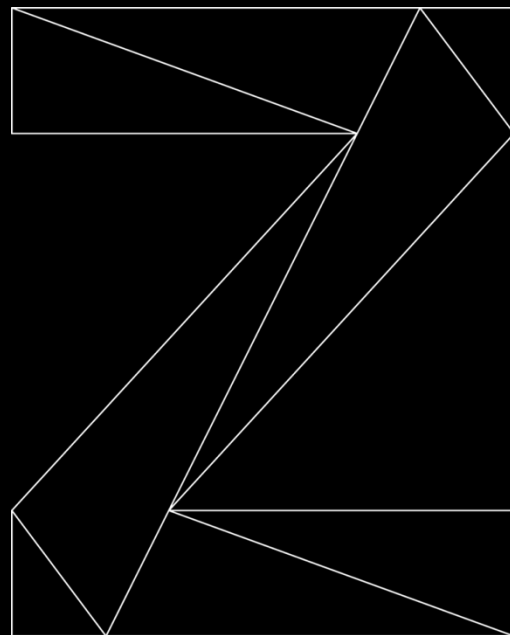# IBM z14 and IBM LinuxONE GA2 Hardware Innovation Overview

Munich October 4-5, 2018

Gerard Laumay
IBM Z New Technology Introduction
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z14 servers are designed for trusted digital experiences

Pervasive encryption is the new standard

Exploit the value of real-time data with scale

Open enterprise platform to extend, connect and innovate

New IBM Z hardware enhancements

IBM z14

IBM LinuxONE

October 2, 2018
Announce

December 3, 2018
General Availability *

* OSA-Express7S 25GbE
GA: April 9, 2019

IBM z14 and LinuxONE™ Enhanced Driver Maintenance

New GA2 LIC driver updates **from Driver 32 to Driver 36** in support of new features and functions

z14 GA2 provides a trusted environment for the flexible and efficient deployment of new workloads

October 2 GA2 announcement: Continues to build on the z14 announcements

| Extending encryption across the enterprise	Integrate analytics and AI into transactions for accelerated insights	Exploiting open and industry standards with a cloud consumption model
Secure service containers to deploy these new workloads in a tamper proof environment with full data encryption and protection against both insider and external threats.	A new solution, MLz for Db2z Solution, based on Db2® AI for z/OS® finds the best SQL access path through the optimizer to deliver better performance and lower CPU consumption. By incorporating advanced cognitive capabilities with Machine Learning, IBM Z® delivers true Hybrid Transactional and Operational Processing (HTAP) and Db2 for z/OS with orchestrated knowledge built in.	IBM Cloud Private enables you to quickly move, modernize and automate workloads or build new cloud-native applications while mitigating risk and maintaining greater control. **SoD** for Master Node on IBM Z IBM is a founder participant in Zowe. A new initiative from the Open mainframe project to enable exploitation of open source tools in a z/OS environment. Introducing the Solution Consumption License Charges, offering true pay-as-you-go pricing for new apps on z/OS or a committed MSU option

GA2 Hardware
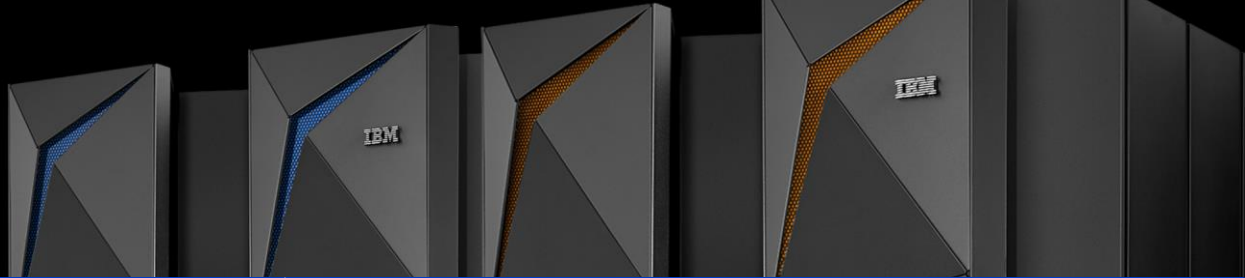
Security

Crypto

New Crypto enhancements enables compliance with PCI, ANSI and other evolving standards, provides enhanced performance, simplified TKE processes and a new smart card to meet expected encryption strengths required for compliance.

