IBM z Systems

z/OS Update @SHARE

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Notes:

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Topics

- **1Q Announcements :**
  - **z13**
  - **z/OS V 2.2 Preview**
  - **etc.**
- **Changes in pricing options**
- **SHARE Requirements**
- **z/OS V 2.3**

1Q Announcements

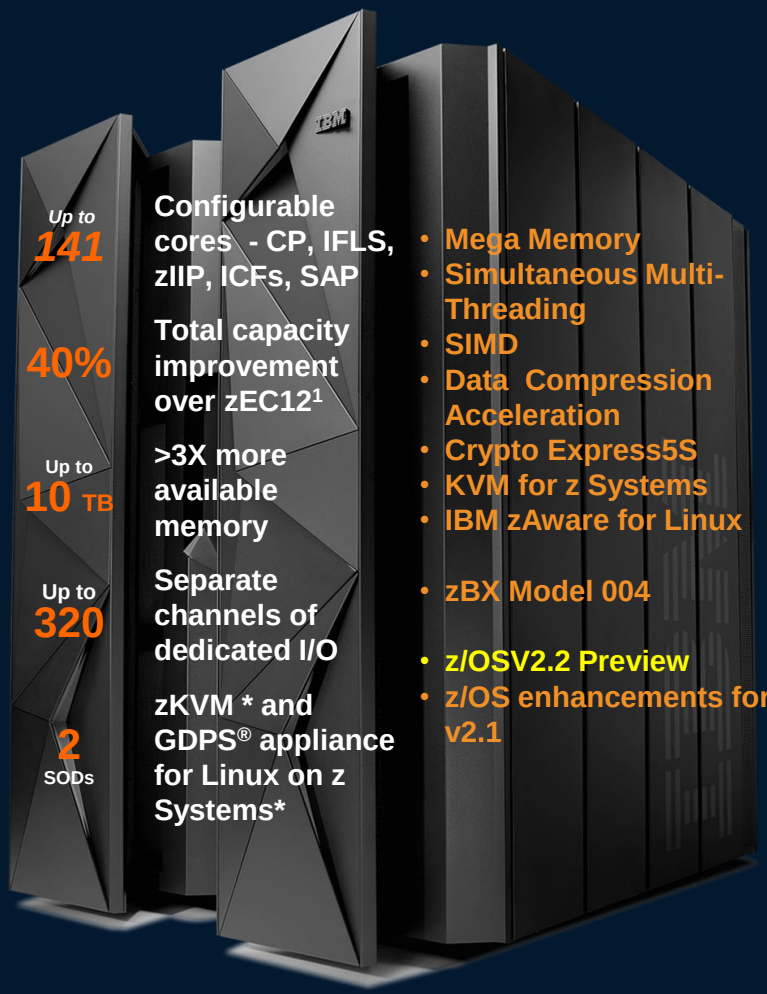
z13 Announcement Overview

Mobile

- Mobile Solution Kit
- IBM Mobile CoCs
- Enterprise Ready Mobile Apps
- US Mobile ISV partnership
- Enterprise Compilers
- UrbanCode™ 6.1.1
- CICS® TS v5.3 SOD
- Rational® Test Workbench 8.7
- Mobile Application Throw down
- BPM and Monitor v8.5.6 for Linux® on IBM z Systems™
- IBM Integration Bus v10
- IBM zSecure® Audit Reporting

Analytics

- IBM DB2® Analytics Accelerator v5 (SOD)
- CPLEX Optimizer for z/OS
- IBM DB2 BLU for zLinux
- InfoSphere® BigInsight™ Connector Technology (for Hadoop)
- IBM SmartCloud® Analytics + Log Analysis z/OS Insight Packs



Up to 141 — **Configurable cores - CP, IFLS, zIIP, ICFs, SAP**

40% — **Total capacity improvement over zEC12[1]**

Up to 10 TB — **>3X more available memory**

Up to 320 — **Separate channels of dedicated I/O**

2 SODs — **zKVM * and GDPS® appliance for Linux on z Systems***

- **Mega Memory**
- **Simultaneous Multi-Threading**
- **SIMD**
- **Data Compression Acceleration**
- **Crypto Express5S**
- **KVM for z Systems**
- **IBM zAware for Linux**
- **zBX Model 004**
- **z/OSV2.2 Preview**
- **z/OS enhancements for v2.1**

Plus...

- New Workload Container Pricing
- zTPF Transformation Engine

Cloud

- Enterprise Cloud System v2
- Elastic Storage / GDPS virtual appliance for Linux (sod)
- BlueMix™ Catalog
- Cloud Patterns on zLinux
- Postgres, Docker
- Joint Development Agreements
- Managed Services Offerings (RD&T, CLM)
- Cloud Manager w Openstack® v4.2
- New cloud Workload Scheduler
- Optimized WebUI for z Systems

Skills

- Master the Mainframe Country Contests
- Master the Mainframe World Championship
- New Jobs Board/Connector

IBM zEnterprise 196 (z196) System Functions and Features

- Five hardware models
- **Quad-core 5.2 GHz processor chips**
- **Up to 80 processors configurable as CPs, zAAPs, zIIPs, IFLs, ICFs, or optional SAPs (up to 32-way on R7, 64-way on R9, 80-way on R11)**
- **Out of order instruction execution**
- **Improved processor cache design**
- Up to 15 subcapacity CPs at capacity settings 4, 5, or 6
- Up to 3TB real memory (1TB per LPAR)
- Improved availability with Redundant Array of Independent Memory (RAIM)
- **Power save functions**
- **On Demand enhancements**
- **IBM zEnterprise Unified Resource Manager (from HMC)**
- **New and enhanced instructions**
- **Changes to the Common Cryptographic Architecture, Crypto Express3, and Trusted Key Entry**
- **IPL from an alternate subchannel set**
- **PCIe-based I/O infrastructure - – FICON Express8S and OSA Express4S**
- **Large send for IPv6 packets**

z196 zBX

(z/OS support in blue)

(Sept 2011 support in red)

