IBM z15 (z15) Model T02

Businesses of all sizes are transforming for digital and shifting to cloud. As they continue this journey, they need to move critical workloads to the cloud and integrate core operations with engagement systems. This creates new challenges, such as protecting data as it flows around the cloud data center, securing critical workloads from internal and external threats, and ensuring services are always available.

IBM Z servers are designed to help enable cloud native development and deployment, achieve encryption everywhere, and provide cyber resiliency to ensure isolation of workloads at scale to protect from threats while ensuring continuous availability of services. These capabilities help provide the cloud you want, with the privacy and security you need. The IBM z15 Model T02 is the newest entry model into the IBM Z family of servers. It delivers an air-cooled, single frame, efficient design, with a low entry cost, that can easily coexist with other platforms in a cloud data center.

Air-cooled, single frame design

The z15 T02 delivers an agile 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 applications, with no special skills required. The z15 T02 can protect data and simplify compliance with its highly resilient, secure platform.

The z15 T02 is housed in a single 19-inch frame, designed with redundant power, cooling, and line cords. It also has the option of single or three phase power to accommodate data center requirements. These factors can help reduce power costs, reduce footprint cost, and install in virtually any existing data center helping facility standardization.

Highlights

- Optimization of cost, density, and flexibility all within a 19" frame

- Designed for integration with IBM storage for a complete cloud solution

- Encryption everywhere, wherever it resides in your ecosystem

- Simplify development with open standard tools

- Reduce the impact of downtime with instant recovery

- Aligns with z/OS and Linux on IBM Z co-located workloads

If you are utilizing single-phase power and two or fewer PCIe+ drawers, there is an option to hold 16U Reserved Space (#0151) in the z15 T02 rack. This 16U of space in the frame can be populated by you with IBM DS8910F Model 993 storage in order to reduce the physical footprint in the data center. When the 16U Reserved Space feature is ordered, the z15 T02 order will provide additional power ports in redundant power distribution units (PDUs), along with weight ballast and air flow fillers as appropriate. Note that IBM would first complete installation of the z15 T02 and turn it over to your operation, and then the storage can be added if the 16U Reserved Space (#0151) has been ordered. This new hardware configuration flexibility feature is perfect if you want to fit into smaller I/O configurations and need the additional ease of a single-footprint approach. Note: Please be sure to review the Exception Letter on Resource Link to understand when this offering has completed its compliance certification in your geography. Note: Review the z15 T02 and LinuxONE III LT2 Exception Letter on Resource Link to understand when this offering has completed its compliance certification in your geography. Failure to do so may result in a non-compliant machine configuration.

Differentiated value at the core

The z15 T02 twelve core processor chip leverages the density and efficiency of 14 nm silicon-on-insulator technology to deliver a new 98 Processor Capacity Index (PCI) entry point and 156 capacity options available for a wide range of workloads. The IBM z15 T02 is available with five feature-based sizing options – Max4, Max13, Max21, Max31, and Max65. The z15 T02 design incorporates two Central Processor Complex (CPC) drawers for the Max65, which enhances availability by allowing Concurrent Drawer Repair (CDR), a feature previously not available on single frame servers. CDR allows a single CPC drawer in a multi-drawer server, if there is sufficient memory installed, to be removed, serviced and reinstalled without bringing the system down.

The system offers up to 16 TB of Redundant Array of Independent Memory (RAIM). IBM Virtual Flash Memory (VFM) is now located in the RAIM and provides high levels of availability and performance. VFM can help reduce latency for critical paging that might otherwise impact the availability and performance of key workloads. A new optional Hardware Management Appliance can be ordered with the IBM z15 to provide Hardware Management Console and Support Element functions, redundantly packaged within the 19" frame. Access is via a remote browser and the appliance eliminates the need for a separate console outside of the server.

The IBM z15 T02 integrates new file compression capabilities with an on-chip compression coprocessor. The Integrated Accelerator for zEDC can reduce data storage and communications requirements and costs, as well as increase data transfer rates to boost throughput, without adversely impacting response times. The Integrated Accelerator for zEDC replaces the IBM zEnterprise Data Compress (zEDC) Express adapter on earlier Z servers. Best of all, combined with pervasive encryption principles, you have the processing capacity and the confidence to compress and encrypt everything.

The Integrated Accelerator for Z Sort, standard on IBM z15, can help optimize elapsed time for eligible sort workloads, which typically occur during client batch windows. By providing one sort accelerator per core, it can help accelerate frequently used functions to speed up sorting, shorten batch windows, and improve select database functions, such as reorganization. A new SORTL instruction, exploited by DFSort and the Db2 for z/OS Utilities Suite, leverages the new IBM Integrated Accelerator for Z Sort to help reduce CPU usage and can help improve elapsed time for eligible sort workloads.

