

Smarter Computing: z/OS V2.1

Redelf Janßen, Client Technical Specialist System z

Redelf.Janssen@de.ibm.com

+49-7034-643-2431



Trademark

The following are trademarks of the International Business Machines Corporation in the United States and/or other countries.

AIX*	DFSORT	Parallel Sysplex*	System x*	zEnterprise*
BladeCenter*	FICON*	RACF*	System z*	z/OS*
DataPower*	InfiniBand	Redbooks*	System z9*	
DB2*	Infoprint*	RMF	System z10*	
DFSMSHsm	Maximo*	Smarter Cities*	WebSphere*	

* Registered trademarks of IBM Corporation

The following are trademarks or registered trademarks of other companies.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency which is now part of the Office of Government Commerce.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Windows Server and the Windows logo are trademarks of the Microsoft group of countries.

ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java and all Java based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.

Linear Tape-Open, LTO, the LTO Logo, Ultrium, and the Ultrium logo are trademarks of HP, IBM Corp. and Quantum in the U.S. and other countries.

* Other product and service names might be trademarks of IBM or other companies.

Notes:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput 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 ratios stated here.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

What is Happening in the Market

Mobile devices are redefining the conversation with the client



90%

Of organizations will support corporate applications on a personal devices by 2014. Protection of IBM zEnterprise data and secured communications will become even more critical.

Cloud Computing deployments are increasing rapidly



60%

Of CIOs view cloud computing as one of the most important elements up from 33% two years ago. Cloud computing is enabled by the isolation of workloads and data protection on zEnterprise.





Exponential growth in data as a basis for new insight



2.7ZB

This is a 50% increase in Digital Content over 2011. By 2020, IDC estimates there will be 35 zetabytes (ZBs) of data. z/OS® data encryption solutions can protect data throughout its life cycle.

Customer Needs Point to Huge Volumes of Data, Security and an Infrastructure

	Client Pain points	z/OS V2.1 – A Platform to Drive innovation.
 <p>Cloud Ready</p>	<p>Optimize your environment to meet growth and deliver efficiencies of a private cloud</p>	<ul style="list-style-type: none"> ✓ Mission critical transaction processing and batch workloads run with even more with operational efficiencies and drive availability to a new frontier
 <p>Data Ready</p>	<p>Build a High Performing and Highly Available Data Serving Platform</p>	<ul style="list-style-type: none"> ✓ Highly optimized management and data serving creates opportunities to support new mobile, social or analytics applications dependent on huge volumes of data with superior performance. Create a superior foundation for data serving and business intelligence.
 <p>Security Ready</p>	<p>Drive Security Readiness for new Regulations</p>	<ul style="list-style-type: none"> ✓ Drive a security ready infrastructure to help you to transform data to business insight while protecting privacy of customer data. Reduce risk by meeting emerging and evolving regulatory compliance requirements in a global market.
 <p>Powered by Management</p>	<p>Continue z/OS modernization and simplification</p>	<ul style="list-style-type: none"> ✓ Simplify ease of use, and productivity for z/OS. Improve quality and reduce dependency on skills.

z/OS Version 2.1, The Smart Foundation for Smarter Computing

A New Version of z/OS

Efficiency at Scale

Scale and Availability for Cloud Ready Qualities of Service

- *Cloud-like scale*
- *Innovations for paging, throughput*
- *Optimized performance reporting*

Ultimate Security

Security ready infrastructure to protect data, reduce risk and strengthen customer trust

- *New Crypto as a Service*
- *Additional industry standards support*
- *Risk reduction with audit readiness*



Operational Analytics

Outstanding data serving to drive analytics and power new data hungry applications

- *Optimized data storage*
- *Faster file retrieval with new zFS*
- *Improved FICON management*

Powered by a Superior Management Foundation

Management built into the fabric of z/OS

- *Workload Optimization built in*
- *Continued batch modernization*
- *Extended management reporting*



z/OS Roadmap

z/OS, z/OSMF and server cadence



z/OS Version	GA
V1.12	2010
V1.13	2011
V1.13-zEC12	2012
V2.1	2013

Continued Cadence

- Performance, Availability and Scale
- Management and Ease of Use
- Security and Resilience, Encryption
- Programmatic improvements
- Data Serving enhancements
- Ongoing Hardware support
- Storage enhancements
- Improved communications