- **Capacity Provisioning enhanced**
- **6.0 GB/sec InfiniBand I/O interrupt**
- **Three subchannel sets per LCSS**
- **FICON Discovery and AutoConfiguration (zDAC)**
- **OSA-Express3 Inbound Workload queueing (IWQ)**
- **IWQ for Enterprise Extender**
- **OSA-Express4S checksum offload for IPv6 and for LPAR to LPAR traffic (both IPv4 and IPv6)**
- **CFCC Level 17 enhancements**
- **Up to 80 External Coupling Link Ports**
- **Up to 128 Coupling Link CHPIDs Defined**
- Optional water cooling
- Optional High Voltage DC power
- Optional overhead I/O cable exit
- **Support for OSX and OSM CHPIDs**
- **zBX-002 IBM Smart Analytics Optimizer**
- zBX-002 select POWER7 and IBM System x Blades
- zBX-002 IBM WebSphere DataPower Integration Appliance X150 for zEnterprise
- **HiperSockets optimization for intraensemble data networks (IEDN)**

Statements regarding IBM future intent and direction are subject to change or withdrawal, and represent goals and objectives only

IBM z13 System Functions and Features

Five hardware models
Up to 141 processors configurable as CPs, zIIPs, IFLs, ICFs or optional SAPs (no zAAPs) § 100-way on z/OS V1.12 or V1.13 § Up to 141-way on z/OS V2.1 (non-SMT mode) § Up to 128-way on z/OS V2.1 (SMT mode) - max active threads is 213
Up to 10 TB of Redundant Array of Independent Memory (RAIM) ▪1 TB per z/OS LPAR on z/OS V1.12 or V1.13 ▪Up to 4 TB per z/OS LPAR on z/OS V2.1 (SoD)
Changed (node) cache structure
96 GB Fixed HSA
Up to 85 LPARs § Only up to 60 LPARs can be defined if z/OS V1.12 is running in one of the LPARs
Up to six logical channel subsystems (CSSs)
4 Subchannel Sets per CSS
Single Instruction Multiple Data (SIMD) instruction set and execution
Two-way simultaneous multithreading (SMT) support for up to 128 cores (IFLs and zIIPs)
New and enhanced instructions
XL C/C++ ARCH(11) and TUNE(11) exploitation: New z13 hardware instruction support, SIMD (Vector support) and Vector data, Decimal Floating Point packed conversion facility support, Performance improvements

(z/OS support in blue)

IBM zAware: z/OS and Linux on System z
CPU Measurement Facility
Flash Express (Storage Class Memory-SCM)
CF exploitation of Flash Express
IBM zEnterprise Data Compression (zEDC) capability using zEDC Express
OSA Express5S
Shared RoCE Express Support
Greater than 256 PFID support
PCIe extended address translation
Enhanced the PCIe function definition
PCIe function measurement block changes
FICON Express16S
FICON Dynamic Routing
High Performance FICON for System z (including zHPF extended distance II)
Fabric Priority for an I/O request
CryptoExpress5S: Next Generation Coprocessor support, Support architecture for up to 85 Domains, Format Preserving Encryption (FPE)
Integrated Coupling Adapter (ICA) Links
Increases number of coupling CHPIDs from 128 to 256 per CEC
zBX Model 004 support

z/OS V2.2 and IBM z13 Provide Synergies

Meet the challenges of cloud, analytics and mobile workloads

The world's premier transaction and data engine enabled for the mobile generation

Driven by security, resiliency, and the economics of scale

- Strengthened security – encrypt **2X** as fast with CPACF on IBM z13™ (z13)*
- Signed audit records to help improve compliance
- Crypto cards now shareable by 85 LPARS – more than a **5X** increase

An integrated transaction and analytics system for real-time insights

Powered by data serving, analytics, powerful batch

- Selected key z/OS ATLAS 3.10.0 functions are accelerated using SIMD instructions and demonstrate up to **80%** higher throughput on z13 than on zEC12.***
- For eligible data, store up to **4X*** more data with zEDC
- Improve performance of many mobile, cloud, and analytics applications running on z13 with SIMD with Java® SDK 8

The world's most efficient and trusted cloud system that transforms the economics of IT

Fueled by server scale, large memory, high availability and resiliency

- **141-way** support on z13, approximately **40%** more cores than IBM zEnterprise® EC12 (zEC12)
- Up to **4TB** memory
- An average capacity improvement of **38%** compared to zEC12 Including use of SMT for zIIPs**

- **Improved Simplification**
- **z/OSMF now included with z/OS**
- **Easier operations**
- **Superior economics for an improved migration period**

*These results are based on projections and measurements completed in a controlled environment Results may vary by customer based on individual workload, configuration and software levels
The z13 provides lower overall mainframe costs through the ability to process more workload on larger zIIPs with an average capacity improvement of **38% compared to zEC12 including the exploitation of the new multithread option on the z13 zIIP.
***This claim is based on results from internal lab measurements. The double precision function improvement is derived from comparisons of a select set of commonly-used z/OS ATLAS 3.10.0 functions executing on z13 to the equivalent functions executing on zEC12. A subset of these functions is accelerated using SIMD instructions on z13 The SIMD benefit is demonstrated using this subset. The performance improvements achieved will vary depending on the workload and other factors.

IBM z Integrated Information Processor (zIIP) on the z13

- With the IBM z13, zIIP processors now also offer support for simultaneous multithreading (SMT) executing up to ***two threads*** per core
- SMT on zIIP can result in better price performance for zIIPs.
- For every CP on the server you can run up to two zIIPs on the server.
- zAAP eligible workloads such as Java and XML, can run on zIIPs
- Note: zAAPs are no longer orderable beginning with the z13

- *zIIP is a special purpose processor that relieves central processors of running specific DB2 workloads, Java, XML workloads, and more*
- *As more work runs on zIIPs, fewer processing units are consumed on CPs*

- The z13 provides lower overall mainframe costs through the ability to process more workload on larger zIIPs with an average capacity improvement of ***38%*** compared to zEC12 including the exploitation of the new multithread option on the z13 zIIP.

z/OS V2.2 Preview*

A smarter operating system with designs intended for*:

Usability and Skills

z/OSMF as a base element of z/OS; TCP/IP configuration; z/OSMF plug-in setup workflow; Updates to WLM, RMF, Incident Log, Software Management, WebISPF applications; New z/OSMF External Applications API; DJC and Deadline Scheduling for JES2; System Symbol enhancements…

