBM Z servers, features, and functions are identified. A new driver level is required.

HMC (V2.15.0) plus MCLs and the Support Element (V2.15.0) became available on May 15, 2020. You should review the PSP buckets for minimum Machine Change Levels (MCLs) and software PTF levels before IPLing operating systems.

The new functions available on the Hardware Management Console (HMC) version 2.15.0, as described, apply exclusively to IBM z15 and IBM LinuxONE III. However, the HMC version 2.15.0 will also support the systems listed in the table below.

Machine Family	Machine Type	Firmware Driver	SE Version
z14 and Emperor II	3906	36	2.14.1
z14 and Emperor II	3906	32	2.14.0
z14 ZR1 and Rockhopper II	3907	36	2.14.1
z14 ZR1 and Rockhopper II	3907	32	2.14.0
z13 ^(R) and Emperor	2964	27	2.13.1
z13s ^(R) and Rockhopper	2965	27	2.13.1

Software requirements

IBM LinuxONE III Model LT2 requires at a minimum:

- z/VM 7.2.
- z/VM V7.1 with PTFs.
- z/VM V6.4 with PTFs.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SUSE Linux Enterprise Server (SLES) 15 SP1 with service and SLES 12 SP4 with service.
 - Red Hat Enterprise Linux (RHEL) 8.0 with service, RHEL 7.7 with service, and RHEL 6.10 with service.
 - Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.
 - The support statements for LinuxONE III LT2 also cover the KVM hypervisor on distribution levels that have KVM support.

For minimum required and recommended distribution levels refer to the [IBM Z](#) website.

The following software requirements are listed for features and capabilities supported on LinuxONE III LT2:

FICON Express16S+ (CHPID type FC) when utilizing FICON or Channel-To-Channel (CTC) requires at a minimum:

- z/VM V7.2.
- z/VM V7.1.
- z/VM V6.4.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:

- SLES 15 SP1 with service and SLES 12 SP4 with service.
- RHEL 8.0 with service, RHEL 7.7 with service, and RHEL 6.10 with service.
- Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.

FICON Express16S+ (CHPID type FC) for support of zHPF single-track operations requires at a minimum:

- z/VM V7.2.
- z/VM V7.1.
- z/VM V6.4.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service and SLES 12 SP4.
 - RHEL 8.0 with service, RHEL 7.7 with service, and RHEL 6.10 with service.
 - Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.

Note: For minimum required and recommended distribution levels refer to the [IBM Z](#) website.

FICON Express16S+ (CHPID type FC) for support of zHPF multitrack operations requires at a minimum:

- z/VM V7.2.
- z/VM V7.1.
- z/VM V6.4.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service and SLES 12 SP4.
 - RHEL 8.0 with service, RHEL 7.7 with service, and RHEL 6.10 with service.
 - Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.

FICON Express16S+ (CHPID type FCP) for support of SCSI devices requires at a minimum:

- z/VM V7.2.
- z/VM V7.1.
- z/VM V6.4.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service and SLES 12 SP4.
 - RHEL 8.0 with service, RHEL 7.7 with service, and RHEL 6.10 with service.
 - Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.

FICON Express16S+ (CHPID type FCP) support of hardware data router requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 for guest exploitation.
- z/VM V6.4 for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service and SLES 12 SP4.
 - RHEL 8.0 with service, RHEL 7.7 with service, and RHEL 6.10 with service.
 - Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.

T10-DIF support by the FICON Express16S+ features when defined as CHPID type FCP requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 for guest exploitation.
- z/VM V6.4 for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2
 - SLES 15 SP1 with service and SLES 12 SP4.
 - RHEL 8.0 with service, RHEL 7.7 with service, and RHEL 6.10 with service.
 - Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.

OSA-Express 7S 25 GbE SR (#0429) requires at a minimum:

CHPID type OSD:

- z/VM V7.2.
- z/VM V7.1 with PTFs.
- z/VM V6.4 with PTFs.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service and SLES 12 SP4.
 - RHEL 8.0 with service, RHEL 7.7 with service, and RHEL 6.10 with service.
 - Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.

Checksum offload for IPv6 packets (CHPID type OSD):

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 for guest exploitation.
- z/VM V6.4 for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service.
 - RHEL 8.0 with service.
 - Ubuntu 18.04.1 LTS with service.

