

## IBM z15 (z15) Model T01

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### Highlights

- Optimization of cost, density, and flexibility with 19" frame
  - Embedded infrastructure resilience with the new IBM System Recovery Boost
  - Protection of data flow within and across datacenters with new adapters
  - Availability of compression for broader set of apps with new coprocessor
  - Aligns with z/OS and Linux on Z colocated workloads
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Digital technologies are creating profound and accelerated transformations of business activities, processes, competencies and models. To succeed, organizations must embrace the transformation, adopt agile processes, and embrace new technologies to deliver services and experiences that customers demand. They must also ensure they maintain infrastructure security and protect data privacy while providing 24x7 availability. The pressure is on IT to securely deliver services and provide ongoing management and support within tight time and budget constraints.

IBM created the new IBM z15 (z15) platform to deliver the performance, flexibility, availability, protection, and agility required to drive digital transformation. With IBM z15 technology as an infrastructure cornerstone, there is the power to optimize digital services delivery, accelerate business innovation, and ultimately improve the bottom line.

### Simplified Acceleration

The new 12 core processor chip leverages the density and efficiency of 14nm silicon-on-insulator technology, runs at 5.2 GHz, and delivers increased performance and capacity across a wide range of workloads. There are up to 190 customer configurable cores. The IBM z15 comes with up to 190 configurable cores in a single model - the Model T01. The IBM z15 T01 is available with five options of core capacity – Max34, Max71, Max108, Max145, and Max190.

The system offers up to 40 TB of Redundant Array of Independent Memory (RAIM) per system. 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. There are up to 6 TB of granular ordering options available for VFM.

The IBM z15 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.

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*IBM z15 Model T01, 1-frame configuration*

### **Exploit Design Flexibility**

The IBM z15 has radically changed the footprint on for IBM Z. It is built with a 19” frame that flexibly scales from one to four frames depending on the configuration. This new configuration enables significant floor space reduction for most customers. Changes to the footprint mean:

- The Central Processing Complex (CPC) drawer design has relocated the long-distance coupling to the PCIe+ I/O drawer.
- The frame no longer requires the PCIe+ I/O drawers to be locked into fixed locations.
- Support continues for both raised and non-raised floors as well as top and bottom exit I/O and power.

- All cabling is routed to the back of the frame with new brackets to contain cables.
- There are two power options - intelligent power distribution unit (iPDU) and Bulk Power Assembly (BPA).
- The doors are designed for acoustics and optimized for air flow.
- The frame requires 3-phase power.

The use of the iPDU power may improve power efficiency and lower overall energy costs dependent on the required configuration. Any requirement for internal battery feature (IBF), a customer-based water cooling or balanced power will require the selection of BPA.

The 19" frame technology supports the A3 operating class as defined by the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE).<sup>1</sup>The benefit of having an A3 class rating is being able to save on Heat, Ventilation, and Air Conditioning (HVAC) costs due to the wide range of operating conditions that will now be available.

A new optional IBM Z Hardware Management Appliance can be ordered with the IBM z15 to provide Hardware Management Console (HMC)/SE functions within the 19" frame, eliminating the need for a separate HMC outside of the server.

### **Deliver with confidence**

On premises or in the cloud, IT resiliency is the ability to adapt to planned or unplanned events while keeping services and operations running continuously. IT resilience means:

- Data loss is rare
- Applications can operate, even during an outage
- Hardware, middleware, and workloads are available
- Service disruptions are mitigated

IBM Recovery Boost is a new function on IBM z15 that can help customers recover workloads substantially faster than on prior Z machines, reducing the length, and mitigating the impact of downtime. It helps to restore normal service and meet SLAs after both planned and unplanned events.

For planned downtime, the function accelerates system shutdown processing. And for unplanned outages, it expedites the system IPL (initial program load), the middleware and workload restart, the system recovery, and the workload execution that follows. This short-term, limited-duration performance increase allows the IBM Recovery Boost function to maximize available processor capacity and parallel execution. It allows the z15 to run sub-

capacity general processors at full capacity. It can accelerate and parallelize IBM GDPS reconfiguration actions.

Just as important, the z15 customer gets these boost-period benefits without any increase to the IBM monthly licensing charge (MLC), software billing costs or impacts to millions-of-service-unit (MSU) consumption. Allowing increasing operational agility and reduce downtime impacts—while gaining peace of mind. IBM Recovery Boost is supported by z/OS 2.4, z/OS 2.3 with service and z/VM 7.1.

Tailored Fit Pricing for IBM Z enables price stability, particularly in an unpredictable hybrid cloud environment. The Tailored Fit Pricing Software and Hardware Consumption solutions are transformational pricing options for IBM Z. It provides simple, transparent, and predictable pricing for IBM Z hardware and software when running the IBM z/OS platform. The Tailored Fit Pricing options maximize cost predictability, while still supporting optimal response times and Service Level Agreements (SLA) compliance.

The Tailored Fit Pricing for IBM Z Hardware Consumption Solution provides instantaneous access to additional capacity for short, unpredictable spikes in business-critical z/OS workloads. It was designed to meet the demands of hybrid cloud workload on IBM Z. To meet these demands, the IBM Z system can now include, on top of the base capacity that you own, a fixed corridor of pay for use capacity. This always on corridor of consumption priced capacity will help you to alleviate the impact of short unpredictable spikes in workloads that are becoming more common in today's digital world.