Application Development

Web Enablement Toolkit, EU ordering rules for Unicode, ISPF improvements, DFSORT Date Functions, Enhanced RESTful data set and file APIs, Parallel Batch Scheduling, Improved JES3 symbol and JCL support, …

Scalability & Performance

More threads for z/OS UNIX® System Services, AMODE64 File System Services for zFS & NFS, CA-Level Locking for RLS, zFS performance, Even More Jobs for JES2, …

Enhancing Security

Signed SMF records, RFC 4556 X.509 support in Kerberos, RRSF Dynamic Node Reassignment, Multiple certificate approvers, PKI RFC 6277 Support, System SSL RFC 2560 OCSP Support, z/OS UNIX security improvements, BCPii audit records, …

Availability

Dynamic JES2 Checkpoint Tuning & Expansion, Private Area Virtual Storage Tracking in PFA, Dynamic TDS (LDAP) Compatibility Upgrades, Multi-target PPRC, Incremental FlashCopy, XCF message processing, LOGREC deallocation, O/C/EOV Dynamic Exits, …

Systems Management

Smarter Subsystem Interface processing, DFSMShsm Storage Tiers Extensions, Health-Based Workload Routing, RMF Reporting Enhancements, Generic Tracker Improvements, …

Networking

64-bit TCP/IP Stack, RoCE Improvements, DVIPA Limit, CICS Sockets, Enterprise Extender Scalability, NIST SP800-131a, TLS Session Reuse, Resolver Improvements, …

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Large Memory Drives Performance

z/OS V2.2 is planned to support up to 4 TB memory per LPAR, 10 TB RAIM memory total per CEC

SAP performance efficiencies for response time gains
- Reduce I/O by caching data; improve response time and throughput, and get CPU savings

Database performance improvements for faster results
- Improve response time using in-memory buffer pools
- Host in-memory database systems
- Use tuning knobs you already have in place

Shortened elapsed time to get more work done
- Run concurrent memory intensive workloads (e.g. sort)
- Improve response time and relieve constraints on batch

Support for new innovative workloads that were not possible before
- Enable the possible: new fraud detection apps, new real time scoring, mine customer sentiment data real time
- Deliver consistent response time even during application spikes

Candidates benefiting from large memory include:

- *Analytics*
- *Java*
- *DB2*
- *Cognos®*
- *Indexing*
- *Batch*
- *Language Environment™*
- *CF*

Achieve CPU savings- zEC12 measurements

- ***Response time reductions of up to 70%, transaction rate increases of up to 37%, and CPU time per transaction savings of up to 25%.****
- ***See*** ***White paper on DB2 and SAP***

www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP102461

Keep More Active Data with Compression

Efficiently compress active data by providing a low CPU, high performance, dedicated compression accelerator

- Industry standard compression for cross platform data distribution
- Uses Compression features and Data Compression for zEDC feature
- **NEW! DFSMSdss™** use of compression improves utilization of storage
  - Extends compression when DFSMSdss is used as the data mover by DFSMShsm
  - Also available on z/OS V2.1 with the PTF for APAR OA42243

Other Use Cases:

- **Compression for sequential files** with less CPU costs
- **Shorten encryption time** with hardware compression and IBM Encryption Facility for z/OS
- **Fast, secured data transfer across the enterprise** with IBM Sterling Connect:Direct for z/OS Standard Edition V5.2
- **Transparent acceleration** of Java compressed applications

NEW

Migrate and Recall

When migrating data to ML1 Disk using zEDC, use up to **58%** less disk space and use up to **80%** less CPU compared to using DFSMShsm with the COMPACT keyword*

*When using DFSMShsm with zEDC, recalling data from ML1 Disk*uses up to **69%** less CPU as compared to using DFSMShsm with the COMPACT option.*

BSAM/QSAM

Compress data up to 4X, with up to 80% reduced CPU

Disclaimer - Measurements for comparisons were completed as part of a formal performance evaluation on a dedicated, isolated test system

z/OS Management Facility
Extend Skills and Improve Quality of Administration

New!…z/OSMF Delivered as part of z/OS

- **z/OSMF … a base element of z/OS**
  - Included automatically for superior management and administration
  - Helps improve quality, self service, automation -- which means lower costs
- **Monitor Resources**
  - Retrieve historical performance data from Resource Monitoring as well as real time data; export data to a spreadsheet for further analysis
- **Manage capacity and workloads**
  - Support the provisioning of capacity based on overall CPC-wide utilization
- **z/OSMF workflow enhancements**
  - Migration Workflow for z/OS V2.2, simplifying migration
  - Use nested workflows for component based design and reuse
  - Support default values and automatic step execution
- **Manage problems across sysplexes**
  - View incidents across sysplexes and manage from a single point of control
- **Software Management enhancements**
  - Easier to add many non-SMP/E-managed data sets to a software instance to associate other files with the instance

"The IBM z/OS Management Facility is the most important new facility since the Workload Manager and Parallel Sysplex®. Every z/OS staff should be planning for their z/OSMF implementation now. This is a 'must have' for the system programmers of tomorrow (or even today)." Cheryl Watson, Watson and Walker Inc.

Java Enhancements –Superior Performance for your Modern Applications

New! z/OS 2.1 Java V8 Planned Enhancements for 1Q 2015*

- High-performance analytics with vector extension facility (SIMD) support on z13 servers can help accelerate text processing and business analytics
- Improve performance of new Java 8 applications exploiting SIMD on z13 to accelerate string operations, character conversion, simple floating point loops.
- Uses SMT to address capacity planning around growth of zIIP-eligible work
- Expected performance improvements with direct exploitation of CPACF crypto and zEDC, and RoCE
- Use of Runtime Instrumentation facility in zEC12 and z13 can help reduce CPU
- Better integration of Java with z/OS workload management
- Also a future release of IBM CICS Transaction Server for z/OS will support 64-bit SDK for z/OS, Java Technology Edition, Version 8

Read announcements here:
IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8
www-01.im.com/common/ssi/cgi-bin/ssialias?=ca&infotype=an897&letternum=ENUS215-010
IBM 64-bit SDK for z/OS, Java Technology Edition, Version 8
www-01.im.com/common/ssi/cgi-bin/ssialias?=ca&infotype=an897&letternum=ENUS215-004

Java SDK 8 applications[1] running with z13 SMT enabled zIIP specialty engines can achieve throughput improvements of up to 50% compared to Java 7 on zEC12

[1] Java 8 on z13 not using cryptographic clear key security

Improve the performance of many mobile, cloud, and analytics applications running on z13 with SIMD by using Java SDK 8

Java 8 planned GA in 1Q15

*IBM intends to exploit 64-bit SDK for z/OS, Java Technology Edition, Version 8 in IBM WebSphere Liberty Profile for z/OS, and in the full profile of WebSphere Application Server for z/OS.