Checksum offload for LPAR-to-LPAR traffic for IPv4 and IPv6 packets (CHPID type OSD):

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 for guest exploitation.
- z/VM V6.4 for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service.
 - RHEL 8.0 with service.
 - Ubuntu 18.04.1 LTS with service.

Large Send for IPv6 packets (CHPID type OSD):

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 for guest exploitation.
- z/VM V6.4 for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:

- SLES 15 SP1 with service.
- RHEL 8.0 with service.
- Ubuntu 18.04.1 LTS with service.

CHPID type OSE supporting 4 or 2 ports per feature:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 for guest exploitation.
- z/VM V6.4 for guest exploitation.

Crypto Express7S (2 port) (#0898) toleration, which treats Crypto Express7S cryptographic coprocessors and accelerators as Crypto Express6 coprocessors and accelerators, requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 with PTFs for guest exploitation.
- z/VM V6.4 with PTFs for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service and SLES 12 SP4.
 - RHEL 8.0 with service, RHEL 7.7 with service, and RHEL 6.10 with service.
 - Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.

Crypto Express7S (1 port) (#0899) toleration requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 with PTFs for guest exploitation.
- z/VM V6.4 with PTFs for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service and SLES 12 SP4.
 - RHEL 8.0 with service, RHEL 7.7 with service, and RHEL 6.10 with service.
 - Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.

Crypto Express7S (1 port) (#0899) support of VISA Format Preserving Encryption requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 with PTFs for guest exploitation.
- z/VM V6.4 with PTFs for guest exploitation.

Crypto Express7S (1 port) (#0899) exploitation requires at a minimum:

- z/VM V7.2 for guest exploitation and exploitation within the z/VM TLS/SSL server.
- z/VM V7.1 with PTFs for guest exploitation and exploitation within the z/VM TLS/SSL server.
- z/VM V6.4 with PTFs for guest exploitation and exploitation within the z/VM TLS/SSL server.
- Linux on IBM Z-IBM is working with its Linux distribution partners to provide support in future distribution releases.

Crypto Express7S (1 port) (#0899) support of PCI-HSM compliance requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 with PTFs for guest exploitation.

- z/VM V6.4 with PTFs for guest exploitation.

10 GbE RoCE Express2.1 (#0432) for Shared Memory Communications - Remote Direct Memory Access (SMC-R) requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 with PTFs for guest exploitation.
- z/VM V6.4 with PTFs for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service.
 - RHEL 8.0 with service.
 - Ubuntu 18.04.5 LTS with service.

10 GbE RoCE Express2.1 (#0432) for Ethernet communications (which does not require a peer OSA) including Single Root I/O Virtualization (SR-IOV) requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 with PTFs for guest exploitation.
- z/VM V6.4 with PTFs for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service.
 - RHEL 8.0 with service.
 - Ubuntu 18.04.1 LTS with service.

10 GbE RoCE Express2.1 (#0432) for TCP/IP requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 with PTFs for guest exploitation.
- z/VM V6.4 with PTFs for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service and SLES 12 SP4 with service.
 - RHEL 8.0 with service and RHEL 7.7 with service.
 - Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.

25 GbE RoCE Express2.1 (#0450) for Shared Memory Communications - Remote Direct Memory Access (SMC-R) requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 with PTFs for guest exploitation.
- z/VM V6.4 with PTFs for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service.
 - RHEL 8.0 with service.
 - Ubuntu 18.04.1 LTS with service.

25 GbE RoCE Express2.1 (#0450) for Ethernet communications (which does not require a peer OSA) including Single Root I/O Virtualization (SR-IOV) requires at a minimum:

- z/VM V7.2 for guest exploitation.

- z/VM V7.1 with PTFs for guest exploitation.
- z/VM V6.4 with PTFs for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service.
 - RHEL 8.0 with service.
 - Ubuntu 18.04.1 LTS with service.

25 GbE RoCE Express2.1 (#0450) for TCP/IP requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 with PTFs for guest exploitation.
- z/VM V6.4 with PTFs for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on LinuxONE III LT2:
 - SLES 15 SP1 with service and SLES 12 SP4 with service.
 - RHEL 8.0 with service and RHEL 7.7 with service.
 - Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.

Lattice-based Cryptography support requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 with PTFs for guest exploitation.
- z/VM V6.4 with PTFs for guest exploitation.