Data Serving

IBM Adapter for NVMe* "vendor card adapter Beta" provides the ability for embedded storage within the system through the PCIe bus interface. This feature uses PCIe adapter cards with attached Solid State Drives (SSDs) that connect directly to the I/O backplane, providing customers with the ability to have embedded storage without the need for external DASD or Tape (after initial install). This feature can help with memory-intensive workloads, real-time analytics, fast storage workloads such as streaming, paging/sorting, and traditional applications such as relational databases.

FCP Express32S* provides high-speed network technology for use with Storage Area Networks (SANs). FCP32 provides the ability for 32 Gigabits per second (Gbps) speeds over a fast fibre channel protocol. This feature provides the ability to consolidate multiple / slower FCP cards and allows higher bandwidth and I/O rates for the most advanced data-serving needs.

Support for zHyperLink™ Writes accelerates Db2 log writes to help meet clients most stringent requirements and deliver superior service levels by processing high volume Db2 transactions.

* Available on LinuxONE only

IBM LinuxONE™

GA2 Hardware (continued)

Open and Connected	Simplification	Resiliency	Infrastructure
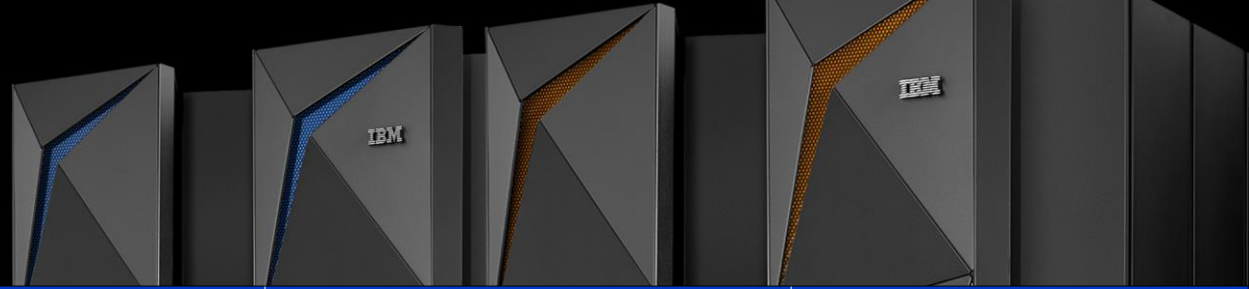
Open and Connected

DPM 3.2 import of FICON® based configuration data from an existing machine – or data center IOD enables a quick setup of the Storage Configuration when installing a new machine.

Simplification

Dynamic I/O for Standalone Coupling Facility eliminates the client workload disruption caused by needing to perform CEC IMLs to make dynamic I/O configuration changes involving standalone Coupling Facilities in a Parallel Sysplex® environment.

Improves client workload availability and minimizes the risks associated with disruptive changes.

HMC (Hardware Management Console) 2.14.1 Enhancements provide improvements in the areas of I/O, Security, System Concurrency, User Experience, and HMC Mobile.

Resiliency

Asynchronous XI is a new sysplex capability intended to provide performance and improved cross-site operation.

Allows the cache coherency messages that flow around the sysplex to maintain data integrity to be performed in a lazy, asynchronous fashion rather than synchronously, with exploitation from the data manager (Db2).

The asynchronous protocol is expected to reduce cache services times and sysplex coupling overhead.

STP CTN split/merge is a new sysplex timing capability for availability that allows 2 distinct timing networks to be merged into one, or vice versa, nondisruptively. Previously, these timing network reconfigurations/ transitions were disruptive to the running sysplex(es).

Infrastructure

OSA-Express7S 25 GbE SR*

25GbE RoCE Express2

Meet increased networking performance demands driven by high speed processors and expansion of network traffic.

25 GbE can provide increased bandwidth for workloads

Depending upon the environment, these 25 GbE adapters can reduce the cost of network cabling and switching by consolidating 10GbE links onto 25 GbE adapters.[1]

* Planned availability of OSA-Express7S 25GbE SR is April 9, 2019

[1] For OSA-Express7S 25GbE, clients that have enabled TCP Segmentation Offload may not see the throughput benefits required for adapter consolidation as the throughput of the adapter is currently limited in that environment.