1.Benchmarks were performed on standalone dedicated System zEC12 EC and z13 using z/OS 2.1 with no other workloads running. IBM 64-bit SDK for z/OS Java Technology Edition, Version 7 SR4 on zEC12 EC was used as the baseline These claims are based on results from internal IBM lab measurements in a controlled environment with dedicated processors. Unless specifically documented, performance is based on Internal Throughput Rate (ITR) measurements and projections using standard IBM benchmarks in a controlled environment. The actual 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. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance stated here. All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

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IBM Encryption Facility for z/OS V1.2:
Securely share sensitive data with business partners

- **The Encryption Facility for z/OS helps organizations and business partners transfer sensitive data securely**
  - Produces encrypted data written to tape, disk and other removable media.
  - Encryption Services feature now supports the OpenPGP* standard, RFC 4880. It supports popular OpenPGP certificates for key information exchange with business partners.
- **Enforces practices for data integrity**
  - Digital signatures for partner authentication and non-repudiation of messages.
  - Uses a strengthened randomly generated symmetric session key.
- **Efficient processing using standard libraries**
  - Uses zEDC and hardware encryption for faster, more efficient processing; Uses the standard ZIP and ZLIB algorithms.

*OpenPGP is a standard protocol for ensuring the integrity of data that can be exchanged between trusted partners.

1.
All measurements were performed on standalone dedicated System zEC12 EC and z13 EC using z/OS 2.1 with no other workloads running. The z13 EC machine was at GA hardware level (DD2.1). Only externally documented options were used. zEC12 EC was configured with CPs and zIIPs. z13 EC system was configured with single thread CPs, single thread zIIPs, and SMT zIIPs. Hardware instrumentation data was collected and analyzed on all benchmarks to verify performance results.

New!

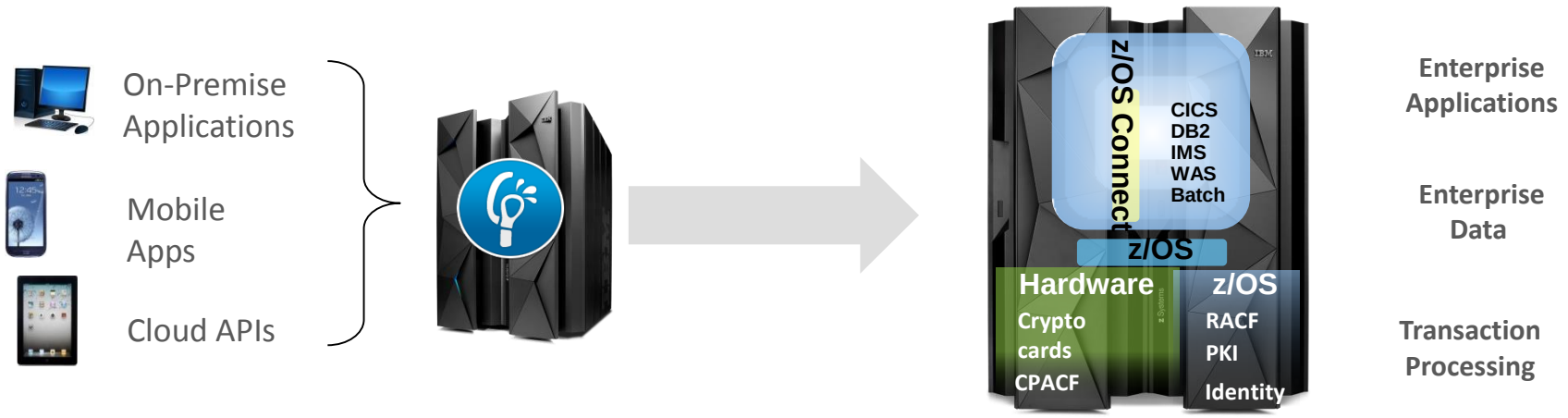
Customers running Encryption Facility to share sensitive files with business partners may encrypt their data using clear key in half the time ***and reduce the CPU time by one third*** when using IBM 64-bit SDK for z/OS, Java Technology Edition, Version 8 on z13 compared to using Java 7.1 on zEC12.[1]

IBM WebSphere Liberty z/OS Connect
Deliver Mobile to Mainframe Connectivity

Feature of Liberty Profile on z/OS

- Ships with WAS, CICS, and IMS. Runs on z/OS.
- Built on z/OS quality of service: security, audit, workload management
- A common solution for mobile, cloud and web transactions
- Leverages the power of data on z13
- Hides the complexity of connecting to z/OS using REST
- Mobile developers can discover the select transactions you choose
- No additional cost to use z/OS Connect, packaged with WebSphere Application Server, CICS and IMS

z/OS Connect helps mobile users connect to infrastructure on z/OS



* Estimated performance, sizing and cost for z13 based on tests conducted on zEC12

This is based on an IBM internal study designed to replicate a typical IBM customer workload usage in the marketplace. Test involved measuring throughput in transactions per second and response time for executing a materially identical mobile transaction processing workload in a controlled laboratory environment with comparable tuning and sizing. Prices, where applicable, are based on US prices as of 12/31/2014 for both IBM and competitor. Price comparison based on 3 Year Total Cost of Acquisition (TCA) includes all HW, SW and 3 years of service & support. Sizing shown is for Production to which 30% is added for System z for Dev/QA and CBU pricing for DR and 2x for Distributed.