Efficiency at scale

Superior support for high volumes of heterogeneous workloads to drive business critical workloads + private clouds



Operational Analytics

Faster business insight, manage huge quantities of data, drive a strong foundation for analytics



Ultimate Security

Protect data privacy and secure workloads

IBM zEC12 System Functions and Features



(z/OS support in blue)

<i>Five hardware models</i>
<i>5.5 GHz processor chips</i>
Up to 100-way on z/OS 1.12 and higher
<i>Doubled HSA – 32 GB</i>
Improved processor cache design
<i>Improvements to pre-fetch instructions</i>
<i>Up to 3TB real memory (1TB per LPAR)</i>
<i>Improved availability with Redundant Array of Independent Memory (RAIM)</i>
<i>Industry standard Peripheral Component Interconnect Express Generation 2 (PCIe Gen2) I/O drawer</i>
Flash Express (Storage Class Memory)
1 MB Pageable Large Pages
Dynamic reconfiguration support for Flash Express (planned for 1Q2013)
2 GB Large Page Support (planned for 1Q2013)*
Optional PLPA, COMMON page data sets
Crypto Express4S cryptographic coprocessors and accelerators
New support for PKCS #11 Hardware Security Module (HSM)
DUKPT for MAC and Data Encryption

New and enhanced instructions
IBM zAware
OSA-Express4S (GbE LX and SX, 1000BASE-T, 10 GbE LR and SR)
FICON Express8S
Parallel Sysplex® InfiniBand™ (PSIFB) Coupling Links
High Performance FICON
CPU Measurement Facility
CFCC Level 18 enhancements
Java exploitation of transactional memory-complete Op sys support
Exploitation of new hardware instructions – XL C/C++ ARCH(10) and TUNE(10)
<i>Common Criteria Evaluation Assurance Level 5+ (EAL5+) certification</i>
<i>IBM zEnterprise BladeCenter® Extension (zBX) Model 003 support of general purpose blade servers and optimizers</i>
<i>zBX-003 with IBM WebSphere® DataPower® Integration Appliance XI50 for zEnterprise (DataPower XI50z)</i>
<i>zBX-003 with select IBM BladeCenter PS701 Express blades, or IBM BladeCenter HX5 (7873) blades</i>

What's **New** in z/OS V2.1

Cloud Efficiency at Scale

Cloud Computing Qualities of Service

- Cloud-like scale to support huge volumes of workloads through server improvements
- Availability/performance through innovations (Flash Express and Pageable large pages, 2 GB pages)
- Optimized transactional performance through improvements to multi-threading (Transactional Execution enhancements, System Logger enhancements)

Data Operational Analytics

Manage Data Explosion

- Designed for efficiency—Optimized data placement, access and retrieval to reduce costs
- Improve catalog sharing with VSAM record level sharing within a Parallel Sysplex
- zFS optimized file structures for improved scalability
- Optimized management and performance improvements for FICON® channels
- Improved batch parallelism. DFSMSHsm™-migrated data sets allocated by batch jobs recalled in parallel vs. sequentially

Security Ultimate Security

Security ready to protect assets

- Get access to System z encryption over the network (crypto as a service)
- Strengthened auditing and reporting for Digital Certificates
- Industry-ready standards support (NSA Suite B, TLS 1.2, new certificate validation support)
- Improved support for Enterprise PKCS #11 processing

Powered by a Superior Management Foundation

■ z/OS Version 2.1 Efficiency at Scale

Industry-leading availability and scalability of System z remain reasons why organizations depend on z/OS for their most critical processing. z/OS V2.1 raises the bar on these qualities of service.

Cloud - like Qualities of Service

Efficiency at Scale

- **Scale to accommodate huge volumes of workloads through new server improvements**
 - **100-way** SMP support in a single LPAR on zEC12, 50% more capacity than z196
- **Improved parallelism and throughput**
 - **2 GB** pages to improve paging performance
 - Support for HW/SW for Flash and **1 MB** pageable large pages
 - Enhanced **Transactional Execution Facility** for improved parallelism and throughput
- **Availability/scalability**
 - Logging enhancements to improve scalability
 - DFSMSHsm **Fast Replication** support to enable a consistent point in time snapshot for recovery
- **Enhanced discovery capability (zDAC)** for configuration ease
 - Usability and performance improvements for z/OS FICON Discovery and Auto Configuration (zDAC) make discovery accessible to installations, large and small
- **Cache Structure enhancements for DB2®**
 - DB2 batch updates bypass CF cache & write to disk for improved online performance
 - **Batch Runtime Environment enhancements for improved data sharing**
 - COBOL and Java programs to interoperate using a shared DB2 while maintaining transactional integrity, now extended to include PL/I , now supports Java and transactional VSAM (DFSMSStvs), in addition to DB2.



z/OS offers the availability, scale and performance you need to run business critical workloads and even your private clouds. With unmatched qualities of service, customers can innovate on z/OS.