Extending the IBM z14 and LinuxONE product families

IBM z14

IBM LinuxONE

GA2 Content for both IBM Z and LinuxONE

- Crypto Enhancements
- DPM 3.2
- HMC 2.14.1
- OSA-Express7S 25GbE SR
- 25GbE RoCE Express2
- DS8882F Rack Mounted
- Secure Service Container with IBM Cloud Private (Linux)
- IBM Cloud Private (Linux) *Statement of Direction for Master on IBM Z*

IBM Z Content for GA2

- zHyperLink Writes
- Dynamic I/O for Standalone Coupling Facility
- New Sysplex Capabilities
- Solution Consumption License Charge
- Zowe
- Db2 AI for z/OS
- AI Infused Analytics & ML on IBM Z
- z/OS Cloud Broker for ICP *Statement of Direction*

LinuxONE Content for GA2

- IBM Adapter for NVMe
- FCP Express32S

GA2 hardware content for IBM Z and LinuxONE Servers

Enhancements	All z14 Servers	z13®/z13s® Servers	zEC12/zBC12 Servers	z196/z114 Servers	z10EC/z10BC Servers	Emperor	Emperor II	Rockhopper	Rockhopper II
Crypto Enhancements	X						X		X
IBM Adapter for NVMe							X		X
FCP Express32S							X		X
zHyperLink Writes	X								
DPM 3.2	X						X		X
Dynamic I/O for Standalone Coupling Facility	X								
HMC 2.14.1	X	X	X	X	X	X	X	X	X
New Sysplex Capabilities	X								
OSA-Express7S 25 GbE	X						X		X
25GbE RoCE Express2	X						X		X

IBM DS8882F Rack Mounted

IBM is introducing a new member of the DS8880F family of all-flash data systems that span a wide range of business-critical application workloads
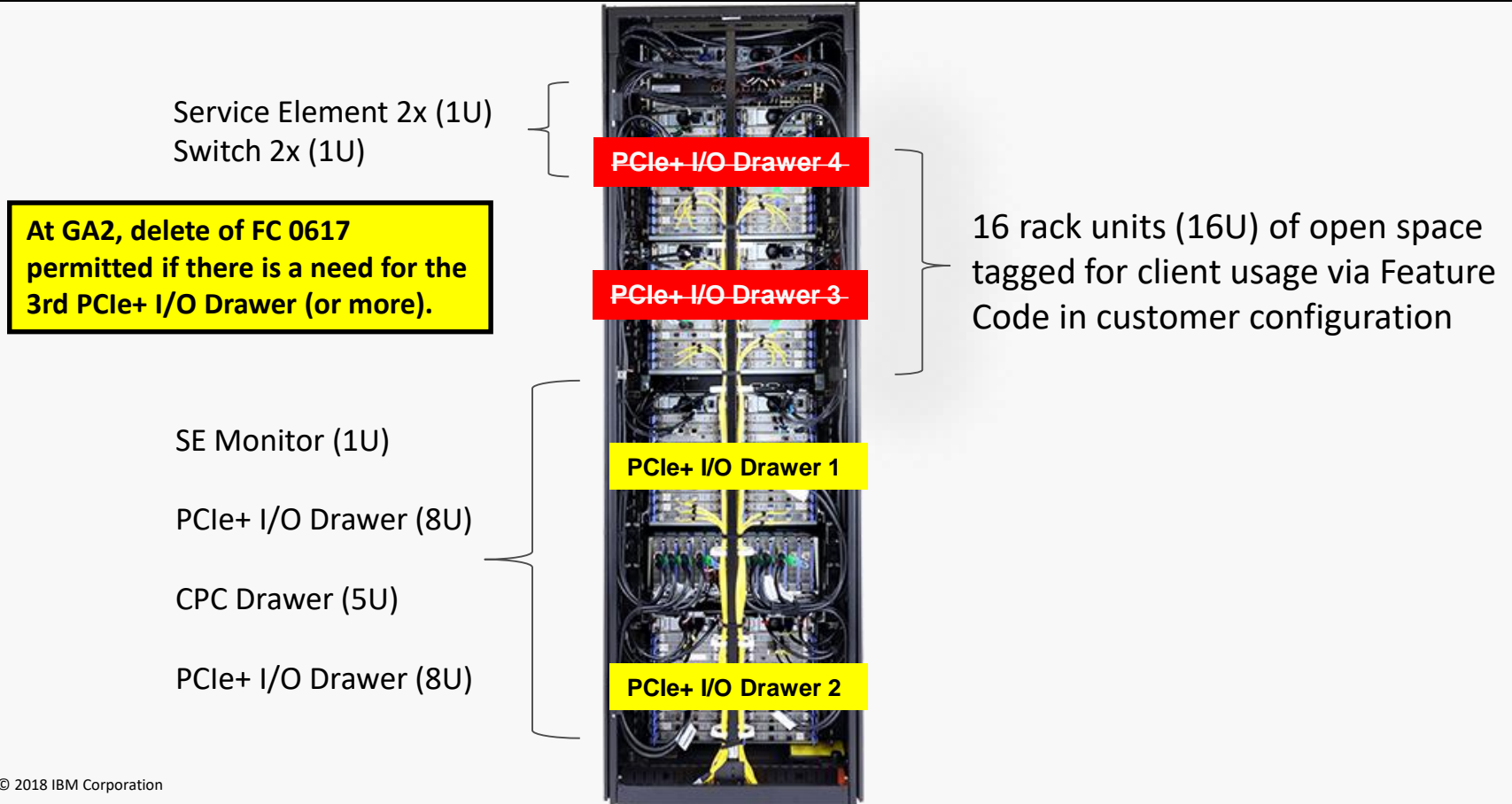
- Can be integrated into **IBM z14 ZR1** or **IBM LinuxONE Rockhopper II** systems