Remote Code Load for IBM Z Firmware optimizes resilience and keeps your IBM Z system up to date with the latest features, fixes, and maintenance without requiring someone to be physically in the data center to install and monitor planned updates to your system. This optional feature provides secure, remote installation and monitoring by IBM for planned updates to your IBM Z system

## **Strengthen Data Security**

IBM introduced pervasive encryption on the IBM z14. Pervasive encryption is a consumable approach to enable extensive encryption of data in-flight and at-rest to substantially simplify it and reduce costs associated with protecting data and achieving compliance mandates. It allows business to defend and protect critical assets with encryption and intelligent data monitoring—without compromising transactional throughput or response times. IBM Z has taken the next step of the journey with the IBM z15 by extending this data protection throughout the enterprise. The goal is protection of data beyond the platform and into distributed and hybrid cloud environments.

Authentication of identities exchanging data and transparent encryption of the data in flight are required to strengthen security of the data. IBM Fibre Channel Endpoint Security is a new end-to-end solution, for the IBM z15 T01, that is designed to provide a means to help ensure the

integrity and confidentiality of all data flowing on Fibre Channel links between authorized server and storage devices, creating a trusted storage network that encrypts data in flight.

The new IBM Data Privacy Passports offering, in conjunction with the IBM z15, is designed to enforce security and privacy protections of data across an organization's multi-platform environment. It provides a data-centric security solution which increases organizational control of eligible data by allowing data protection to remain with the data as it is moved from its data source and proliferated across an enterprise. IBM Data Privacy Passports provides policy-based fine-grained data privacy protection throughout the lifecycle of the data. As a result, only the authorized application or user can only view entitled subset of the data. This solution allows the IBM z15 to enable data protection that can span hybrid and multi-party computing environments, including data stored in public cloud deployments or shared with third parties.

Another key to a strong security position is the ability to control access to data shared with business partners and eco-systems. IBM Data Privacy for Diagnostics 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.

Organizations are often forced to make a choice between serviceability or compliance when it comes to requesting help in diagnosing system problems. Data Privacy for Diagnostics allows an organization to make informed decisions about sharing diagnostic data before it is sent. Sensitive data can be tagged such that it can be identified in dumps with no impact to dump capture times. Tagged sensitive data in dumps can be secured and redacted before sending to third party vendors.

Beyond these security benefits are the ones required to address the next technology evolution. Quantum computing capabilities, and their use, are growing—and will explode over the next 10 - 20 years. This shift will force the entire industry to evolve as quantum computing could break 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 is starting down the path for crypto agility by providing quantum-safe 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 customers an early view of this new technology.

These enhancements supported by the IBM z15 allow an organization to prove that all data originating from their system of record is secured throughout their enterprise and eco-system meeting all company policies and regulatory requirements with configurable and verifiable automation.

## Transform with agility

Transformation requires rapid development using lean and agile principles across the entire application development cycle. 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 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 customer case studies have shown the IBM Application Delivery Foundation for Z solution can help improve developer productivity by over 15 percent.<sup>2</sup> 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 can exploit the latest IBM z15 architecture. This capability allows them to deliver cross-platform development and integration, operate with Java, Swift or Node.JS and optimize enterprise workload performance without recompiling, as well as reduce the central processing unit (CPU) cycles needed to complete the job.

IBM z/OS Container Extensions (IBM zCX) capabilities for the z/OS environment allows developers to build and deploy Linux on Z Docker workloads 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.

The z15 provides Linux deployments with more cores, more memory and cache innovations. The z15 supports IBM Cloud Private on Linux on Z which provides the platform for modernizing, developing and managing on-premises, containerized applications. The new 19" frame opens new opportunities within a data center. A Linux platform can be deployed as a standalone server, or side-by-side with z/OS or z/VSE environments on a single physical server. This allows

for easy integration of Linux workloads on the z15 resulting in infrastructure benefits from tight data and application colocation, fast internal communications, and integrated high availability.

### 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. The IBM z15 offers:

- A new 2-port FICON Express16SA adapter that connects your IBM z15 to switches, directors and storage devices at up to 16 Gbps. With support for native FICON, High Performance FICON for IBM Z (zHFP) and Fibre Channel Protocol (FCP), the adapter helps meet the low latency and increased bandwidth demands of applications. When the Fibre Channel connection endpoints use the FICON Express16SA adapters to the IBM DS8900F storage, authentication of the endpoints is enabled.
- A new set of OSA-Express7S adapters that meet the increased networking bandwidth demands driven by high speed processors and faster network-attached storage devices.
- Support for IBM zHyperLink, a direct connect, short distance, IBM Z I/O adapter offering extremely low latency connectivity to FICON storage systems. The IBM Washington Systems Center offers the zBNA tool to help determine good candidates for the adapter.
- Shared memory communications that is used for either direct memory placement of data within the z15, or host-to-host memory communications, using Remote Direct Memory Access over Converged Ethernet (RoCE) Express adapters, without significant TCP/IP processing costs. Support memory-memory communications is available for both z/OS and Linux on Z.
- Support for IBM Internal Coupling Adapter Short Reach (ICA SR)1.1 and Coupling Express LR (long range) coupling interconnects with significant changes to the coupling limits with increase for ICA SR physical coupling links and coupling channel path identifiers (CHPID).<sup>3</sup>

With the internal configuration changes implemented for the 19", the amount of I/O that can be attached is dependent on the type of power that is selected. There is a maximum of twelve PCIe+ I/O drawers when iPDU power is selected or a maximum of eleven PCIe+ I/O drawers when BPA is selected.

<sup>1</sup> ASHRAE Thermal Guideline Classes for IT Equipment Spaces, 4th Edition, ASHRAE, 2015

<sup>2</sup> IBM Rational Developer for Z case studies, TechValidate, accessed 15 April 2019

<sup>3</sup> The Host Channel Adapter (HCA) is no longer supported.

## Why IBM?

### Maximize the Bottom Line

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 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 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.

## Next steps

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## For more information

Detailed IBM z15 Specifications Table:  
<https://www.ibm.com/downloads/cas/2GO7LRDV>

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