IBM z15 T02

Cloud native development

IBM z15 T02 is the ideal platform for building new cloud-native apps and modernizing existing applications to interface with cloud services through APIs, integrated container services and a new elastic software consumption pricing approach. All the latest cloud application development tools, languages and processes are supported in a cloud-native mode on IBM Z to better enable developers.

Linux on IBM Z benefits from z15 T02 technology advantages transparently, providing a great infrastructure to meet demands in the hybrid cloud world. Linux workloads can easily integrate with other existing workloads on the z15 T02, such as IBM z/OS, IBM z/VSE, or IBM z/TPF, to deliver better value to the business. Co-locating workloads on z15 T02 can benefit from great performance and operational efficiency.

IBM's new Cloud Paks, along with Red Hat OpenShift, will assist in modernization and automation to develop, deploy, and manage cloud-native applications. Red Hat OpenShift is an enterprise containers and Kubernetes platform that provides a common environment for cloud-native workloads. IBM Cloud Paks are complete solutions that provide a common, consistent and integrated environment for cloud-native workloads. IBM Cloud Paks run on top of Red Hat's OpenShift container platform. In addition, the recently introduced IBM Hyper Protect Virtual Servers are the first customer-managed, IBM Z and architecture-based virtual servers offered for use in hybrid clouds.

The new IBM Cloud Infrastructure Center delivers industry-standard user experience to define and manage the lifecycle of virtual infrastructure. IBM announced the availability of Red Hat Ansible Certified Content for IBM Z. which allows you to automate z/OS applications and IT infrastructure as part of your enterprise automation strategy. In addition, the recently introduced IBM Hyper Protect Virtual Servers are the first client-managed, IBM Z and architecture-based virtual servers offered for use in hybrid clouds.

Transforming with agility

IBM Z can help transform your mission-critical applications for multicloud environments, using DevOps principles across the entire application development cycle, without sacrificing stability, security, or agility. Achieving these enterprise shifts requires a secure and stable technology infrastructure that performs consistently, and seamlessly integrates workloads across organization—even as enterprise assets grow.

DevOps for IBM Z on the IBM z15 T02 provides a cohesive, cost effective toolset to help maintain and modernize valuable applications on Z and hybrid cloud platforms. DevOps is the practice organizations are adopting because it defines the speed, security, and availability that customers and developers demand in today's hybrid cloud economy.

Multiple client case studies have shown the IBM Application Delivery Foundation for z/OS solution can help improve developer productivity by over 15 percent.[1] It accomplishes this result by providing an integrated set of tools to create and maintain applications for z/OS environments.

Increasing the current test capacity in the IBM z/OS environment without increasing MLC costs is achievable using the IBM Application Development and Test Solution with one of the Tailored Fit Pricing for IBM Z pricing containers. This provides the advantage of discounted DevOps tools packages and removes any cost barriers to ongoing integration and delivery.

With IBM Z open and integrated tooling, developers can work in mainframe and distributed environments with the same tools and processes using modern interfaces like the Zowe open source framework. The resulting end-to-end, cross-platform delivery pipeline solution

integrates with a variety of open source and third-party tools, such as Git, Jira, Jenkins and SonarQube. This integration allows blending open source and enterprise tooling together on the security-rich IBM Z platform with a pipeline that's right for the enterprise and its unique needs.

IBM compilers and runtimes exploit the latest IBM z15 T02 architecture to deliver optimized performance, improved resource usage and capabilities for your business applications. Boost productivity by leveraging the latest language features, compiler innovations, and modern frameworks. Streamline your development experience with cross-platform development and integration. Modernize with newer languages like Java, Node.js and Swift for today's cloud and API enabled world.

IBM z/OS Container Extensions (IBM zCX) capabilities for the z/OS environment allows developers to build and deploy Linux containers on z/OS. This can minimize the barrier to develop on the IBM Z platform, while allowing the workloads to inherit the z/OS qualities of service benefits of high availability, integrated disaster recovery, scalability, workload manager, and integration with z/OS security.

Encryption everywhere

The z15 T02 is the ideal choice for managing sensitive data and critical applications in your cloud. Pervasive encryption was a key element in the IBM z14 offering. Pervasive encryption is a consumable approach to enable extensive encryption of data in-flight and at-rest to help reduce costs associated with protecting data and achieving compliance mandates. It allows business to defend and protect critical assets with encryption, without compromising transactional throughput or response times. With pervasive encryption adopted, the z15 has a goal of protection of data beyond the platform.