- Feature code (FC 0617) based ability to use 16U of contiguous space in the **IBM z14 ZR1** or **LinuxONE Rockhopper II** system frames

- Provides a midrange product with the same advanced functions as the larger DS8880F systems

- From 6.4 TB to 368.64 TB of all-flash capacity

- Guidelines for physical structures as well as restriction of interaction with the 'mainframe server' provided

Announcement date: August 21
General Availability: September 7

FC 0617 – 16U Reserved on model ZR1

42u, industry standard rack

Service Element 2x (1U)
Switch 2x (1U)

At GA2, delete of FC 0617 permitted if there is a need for the 3rd PCIe+ I/O Drawer (or more).

PCIe+ I/O Drawer 4

PCIe+ I/O Drawer 3

SE Monitor (1U)

PCIe+ I/O Drawer (8U)

CPC Drawer (5U)

PCIe+ I/O Drawer (8U)

PCIe+ I/O Drawer 1

PCIe+ I/O Drawer 2

16 rack units (16U) of open space tagged for client usage via Feature Code in customer configuration
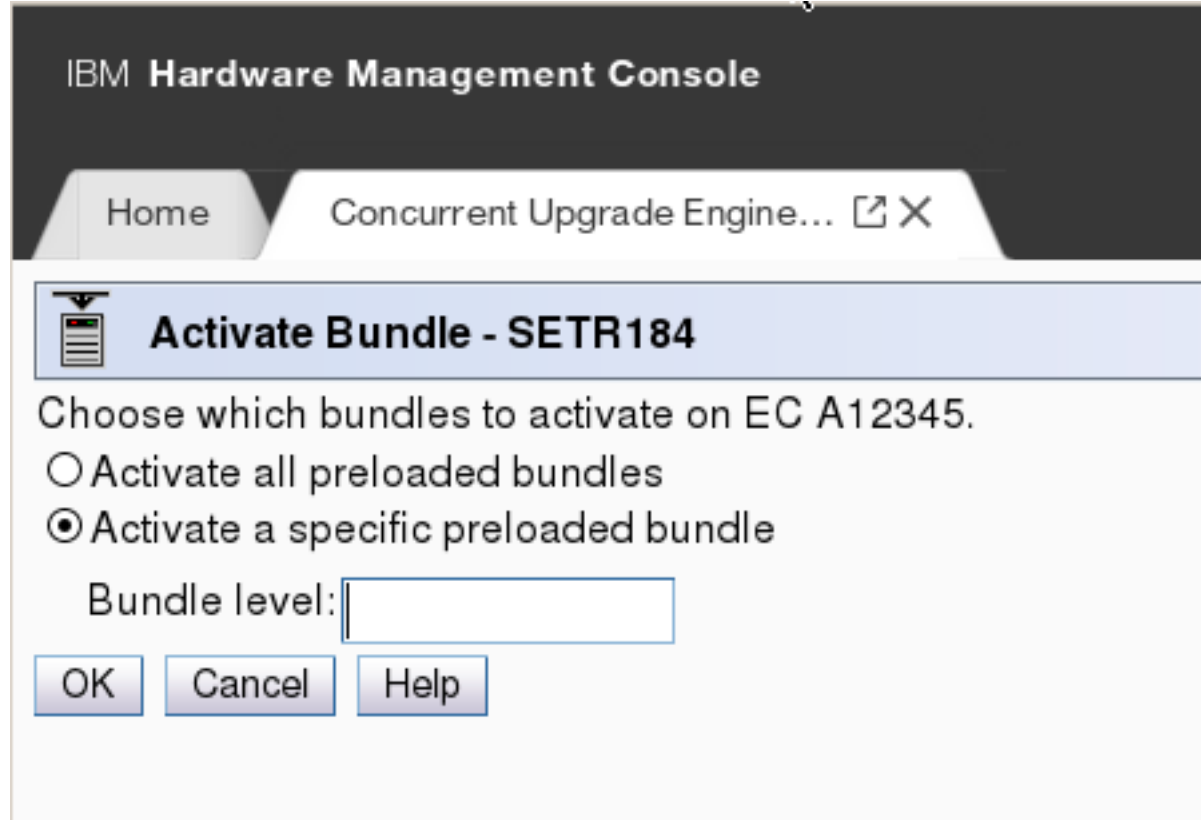
Customers are able to specify the target bundle.