Greater than 16 CEX adapters requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 with PTFs for guest exploitation.
- z/VM V6.4 with PTFs for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on IBM LinuxONE III:
 - SUSE Linux Enterprise Server (SLES) 15 SP1 with service and SLES 12 SP4 with service.
 - Red Hat Enterprise Linux (RHEL) 8.0 with service, RHEL 7.7 with service, and RHEL 6.10 with service.
 - Ubuntu 18.04.1 LTS with service and Ubuntu 16.04.6 LTS with service.

Integrated Accelerator for z Enterprise Data Compression requires at a minimum:

- z/VM V7.2 for guest exploitation.
- z/VM V7.1 with PTFs for guest exploitation.
- z/VM V6.4 with PTFs for guest exploitation.
- Linux on IBM Z-IBM supports running the following Linux on IBM Z distributions on IBM LinuxONE III:
 - SLES 12 SP5 with service.

Secure Execution for Linux requires support in the KVM host and the KVM guest, at a minimum:

- IBM supports running the following Linux on IBM Z distributions as a KVM guest on LinuxONE III LT2:
 - SLES 12 SP5.
 - RHEL 7.8.

- RHEL 8.1.
- IBM is working with its Linux distribution partners to provide support in future distribution releases.
- IBM supports running the following Linux on IBM Z distributions as a KVM host on LinuxONE III LT2:
 - IBM is working with its Linux distribution partners to provide support in future distribution releases.

Planning information

Client responsibilities

Information on customer responsibilities for site preparation can be found in the "Library" section of Resource Link.

Cable orders

Not applicable.

Installability

The average installation time for an IBM LinuxONE III Model LT2 is approximately 22 installer hours. This does not include planning hours. This assumes a full System Assurance Product Review, and implementation of the cable services have been performed. See your IBM representative for details on these services.

Security, auditability, and control

The IBM LinuxONE III Model LT2 uses the security and auditability features and functions of host hardware, host software, and application software.

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

IBM Systems Lab Services

For details on available services, contact your IBM representative or go to the [Lab Services](#) website.

Terms and conditions

IBM Global Financing

Yes.

Products - terms and conditions

Warranty period

One year.

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM. An IBM part or feature installed during the initial installation of an IBM machine is subject to the full warranty period specified by IBM. An IBM part or feature that replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature are the same as those for the machine in which it is installed.

Warranty service

The specified level of maintenance service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country- and location-specific information. IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose. The following service is available as warranty for your machine type.

- 24 hours per day, 7 days a week, same day response

International Warranty Service

International Warranty Service allows you to relocate any machine that is eligible for International Warranty Service and receive continued warranty service in any country where the IBM machine is serviced. If you move your machine to a different country, you are required to report the machine information to your Business Partner or IBM representative.

The warranty service type and the service level provided in the servicing country may be different from that provided in the country in which the machine was purchased. Warranty service will be provided with the prevailing warranty service type and service level available for the eligible machine type in the servicing country, and the warranty period observed will be that of the country in which the machine was purchased.

The following types of information can be found on the [International Warranty Service](#) website:

- Machine warranty entitlement and eligibility
- Directory of contacts by country with technical support contact information
- Announcement Letters

Warranty service upgrades

The specified level of maintenance service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country- and location-specific information. IBM On-site Service: IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

The following service is provided.

- 24 hours per day, 7 days a week, same day response.

Usage plan machine

No.

IBM hourly service rate classification

Three.

When a type of service involves the exchange of a machine part, the replacement may not be new, but will be in good working order.

General terms and conditions

Field-installable features

Yes.

Model conversions

Yes.

Machine installation

Installation is performed by IBM. IBM will install the machine in accordance with the IBM installation procedures for the machine.

In the United States, contact IBM at 1-800-IBM-SERV (426-7378). In other countries contact the local IBM office.

Graduated program license charges apply

No.

Licensed Internal Code

IBM Licensed Internal Code (LIC) is licensed for use by a customer on a specific machine, designated by serial number, under the terms and conditions of the IBM License Agreement for Machine Code, to enable a specific machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement by contacting your IBM representative or visiting the [License Agreement for Machine Code and Licensed Internal Code](#) website.

Specific Machine Type Model:

- 8562-LT2

Licensed Machine Code

Not applicable.

Other Installed Licensed Code

None.