In combination with the z15 T02, IBM Data Privacy Passports is designed to make sure that data is protected wherever it travels throughout the enterprise. With Data Privacy Passports, source data is encrypted and then wrapped with a trusted data object, that includes metadata that describes the attributes of the original source of the data, as well as instructions for opening it. Policy-based views of the data are provided when it is accessed, and the access is audited. Information is available to show the data is being accessed by the right people and show the way that the data is being used. It allows the IBM z15 to enable data protection that can span hybrid and multiparty computing environments. Data Privacy Passports exploits the latest release of Hyper Protect Virtual Servers, which delivers improved exploitation of key IBM z15 features, with more exploitation continuously being introduced.

Another key to a strong security position is the ability to control access to data shared in diagnostic dump data with vendors. IBM Z Data Privacy for Diagnostics (DPfD) is a new capability of z/OS that helps by tightening dump protection for data that will need to be shared with others. When sending diagnostic information to vendors, there is a risk of accidentally sharing sensitive data. This often poses a problem for organizations who must comply with the General Data Protection Regulation (GDPR) laws and/or other data privacy laws.

Use of DPfD allows for sensitive data-tagging APIs to be combined with machine learning to detect, tag, and redact all tagged data from diagnostic dumps. These can then be sent to vendors for further analysis. This minimizes the impact of securing sensitive data in dumps on the overall problem resolution time.

Beyond these security benefits are the ones required to address the next technology evolution. Over the coming decade quantum computing will emerge with use cases across a number of industries, and beyond that eventually be able to decrypt many currently secure cryptographic algorithms. To keep up, enterprises must adopt crypto agility, so they can quickly shift from one implemented algorithm to another. IBM Z has started down the path for crypto agility by supporting lattice-based cryptographic digital signing algorithms as part of the base system. As an initial use case, z/OS audit logs can be dual-signed with one National Institute of Standards and Technology (NIST) certified digital signature and one quantum-safe digital signature in order to provide clients an early view of this new technology. We have also provided the ability to define, implement and test processes to update and replace the cryptography used in applications by surfacing the quantum-safe digital signature for client use. Cryptographic algorithm enhancements have been made for Common Cryptographic Architecture (CCA) and Digital Asset and Cloud Domain Management and Privacy Enhancements have been made for Enterprise PKCS #11.

The IBM z/OS Authorized Code Scanner, a new optional priced feature of z/OS Version 2 Release, helps support your efforts to strengthen the security posture of their z/OS dev/test pipeline. It dynamically scans the Supervisor Calls (SVCs) and Program Calls (PCs) of code running at a high level of privilege for potential vulnerabilities and provides diagnostic information for subsequent investigation to help avoid potential compromise to the system integrity & security of the z/OS platform.

Cyber resilience

The IBM z15 T02 is designed with the instant recovery capabilities that help deliver the highest levels of uptime and system availability. The z15 T02 provides resiliency and continuous service availability across your hybrid multicloud platform and provides protection from both internal and external cyber attacks. On premises or in the cloud, IT resiliency means data loss is rare, applications can operate even during an outage, service disruptions are mitigated, and hardware, middleware, and workloads are kept available.

Built into IBM z15 T02, Z System Recovery Boost diminishes the impact of downtime, planned or unplanned, accelerating service restoration and workload recovery with zero increase in IBM software licensing costs. It offers a short-term, limited-duration performance increase that allows the boost function to maximize available processor capacity and parallel execution, and so helps to restore normal service and meet SLAs after both planned and unplanned events.

For planned downtime, the function accelerates system shutdown processing. For both planned and unplanned outages, it expedites the system IPL (initial program load), the middleware and workload restart, the system recovery, and the workload execution that follows.

By enabling general-purpose processors to run at full-capacity speed, and allowing general-purpose workloads to run on IBM Z Integrated Information Processors (zIIPs), the function accelerates the entire recovery process in the image(s) being boosted. IBM System Recovery Boost is supported by z/OS 2.4 with service, z/OS 2.3 with service, z/VM 7.1, and z/TPF V.1.1 with service.[2]

We are introducing even more ways for you to leverage the new System Recovery Boost technology beyond the traditional IPL by announcing new ways to accelerate sysplex recovery processes with System Recovery Boost. IBM will deliver new System Recovery Boost capabilities that lets you leverage a new class of boost called "recovery process boosts". These recovery process boosts can be applied to a range of sysplex recovery processes, including sysplex partitioning, CF structure recovery, CF data sharing member recovery, and HyperSwap recovery. This new capability can help reduce disruption, expedite return to steady-state operations, and catch-up faster on workload backlog.