Many clients want all of their machines to be at the same bundle level, while their enterprise is updated over a period of weeks. Concurrent Driver Upgrade (CDU) in prior drivers automatically tried to load 'All MCL bundles'

Enhancement: Let the customer specify what bundle the machine should arrive at when the CDU has completed.

IBM **Hardware Management Console**

Home   Concurrent Upgrade Engine... ☐ ✕

Activate Bundle - SETR184

Choose which bundles to activate on EC A12345.

○ Activate all preloaded bundles
◉ Activate a specific preloaded bundle

Bundle level: [_____]

[OK] [Cancel] [Help]

Miscellaneous HMC Enhancements

1. Enable/Disable InfiniBand Coupling Port (Previously only available via the Support Element)
2. z14 ZR1 Manage Power Service State – Power off ½ of the PDU's without call home.
3. eBoD on HMC (Previously only available via Single Object Operations) TERs
4. IBM Z Net Promoter Score (NPS) survey via HMC (Remote Sysprog, e-mail it to another user, remind me later).
5. SCSI Load Normal Enhancement
6. Dynamic I/O for Standalone Coupling Facility
7. Enhancement of SE logins from the HMC (Chat, SOO - force off other user).
8. z14 ZR1 Enhanced Driver Maintenance
9. Statements of Direction (Remove zBX, HMC Legacy CPCs)
10. YouTube videos for HMC Content - https://ibm.biz/IBM-Z-HMC
11. HMC Mobile Enhancements, Biometrics, load, delete HW messages, respond to OS messages, delete OS messages: https://ibm.biz/hmc-mobile

Hardware Management Console - Statement of Direction

The z14 will be the last IBM Z machine family where the associated Hardware Management Console release will support greater than n-2 machine family CPCs.

Machine Family	Machine Type	Firmware Driver	SE Version	Ensemble Node Potential
z14	3906	32	2.14.0	Yes
z13	2964	27	2.13.1	Yes
z13s	2965	27	2.13.1	Yes
zBX Node	2458 Mod 004	22	2.13.0	Required
zBC12	2828	15	2.12.1	Yes
zEC12	2827	15	2.12.1	Yes
z114	2818	93	2.11.1	Yes
z196	2817	93	2.11.1	Yes
z10 BC	2098	79	2.10.2	No
z10 EC	2097	79	2.10.2	No

Machine Family	Machine Type	Firmware Driver	SE Version
zNext*	xxxx	xx	x.xx.x
z14 M0x	3906	36	2.14.1
z14 ZR1/LR1	3907	36	2.14.1
z13	2964	27	2.13.1
z13s	2965	27	2.13.1

*Note: No support for Unified Resource Manager (Ensemble)

Red text indicates end of support after December 31, 2018.

STP: The old user interface to go away from SE on the zNext.