Educational allowance

Not applicable.

Prices

For additional information and current prices, contact your local IBM representative or IBM Business Partner.

Product charges

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
IBM LinuxONE III	8562	LT2					
RFID Tag			0035	**			Both
Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
IBM LinuxONE III	8562	LT2					
US TAA			0983	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
Compl Ind							
Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
IBM LinuxONE III	8562	LT2		**		X	Both
MTU 1 - D			0001	**			Both
MTU 100 -D			0002	**			Both
MTU 1 -V			0003	**			Both
MTU 100 -V			0004	**			Both
GTU 1 - D			0005	**			Both
GTU 100 - D			0006	**			Both
GTU 1 -V			0007	**			Both
GTU 100 -V			0008	**			Both
GTU 1000 - D			0009	**			Both
GTU 1000 - V			0010	**			Both
HW for DPM			0016	**			Both
Non RSF On/Off CoD			0032	**			Both
Serv Docs Optional Print			0033	**			Both
HMC			0062	**			Both
HMC Rack Mount			0063	**			Both
TKE Rack Mount			0087	**			Both
TKE			0088	**			Both
OEM Generic Indicator			0093	**			Both
WWPN Persist			0099	**			Both
IBM Z HW Mgmt Appliance			0100	**			Both
Linux Hosting Found			0103	**			Both
Container Hosting Found			0104	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
Secure Execution for Linux			0115	**			Both
1 CPE Capacity Unit-IFL			0119	**			Both
100 CPE Capacity Unit-IFL			0120	**			Both
1 CPE Capacity Unit-SAP			0127	**			Both
100 CPE Capacity Unit-SAP			0128	**			Both
Fanout Airflow PCIe			0137	**			Both
HMC Table Top KMM			0148	**			Both
HMC Rack Keybd/Monitor/Mouse			0154	**			Both
TKE Rack Keybd/Monitor/Mouse			0156	**			Both
TKE Table Top KMM			0157	**			Both
PCIe+ Fanout			0175	**			Both
Client Must Provide HMC KMM			0188	**			Both
Client Must Provide TKE KMM			0190	**			Both
2965 w/o TEIO & w/o HtR			0196	**			Both
2965 w/o TEIO & w/HtR			0197	**			Both
2965 w/			0198	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
TEIO & w/o HtR							
2965 w/ TEIO & w/HtR			0199	**			Both
3907 w/o Ht Reduc			0205	**			Both
3907 w/ Ht Reduc			0206	**			Both
US English			0235	**			Both
France			0236	**			Both
German/Austrian			0237	**			Both
LA Spanish			0238	**			Both
Spain			0239	**			Both
Italian			0240	**			Both
French Canadian			0241	**			Both
Portug			0242	**			Both
UK English			0243	**			Both
Norweg			0244	**			Both
Sweden Finland			0245	**			Both
Netherl			0246	**			Both
Belgian French			0247	**			Both
Denmark			0248	**			Both
Swiss French/German			0249	**			Both
PCIe Inter connect ^(R) Gen4			0421	**			Both
OSA-Express 6S GbE LX			0422	**			Both
OSA-Express 6S GbE SX			0423	**			Both
OSA-Express 6S 10 GbE LR			0424	**			Both
OSA-Express 6S 10 GbE SR			0425	**			Both
OSA-Express 6S			0426	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
1000 BASE- T							
FICON Express 16S+ LX			0427	**			Both
FICON Express 16S+ SX			0428	**			Both
OSA- Express 7S 25 GbE SR			0429	**			Both
10 GbE RoCE Express 2.1			0432	**			Both
FCP Express3 2S LX			0438	**			Both
FCP Express 32S SX			0439	**			Both
IBM Adapter for NVMe 1.1			0448	**			Both
25 GbE RoCE Express 2.1			0450	**			Both
Model LT2			0506	**		X	Both
200-208 V 60/30 A 3Ph PDU			0629	**			Both
380-415 V 32 A, 3Ph WYE PDU			0630	**			Both
Ethernet Switch			0631	**			Both
IBM Virtual Flash Memory			0643	**			Both
Max4			0649	**		X	Both
Max13			0650	**		X	Both
Max21			0651	**		X	Both
Max31			0652	**		X	Both
Max65			0653	**		X	Both
CPC PSU			0666	**			Both