For IBM z/VSE clients, basic System Recovery Boost support is now available and allows sub-cap clients to take advantage of the full speed of the engine.

Secure Execution for Linux on Z is a new capability introduced with the z15 T02, available for all models of the z15 generation. Engineered to help protect against insider and outsider threats in multi-tenanted cloud environments, it ensures users, and even system administrators, are unable to access sensitive data in Linux-based virtual environments. Secure Execution for Linux protects the confidentiality and integrity of data at enterprise scale, by isolating data at the virtual machine level, and ensuring that only the people within the organization that have a need-to-know have access to data in the clear.

z15 T02 offers more coupling facility connectivity and processing capacity than its predecessor, allowing more flexibility for connecting and deploying coupling facility images across parallel sysplex environments. In comparison to the z14 ZR1 there are 3x more IBM Internal Coupling Adapter Short Reach (ICA SR) 1.1 links, 2x more and Coupling Express LR (long range) links, 2x more Internal Coupling Facilities (ICFs) and 2X as many Internal Coupling Channels (ICPs) and 1.5 as many total coupling channels CHPIDs- The maximum number ICP is increased from 32 on z14 ZR1 to 64, and the maximum overall number of allowed coupling channels (CHPIDs) per CPC is increased from 256 to 384. These improvements make the z15 T02 a cost-effective platform for coupling.

IBM z/VM 7.2 now delivers centralized service management to apply maintenance across multiple non-Single System Image (SSI) z/VM systems. This function provides support to deploy service to multiple systems, regardless of geographic location, from a centralized primary location that manages distinct levels of service for a select group of traditional z/VM

systems.

Fast and secure access to data

Being able to protect, optimize, and manage data can slow down an organization and make it difficult to take advantage of the power of the data. High-speed connectivity to data is critical to achieve exceptional transaction throughput.

When an application must communicate with other distributed elements or ascertain the validity of data that it is processing, cryptography is an essential tool. CP Assist for Cryptographic Function (CPACF), the on-chip cryptographic processors, and the new Crypto Express7S adapters, introduced on the IBM z15, are also key to supporting a secure cloud strategy. IBM z15 Model T02 now supports up to 40 crypto HSMs, supporting 40 domains, which provides over 1600 virtual HSMs for ultimate scalability. The Crypto Express7S continues to add functionality to enable new industry standards driven by workload enhancements for IBM Common Cryptographic Architecture (CCA) and the Secure IBM Enterprise PKCS #11 (EP11)

The z15 T02 supports a 2-port FICON Express16S+ adapter that connects your z15 T02 to switches, directors, and storage devices at up to 16 Gbps. With support for native FICON, High Performance FICON for IBM Z (zHPF), and Fibre Channel Protocol (FCP), the adapter helps meet the low latency and increased bandwidth demands of applications.

OSA-Express6S adapters on the z15 T02 are designed for high-speed communication or to consolidate file servers onto IBM Z with an External LAN. The workloads can be Internet Protocol-based (IP) or non-IP based. The new OSA-Express7S 25 GbE SR adapter is supported and provides improved network bandwidth and the framework for possible OSA consolidation.

IBM zHyperLink Express1.1 on the z15 T02 provides a direct connect, short distance, I/O adapter offering extremely low latency connectivity to FICON storage systems. zHyperLink improves application response time, cutting I/O sensitive workload response time by up to 50%.

Shared memory communications (SMC) is used for either direct memory placement of data within the z15 T02, or host-to-host memory communications, using Remote Direct Memory Access over Converged Ethernet (RoCE) Express adapters. RoCE Express are adapters optimized for mainframe Ethernet local area network (LAN) connections and execute without significant TCP/IP processing costs. Memory to memory communications is available for both z/OS and Linux on Z.

[1] IBM Rational Developer for System z case studies, TechValidate, accessed 15 April 2019.

[2] The z15 T02 will not support System Recovery Boost Upgrade the temporary capacity offering that is available on the IBM z15 T01.

Why IBM?

Success in modern markets demand organizations evolve new capabilities in an integrated infrastructure that possesses a unique combination of performance, flexibility, availability, protection, and agility.

The new IBM z15 T02 delivers the power and speed users demand, open access to extend the platform value, and an available and security-rich environment businesses and regulators require. All these capabilities, with the efficiencies that lower operational expenditures. As a result, a comprehensive cost analysis can clearly show a lower total cost of ownership, which maximizes the enterprise bottom line.

For more information

Detailed IBM z15 T02 Specifications Table:

https://www.ibm.com/downloads/cas/JD90 D9QR