Deliver Value with Smarter Compilers-

Designed for Speed
Continued Modernization

- ✓ Dynamic XL C/C++ lets you use a single source file and select different levels of hardware architecture at runtime for more flexibility
- ✓ Optimize code with XL C/C++ support for the new z13 processor*, with new ARCH(11) and TUNE(11) parameters
- ✓ Improved compiler performance with SIMD
  - COBOL V5.2 and XL C and C++ use SIMD for string operations.
  - XML System Services use SIMD on z13 for character and string manipulation

Note: The C/C++function is also planned to be available in February 2015 for z/OS V2.1 XL C/C++ with a web deliverable

- *Enterprise COBOL 5.2 provides up to **14%** reduction in CPU time for compute intensive batch COBOL programs executing on z13 compared to the same program compiled with the Enterprise COBOL 5.1 GA compiler executing on zEC12.**
- *With recompilation of C and C++ modules on z13 you can achieve improved throughput to drive up to **17%** more work with the same capacity***

* This significant reduction in execution time is achieved through more powerful hardware, improved compiler optimization, increased exploitation of the Decimal Floating Point facility and exploitation of the new Vector Facility. Users of COBOL 5.1 upgrading to the latest PTF will also see a performance improvement compared to the Enterprise COBOL 5.1 GA compiler.

**Disclaimer:

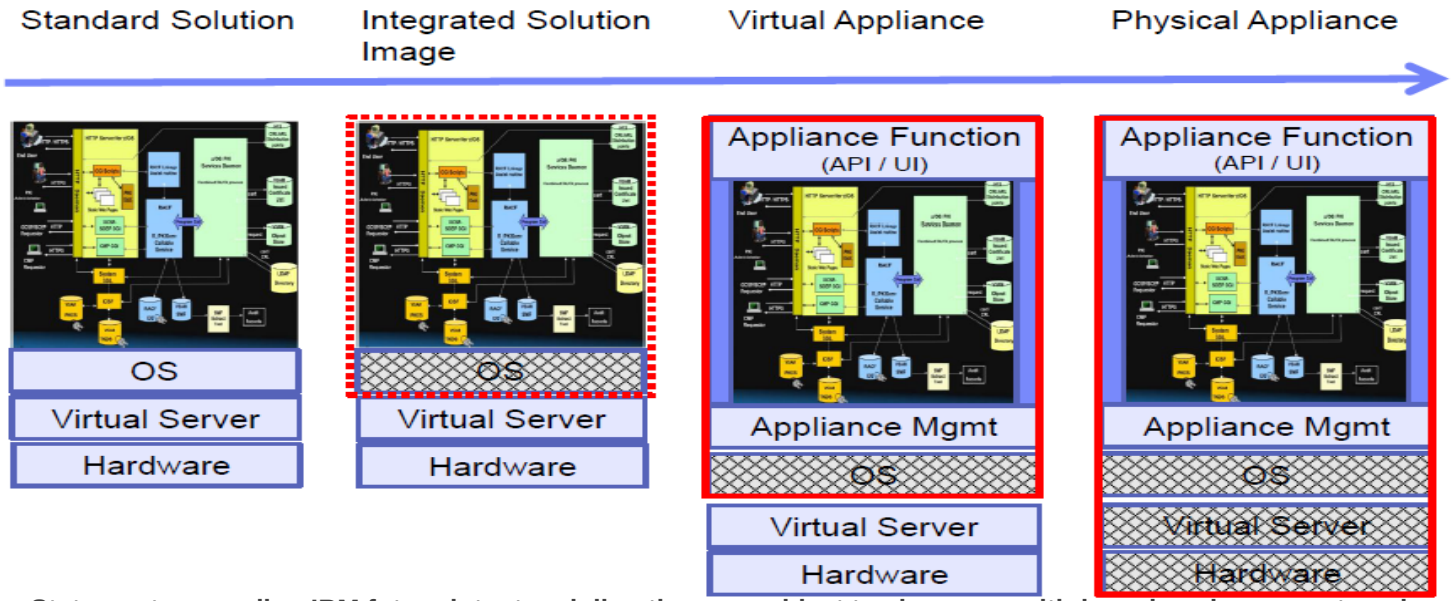
The performance improvements are based on internal IBM lab measurements. All CPU intensive integer and floating-point benchmarks were compiled in 64-bit addressing mode and built using XPLINK, HGPR, O3 and HOT compiler options. Majority of the benchmarks were also built with IPA LEVEL(2) with PDF compiler option. The benchmarks compiled with the z/OS 2.1 compiler were executed on zEC12 and built using the ARCH(10) TUNE(10) options; the benchmarks compiled with the V2R1M1 compiler were executed on zNext and built using ARCH(11) TUNE(11) options. Performance results for specific applications will vary, depending on the source code, the compiler options specified, and other factors