The IBM LinuxONE Portfolio

IBM LinuxONE Emperor™ II

IBM LinuxONE Rockhopper™ II

The world's premier Linux systems for highly secured data and cloud serving

Engineered for performance and scale

Foundation for data serving and next generation apps

Machine Type: 3906
Models: LM1, LM2, LM3, LM4, LM5
Up to 171 cores and 32TB

Machine Type: 3907
Model: LR1
Up to 30 cores and 8TB

Built on decades of trusted IBM Technology	Built for the cloud with Standardization and Simplicity	Lower cost than x86 for mission critical data serving	Right sized for your business needs

Secure Service Container for IBM Cloud Private

Value Proposition

Protects data and applications against misuse of privileged HW/OS admin credentials – for internal & external threats

- *Automatic File System Encryption (LUKS) for Data at Rest*
- *No Operating system Access*
- *Encrypted Memory*
- *Automatic Network Encryption (TLS) for Data in Flight*

Simplified Deployment and Management via Secure Service Container appliance foundation

- *Avoid management of execution environment*
- *Cloud administrators focus on supporting k8s clusters*
- *Developers focus on building containerized applications*

Supports use of common cloud / container management tooling across IBM Systems platforms (Z / LinuxONE, POWER®, x86)

Offering Co-Requisites

IBM Cloud Private for IBM Z / IBM LinuxONE
HW FC 0104: RTU Embedded OS Variable (Base Enablement)
Application Development: Docker & Kubernetes / Helm charts

Securely hosts IBM Cloud Private Docker / Kubernetes (k8s) based solutions on IBM Z or LinuxONE Private and Hybrid cloud deployments

Program number: 5737-I09 v1.1.0
GA: October 19, 2018 Electronic download

GA2 New Naming Guidelines

- IBM Adapter for NVMe

- FCP Express32S

- OSA-Express7S 25GbE

- 25GbE RoCE Express2

- Dynamic I/O for Standalone Coupling Facility

- IBM DS8882F Rack Mounted

SSC for ICP Official name:

- IBM Secure Service Container for IBM Cloud Private

SSC for ICP Short Name:

- Secure Service Container for IBM Cloud Private

Statement of Direction (SoD)

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.

IBM z14 Statement of Direction

HMC Support Efficiency Updates

IBM z14 is planned to be the last release that will allow HMC support across the prior four generations of server (N through N-4). Future HMC releases are intended to be tested for support of the prior two generations (N through N-2). For example, the next HMC release would support the zNext generation, plus z14 generation and z13®/z13s® generation.

This change will improve the number and extent of new features and functions that are able to be pre-tested and maintained in a given release with IBM's continued high-reliability qualification procedures.

Removal of System (Sysplex) Time on the Support Element

IBM z14 is planned to be the last machine generation to support 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, associated with the IBM z14 models. Clients should begin shifting to the new HMC 2.14.0 or later releases for tasks and procedures, including time management.

IBM z14 Statement of Direction (continued)

Ensemble and zEnterprise® Unified Resource Manager

IBM z14 is planned to be the last IBM Z server to support Ensembles and zEnterprise Unified Resource Manager (zManager).

The z14 HMC level is planned to be the last HMC level to support Ensembles. Statements by IBM regarding its plans, directions, and intent are subject to change or withdrawal without notice at the sole discretion of IBM.

IBM LinuxONE Statement of Direction

HMC support efficiency updates

In servers beyond LinuxONE Emperor II and Rockhopper II, HMC support is planned to be changed from N-4 server level to N-2 server level. 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.

IBM z14 & LinuxONE Key Dates

- IBM GA2 Announcement – July 17, 2017 (GA September 13, 2017)

- IBM GA2 additional features and functions Announcement – October 2nd, 2018 (planned GA2 December 3rd, 2018)

- OSA-Express7S 25GbE SR (FC 0429) available for ordering April 9, 2019

- eConfig – Updated for GA2

- ResourceLink™ support available

- Capacity Planning Tools (zPCR, zTPM, zCP3000, zBNA, zSoftCap, zTPM, zSCON) – updated

- SA-TDA (SAPR) Guide for z14 & LinuxONE , SA1069 & SA1071 (updated for GA2)

- CFSizer Tool – July 17, 2017

IBM z14 Redbooks updates

Updated -- z14 Technical Leadership Library (TLLB) – October 2nd, 2018

- IBMers: search for TLLB at: http://w3.ibm.com/sales/support

October 20, 2018 – Updated ITSO Redbooks – Draft Versions

- Updated – IBM z14 Technical Introduction, SG24-8450

- Updated – IBM z14 Technical Guide, SG24-8451

- Updated – IBM Z Connectivity Handbook, SG24-5444

- Updated – IBM Z Functional Matrix, REDP-5157

August 1st, 2017 – ITSO Redbooks

- IBM z14 Configuration Setup, SG24-8460

Enhancing the IBM z14 and LinuxONE families

Building on the breakthrough technologies and strong launches

Trusted digital experience delivered through a secure cloud