32GB USB			0843	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
Load Media							
No Physical Media			0846	**			Both
32GB USB Backup Media			0848	**			Both
TKE 9.2 LIC			0881	**			Both
TKE Smart Card Reader			0891	**			Both
Crypto Express 7S (2 port)			0898	**			Both
Crypto Express 7S (1 port)			0899	**			Both
TKE addl smart cards			0900	**			Both
UID Label for DoD			0998	**			Both
STP Enabl			1021	**			Both
EMEA Special Op			1022	**			Both
64 GB Memory			1500	**			Both
72 GB Memory			1501	**			Both
80 GB Memory			1502	**			Both
88 GB Memory			1503	**			Both
96 GB Memory			1504	**			Both
128 GB Memory			1505	**			Both
160 GB Memory			1506	**			Both
192 GB Memory			1507	**			Both
224 GB Memory			1508	**			Both
256 GB Memory			1509	**			Both
288 GB Memory			1510	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
320 GB Memory			1511	**			Both
352 GB Memory			1512	**			Both
384 GB Memory			1602	**			Both
416 GB Memory			1513	**			Both
448 GB Memory			1604	**			Both
480 GB Memory			1514	**			Both
512 GB Memory			1515	**			Both
576 GB Memory			1516	**			Both
640 GB Memory			1517	**			Both
704 GB Memory			1518	**			Both
768 GB Memory			1519	**			Both
896 GB Memory			1520	**			Both
1024 GB Memory			1521	**			Both
1152 GB Memory			1522	**			Both
1280 GB Memory			1523	**			Both
1408 GB Memory			1524	**			Both
1536 GB Memory			1525	**			Both
1664 GB Memory			1526	**			Both
1792 GB Memory			1527	**			Both
1920 GB Memory			1528	**			Both
2048 GB Memory			1529	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
2304 GB Memory			1530	**			Both
2560 GB Memory			1531	**			Both
2816 GB Memory			1532	**			Both
3072 GB Memory			1533	**			Both
3328 GB Memory			1534	**			Both
3584 GB Memory			1535	**			Both
3840 GB Memory			1536	**			Both
4352 GB Memory			1537	**			Both
4864 GB Memory			1538	**			Both
5376 GB Memory			1539	**			Both
5888 GB Memory			1540	**			Both
6400 GB Memory			1541	**			Both
6912 GB Memory			1542	**			Both
7424 GB Memory			1543	**			Both
7936 GB Memory			1544	**			Both
8448 GB Memory			1545	**			Both
8960 GB Memory			1546	**			Both
9472 GB Memory			1547	**			Both
9984 GB Memory			1548	**			Both
10496 GB Memory			1549	**			Both
11008 GB Memory			1550	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
11520 GB Memory			1551	**			Both
12032 GB Memory			1552	**			Both
12544 GB Memory			1553	**			Both
13056 GB Memory			1554	**			Both
13568 GB Memory			1555	**			Both
14080 GB Memory			1556	**			Both
14592 GB Memory			1557	**			Both
15104 GB Memory			1558	**			Both
15616 GB Memory			1559	**			Both
16128 GB Memory			1560	**			Both
32 GB Mem DIMM (5/ feat)			1642	**			Both
64 GB Mem DIMM (5/ feat)			1643	**			Both
128 GB Mem DIMM (5/ feat)			1644	**			Both
256 GB Mem DIMM (5/ feat)			1645	**			Both
512 GB Mem DIMM (5/ feat)			1646	**			Both
LICCC Ship Via Net Ind			1750	**			Both
IFL			1945	**		X	Both
Unass IFL			1948	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
SAP (opt)			1949	**			Both
8GB Memory Cap Incr			1981	**			Both
16GB Memory Cap Incr			1982	**			Both
128GB Memory Cap Incr			1983	**			Both
CPC1 Reserve			2271	**			Both
Lift Tool Kit			3100	**			Both
Extension Ladder			3101	**			Both
MSS Sales Flag D			3666	**			Both
MSS Sales Flag C			3667	**			Both
CPACF Enabl			3863	**			Both
PCIe + I/O Drawer			4021	**			Both
A Frame Air			4039	**			Both
CP-A			4800	**			Both
CP-C			4802	**		X	Both
0-Way Processor A00			4826	**		X	Both
1-Way Processor C01			4829	**		X	Both
A00 Capacity Marker			4983	**			Both
C01 Capacity Marker			4986	**			Both