IBM

Announced on Feb 24th, 2015

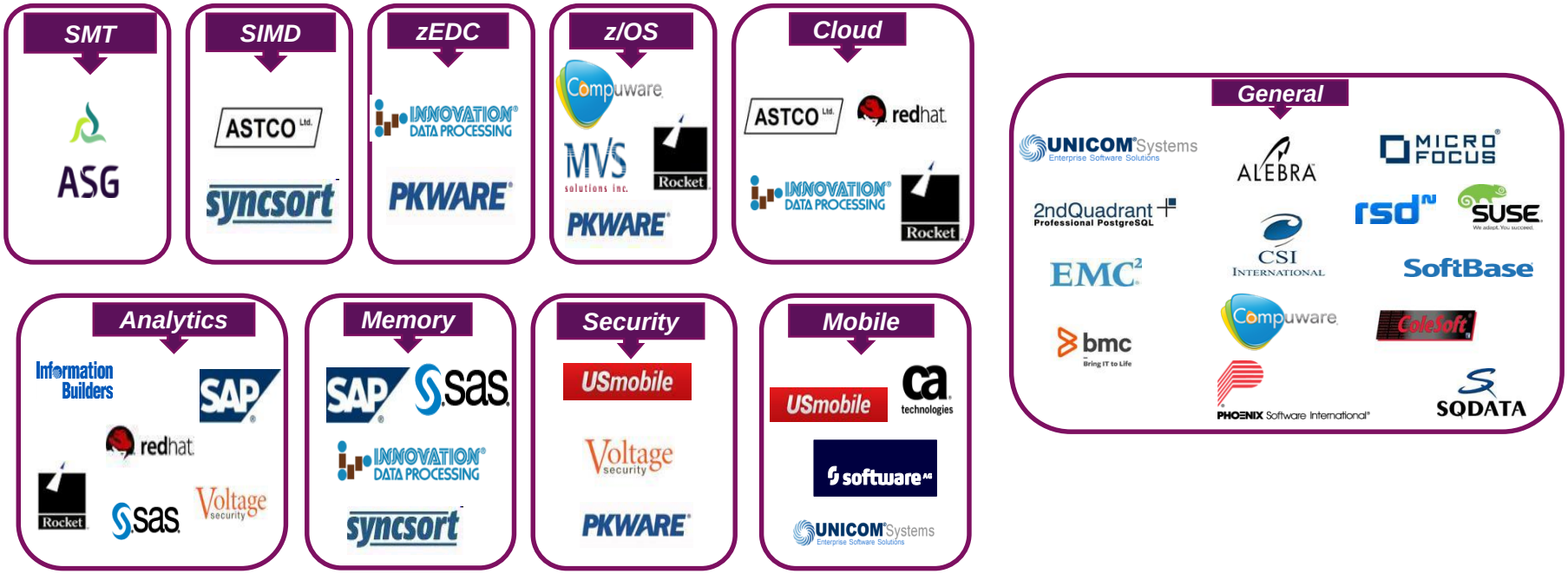
What is GDPS Virtual Appliance

- GDPS Virtual Appliance is a fully integrated software solution that provides Continuous Availability & Disaster Recovery functions for zLinux customers
  - It is an image comprising of an operating system, the application components, an appliance management layer which makes the image self-containing, and APIs / UIs for customization, administration, and operation tailored to the appliance function.
  - It improves both consumability and time-to-value for customers.



Software Developer ecosystem support for z13

In total, more than 4,500 z/OS applications on the platform and over 3,100 Linux on z applications



SW Billing and Pricing Changes

Mobile Workload Pricing Enables Growth

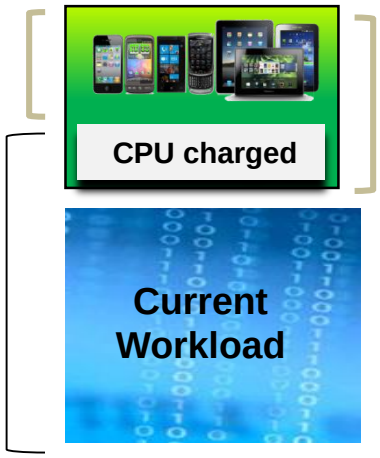
Improves economics for mobile transactions processed in z Systems environments

- Reduces the impact of MLC charges where higher mobile transaction volumes cause a spike in utilization
- No need to change your infrastructure but you must track mobile transactions
- Scale easily with new pricing option

Prior Peak Utilization

CPU reported

New Peak Utilization



Mobile Transaction Growth

Industry first for pricing mobile workloads *provides up to a* ***60% reduction*** *on the processor capacity reported for mobile transactions*

- Applicable to workloads running on z13, zEC12,BC12…
- Up to a 60% reduction in reported CPU utilization for Mobile transactions
- Available to all enterprises running a zEC12 /zBC12 server actual mobile work may run on any zEnterprise machine or later
- Just use MWRT to adjust for Mobile workload impact

See announcement letter for details

www.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/9/649/ENUSA14-0429/index.html&lang=en&request_locale=en

MPO (Migration Price Option)

Use a convenient migration window at compelling economics

- New pricing option for z/OS V2, with a 24 month window for migration from z/OS V1 to V2
- Eligible for clients worldwide that have workloads with aggregated pricing today.
- Reduce need to complete migrations within a 12 month window
- Available up to 24 months from when customers license z/OS V2
- Reduce the total cost of running multiple z/OS versions concurrently during migrations
- Offers up to a 24 month window whereby
  - ✓ Customers do not pay for two separate versions
  - ✓ During a version to version operating system migration, the new version is charged at the combined concurrent peak MSUs for all versions reported on the Sub-Capacity Report for that month.
  - ✓ Charges for the previous version are waived

http://ibm.com/systems/z/swprice/reference/announce.html

IBM z13 Software Announcements

Extending software price/performance for the z13 …

- **IBM continues its strategy to enhance software price/performance for the latest hardware**
  - Announcing "Technology Update Pricing for z13" called TU3
  - Published exhibit of AWLC price reductions for z13, delivers 5% price/performance on average

- **IBM Collocated Application Pricing*** **-** Run your systems the way you want to run them
  - For new applications, workloads priced as if in a dedicated environment while technically integrated with other workloads
  - Applicable to new applications on all zEnterprise and later machines, z196 to z13
  - Eligible applications will have no effect on the reported MSUs for other subcapacity middleware, and reduced impact on z/OS (adjusts MSUs like an offload engine, similar to Mobile Workload Pricing)
  - Enhancement to MWRT subcapacity tool coming

- **Country Multiplex Pricing* -** Evolution from Sysplex pricing, a shift to greater flexibility and simplicity
  - A Multiplex is the collection of all zEnterprise and later machines in a country, measured like one machine for software subcapacity reporting (new multiplex sub-capacity reporting tool coming)
  - Flexibility to move and run work anywhere with the elimination of Sysplex pricing rules
  - A new way of measuring and pricing MSUs, as opposed to aggregating under current rules
  - For anyone selecting Multiplex Pricing there will be a pricing transition, shifting to this model is about growth and flexibility going forward (baseline + growth)