Add CBU Test			6805	**			Both
Total CBU Years Ordered			6817	**			Both
CBU Records Ordered			6818	**			Both
Single CBU IFL Year			6822	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
25 CBU IFL Year			6823	**			Both
Single CBU SAP Year			6830	**			Both
25 CBU SAP Year			6831	**			Both
CBU Replen			6832	**			Both
Capacity for Planned Event			6833	**			Both
OPO Sales Flag			6835	**			Both
OPO Sales Flag - Alteration			6836	**			BOTH
30A/208 V 14ft w/ Twist Lock			7892	**			Both
30A/208 V 14ft w/ Russel stoll			7893	**			Both
32A/250 V Cord EMEA & AP			7894	**			Both
32A/250 V Cord Aus & NZ			7895	**			Both
32A/250 V Cord Korea			7896	**			Both
32A/250 V LSZH Cord			7897	**			Both
Top Exit Cabling			7917	**			Both
Top Exit Cabling w/Top Hat			7898	**			Both
Bottom Exit Cabling			7919	**			Both
Bottom Exit Cabling			7919	**			Both
Top Exit			7928	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
Cabling w/o TopHat							
30A/208 V 14ft w/ Twist Lock			7937	**			Both
30A/208 V 14ft w/ Russel stoll			7938	**			Both
32A/250 V Cord EMEA & AP			7939	**			Both
32A/250 V Cord Aus & NZ			7940	**			Both
32A/250 V Cord Korea			7941	**			Both
32A/250 V LSZH Cord			7943	**			Both
30A/400 V 3Ph Wye w/ Hubbell			7946	**			Both
32 A/380-415 V 3Ph Wye			7947	**			Both
32 A/380-415 V 3Ph Wye LSZH			7948	**			Both
30 A/250 V 3Ph w/ Hubbell			7952	**			Both
30A/250 V 3Ph w/ Cut End			7953	**			Both
FQC Bracket & Mounting Hdw			7960	**			Both
LC Duplex 6.6ft Harness			7961	**			Both
Non Raised Floor Support			7998	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/ MES
LC Duplex 8.5ft Harness			7999	**			Both
19in Earthq Kit, RF			8010	**			Both
19in Earthq Kit, NRF			8011	**			Both
Multi Order Ship Flag			9000	**			Both
Multi Order Rec Only Flag NB			9001	**			Both
Multi Order Rec Only Flag MES			9002	**			Both
RPO Action Flag			9003	**			Both
Downgr PUs Per Request			9004	**			Both
On Off CoD Act 100 IFL Days			9874	**			Both
On Off CoD Act 100 SAP Days			9878	**			Both
On Off CoD Act IFL Days			9888	**			Both
On Off COD author			9896	**			Both
Perm upgr author			9898	**			Both
CIU Activa (Flag)			9899	**			Both
On-Line CoD Buying (Flag)			9900	**			Both
On Off CoD			9909	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
Act. SAP Days							
CBU author			9910	**			Both
CPE author			9912	**			Both
OPO Sales Author			9913	**			Both
1 MSU day			9917	**			Both
100 MSU days			9918	**			Both
10000 MSU days			9919	**			Both
1 IFL day			9920	**			Both
100 IFL days			9921	**			Both
1 SAP day			9928	**			Both
100 SAP days			9929	**			Both
Height Reduce Ship			9975	**			Both
Height Reduce for Return			9976	**			Both

Desc	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
IBM z15	8561	LT1					
Secure Execution for Linux			0115	**			Both
LC Duplex 8.5ft Harness			7999	**			Both

Descr	Mach Type	Model	Feat Num	**	EWFe	MMMC Ind	INIT/MES
IBM z14	3906	LM1					
		LM2					
		LM3					
		LM4					
		LM5					
32GB USB Load Media			0843	**			Both
IBM z14	3907	LR1					
32GB USB Load Media			0843	**			Both

Descr	Mach Type	Model	Feat Num		
LC Duplex 8.5ft Harness			7925	**	Both

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Model conversion purchase price

From Machine Type	From Model	To Machine Type	To Model	Returned Parts	Continuous Maintenance
8562	LT2	8562	T02	Y	Y

Feature conversion purchase price

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Corrections

(Corrected on May 13, 2020)

The "Description" section was revised.