* More info will be available 1H2015

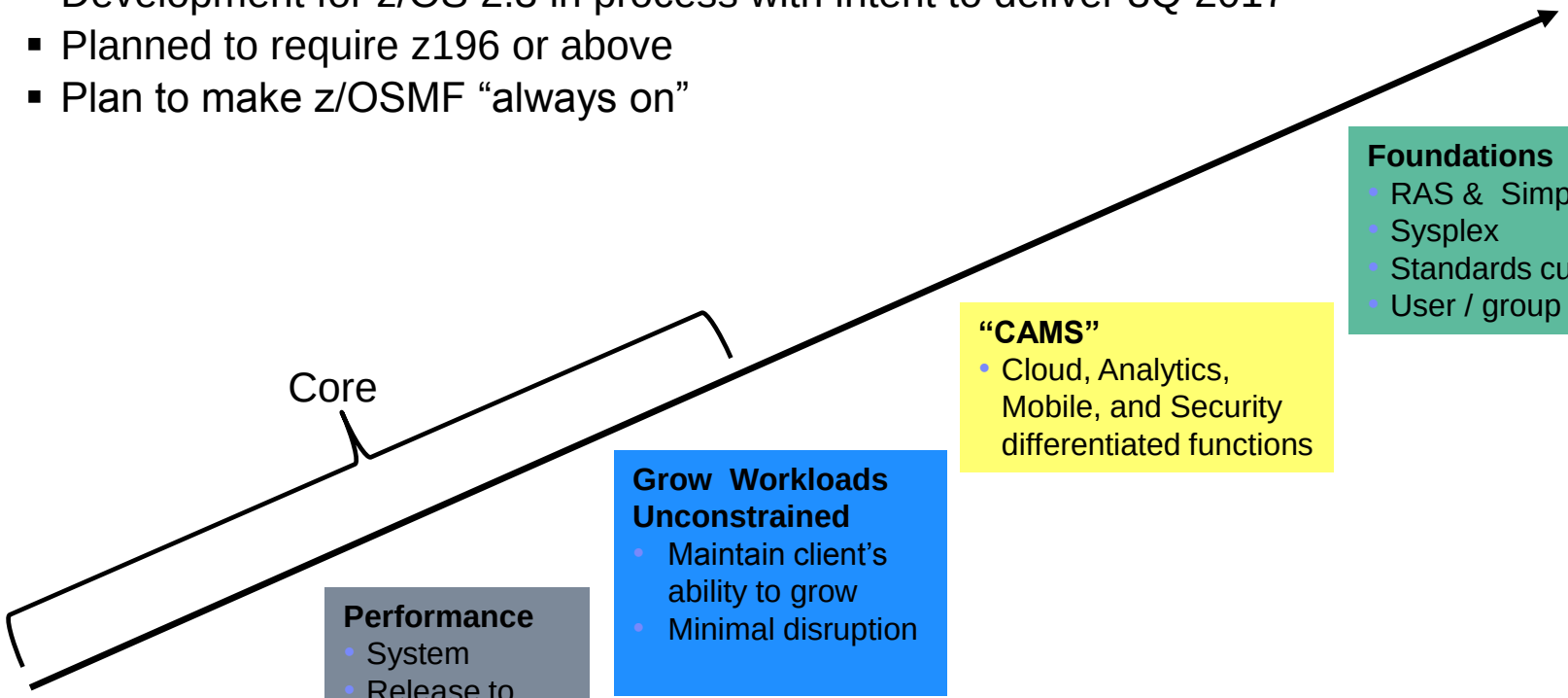
SHARE Requirements

- "TOP 39" list during the z/OS 2.1 development and delivery
  - With z/OS 2.1 we have delivered on over 30% of those
  - With z/OS 2.2 we expect to have increase that to almost 40%
- As we began the development cycle for z/OS 2.2 we asked for updates.
- The price of success – The "TOP 50+25"
  - ~ 25% have been delivered or are planned to be delivered (see the bottom of the page)

We continue to work with the SHARE community to address key requirements

IBM z/OS V2.3

- Development for z/OS 2.3 in process with intent to deliver 3Q 2017
- Planned to require z196 or above
- Plan to make z/OSMF “always on”

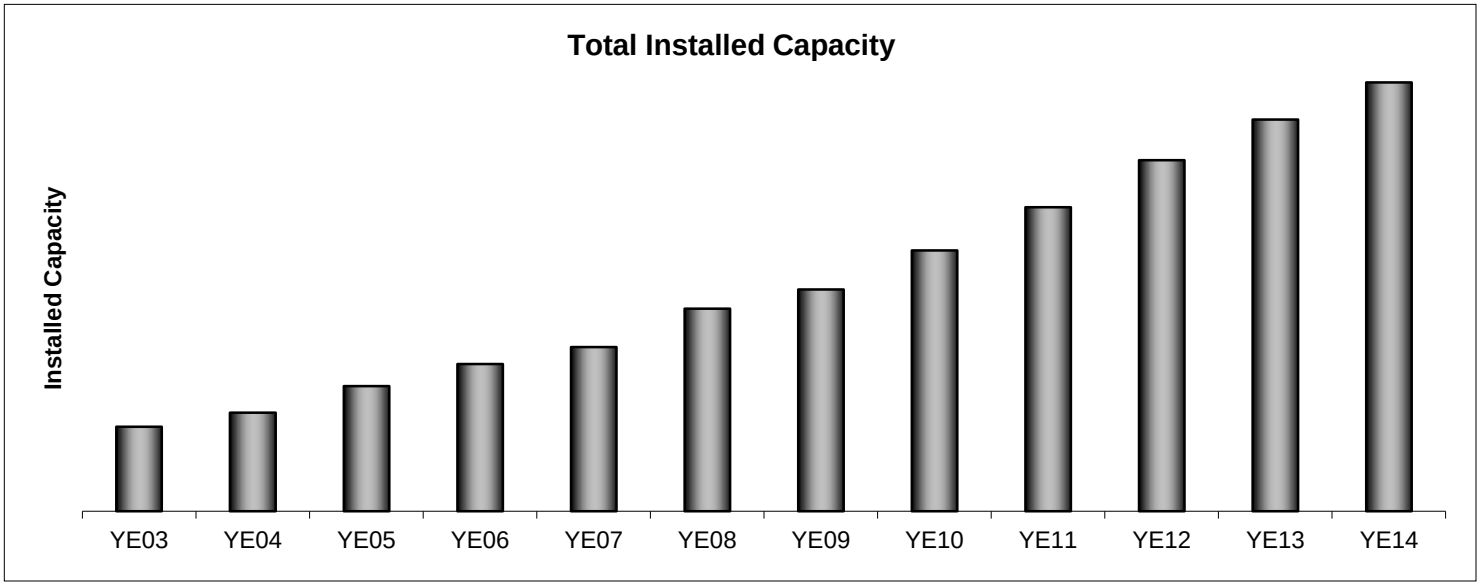


- Ensure client workload growth with minimal changes to applications or operations
- Continue building out z/OS provisioning and services to the cloud
- Continued focus on SHARE requirements

Overall we focus on delivering a balanced plan and release across these categories

IBM z Systems Momentum

z Systems Total Installed Capacity



311

new accounts since 3Q10 zEnterprise launch, with 41% in growth markets

221

hybrid computing units shipped since 3Q10

12%

growth in installed IFL MIPS (YTY)

74,000

Students worldwide have participated in the Master the Mainframe for IBM System z® since 2005

7,600+

ISV apps run on IBM z Systems; More than 650 new and upgraded applications added for z/OS and Linux in 2014.

[IFL = Linux-on-z Only Engine]

Select Enhancements Enabled on Prior Releases
Refer to the Preview: z/OS V2.2 announcement letter

CORES

- z/OS V2.2 will be designed to support up to 141-way multiprocessing (SMP) in a single LPAR on IBM z13 systems, or up to 128 physical processors (256 logical processors) per LPAR in SMT mode. This support is also available for z/OS V2.1 with the PTFs for OA43366, OA43622, OA44101, and OA44439. z/OS V1.13 supports up to 100 processors configured in a single LPAR in non-SMT mode.

FLASHCOPY

- z/OS V2.2 DFSMS will be designed to provide new FlashCopy function by supporting up to 12 targets for incremental FlashCopy. This function is also available for z/OS V1.13 and z/OS V2.1 with the PTFs for APARs OA45412 and PI22256,

FABRIC IO PRIORITY

- I/O priority is set throughout much of the system by the I/O supervisor (IOS) and z/OS Workload Manager (WLM) components. This new function requires a z13 processor. It is planned to be available with z/OS V2.2 at its general availability and available for z/OS V1.13 and z/OS V2.1 with PTFs for APARs OA44529 and OA44431

FOUR SUBCHANNELS

- z/OS V2.2 is planned to support up to four subchannel sets on z13 server. All four subchannel sets support FICON and zHPF protocols. This support is also available on z/OS V1.13 and z/OS V2.1 with the PTF for APAR OA43495

zHYPERWRITE

- IBM zHyperWrite is a new technology that combines DS8000 and z/OS enhancements that deliver performance benefits for writing operations to DB2 logs in the Metro Mirror (PPRC) environment. This new technology can help reduce up to 43% of the DB2 log write time2. zHyperWrite requires z/OS V2.1 with the PTF for APAR OA44973 or z/OS V2.2, either DB2 10 (5605-DB2) or DB2 11 (5615-DB2) with the PTF for PI25747, and an IBM DS8870 Storage

zEnterprise Data Compression (zEDC)

- z/OS V2.2 DFSMSdss and DFSMShsm are designed to exploit this capability for dumping and restoring data and whenDFSMShsm uses DFSMSdss to move data. These capabilities are also available on z/OS V2.1 with the PTF for APAR OA42243.

XMLSS SIMD

- z/OS V2.2 XML System Services is planned to use the new vector (SIMD) instructions available on z13 processors. This function, also available on z/OS V2.1 with the PTF for APAR OA44545, is intended to help improve performance for nonvalidating XML parsing.

4 SUBCHANNELS

- z/OS V2.2 is planned to support up to four subchannel sets on z13 servers. This support is also available on z/OS V1.13 and z/OS V2.1 with the PTF for APAR OA43495.

SIMD

- z/OS V2.2 is planned to provide support for the new vector extension facility (SIMD) instructions available on z13 servers. This new support, also planned to be available for z/OS V2.1 with the PTFs for APARs OA43803 and PI12412

RACF ENCRYPTION

- RACF will offer better protection for offline attacks against encrypted passwords by allowing you to use stronger encryption. This support is also available in z/OS V1.13 and z/OS V2.1 with the PTF for APAR OA43999.
- z/OS V2.2 running on z13 processors with IBM System Storage DS8000 series devices and a minimum MCL is planned to support a new *health check for FICON dynamic routing.* This support, also planned to be available for z/OS V1.13 and z/OS V2.1 with the PTF for APAR OA43308

ROCE

- z/OS V2.2 Communications Server is planned to support the new virtualization capability planned for the RDMA over Converged Ethernet (RoCE Express) features on z13 processors. The virtualization is planned to be available on z/OS V2.1 with the PTF for APARs OA44576 and PI12223 and the corresponding RMF support with the PTF OA44524

For more information…

z/OS Main Page	z/OS Home page	www.ibm.com/systems/z/os/zos/
z/OSMF home page	z/OSMF Home Page	www.ibm.com/systems/z/os/zos/features/zosmf/
IBM V2 Education Assistance	Education	www.redbooks.ibm.com/redbooks.nsf/pages/IBMIEAV21avail?Open
IBM Redbooks®	System z Redbooks	www.redbooks.ibm.com/portals/systemz
Share	Share User Group	www.share.org
Academic Initiative	The Academic Initiative	www.ibm.com/ibm/university/academic/pub/page/systemz
For Partners	IBM PartnerWorld®	www.ibm.com/partnerworld/
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Like us on Facebook	System z Mainframe	https://www.facebook.com/IBMsystemz
Connect on LinkedIn	System z Advocates System z Events Mainframe Experts IBM Mainframe Professionals	www.linkedin.com/groups/
Subscribe on YouTube	IBM System z	www.youtube.com/user/IBMSystemZ

New Redbooks and Papers

Redbooks *(draft)*

- IBM z13 Technical Introduction, SG24-8250

Redpapers *(draft)*

- Get More Out of Your IT Infrastructure With IBM z13 I/O Enhancements, REDP-5134

PoVs

- zMobile Security, REDP-5176
- IBM z13 SMT, REDP-5144
- IBM z13 SIMD, REDP-5145
- IBM z13 Large Memory, REDP-5146
- Enhancing Value to Existing and Future Workloads with IBM z13, REDP-5134

Thank You