"The difference between the Cloud and a Mainframe is the year you were born." anonymous

z/OS Version 2.1 Operational Analytics

We live in a data hungry world. z/OS V2.1 is the undisputed data hub to drive fast business insight. Designed for speed, z/OS enables data intensive workloads like analytics, mobile and social computing

Intelligent Data for Smarter Computing

- **Smart Data**

- **Optimize data residency through policy-based storage tiering**

- For DFSMSHsm, more policy-based movement of SMS-managed data
- Move less recently referenced data to the most appropriate storage tier within the primary hierarchy

- **Fast Data**

- **Find files faster** with zFS directory scale improvements

- **Parallel recalls of migrated data sets improve throughput**

- **Faster batch** – DFSMSHsm-migrated data sets allocated by batch jobs recalled in *parallel vs. sequentially*

- Improved catalog performance in a parallel sysplex with **VSAM RLS** for catalogs

- **Configuration enhancements**

- Improved support for Dynamic Channel Path Management for FICON

- **Superior Data Serving**

- Huge data sorts (**DFSORT™**) (64 GB to 1TB) memory work space- great for sorting very large files
- Large **PDSE** member size limit for additional scale; enables use of PDSEs vs many large sequential data sets



The IBM zEnterprise is the industry's platform of choice for operational analytics with enhancements for policy based management, superb performance, data protection and unrivaled data serving.

z/OS Version 2.1 Ultimate Security



z/OS V2.1 is a trusted operating environment that provides data protection, risk mitigation, and secured isolation. Traditionally, the security hub for the enterprise with protection of core data, zOS can serve as a crypto hub for Linux guests

z/OS...Extending ultimate security to the enterprise

- **Remoteable cryptography lowers cost via *Crypto as a Service***
 - Enable remote access to mainframe cryptography from Linux, zBX clients through the network
- **Enhanced z/OS certificate processing**
 - Support Extended Validation certificates and Certificate Revocation List (CRL)
 - Enhanced digital certificate processing, reporting and auditing
- **Extensions to secured communication**
 - Strengthened crypto support for TLS V1.2 higher-strength ciphers
 - z/OS FTP secure file transfers for securing file delivery against interception
- **Banking and Government Ready (Industry Ready)**
 - Help banking & finance clients meet standards requiring stronger crypto with new ICSF functions
 - Meet NSA Suite B requirements for national security application needs
 - RACF®, z/OS PKI Services, and z/OS System SSL support for Enterprise PKCS #11 processing
- **Reduce risk of unauthorized access**
 - Improved security with automatic user logoff after a specified period of inactivity (for USS)
- **Improve compliance**
 - Get early advance warning of certificate expiration with new **Health Checks**



System z and zOS are the secured hub of the enterprise,

z/OS provides protection of processes and data, compliance and public key infrastructure , plus more...a platform that is Security Ready.

*The average cost of a data breach incident is US \$5.5 M**

z/OS plus z/OSMF Version 2.1, The Management Foundation for Smarter Computing



First, z/OS built in management capabilities helps you meet your most demanding service level requirements with ease ...so you can compete effectively in today's service driven market

z/OS Offers Superior Management, by Design

▪ **Holistic zEnterprise Resource Monitoring**

- In z/OS V2.1, this capability is planned to be extended by providing new SMF 104 Records to provide performance-related information about Linux on System z, and also about Linux on IBM System x®, AIX®, and Microsoft® Windows® Server 2008 operating systems running on zBX blades.
- RMF™ reporting enhancements for 1 MB pages and Flash Express.
- Partial RMF processing offload to zIIPs

▪ **Optimization and Simplification**

- Further optimize code for C and C++ programs running on zEC12 servers
- Improve **symbol** processing in JES2 environments fosters productivity
- New convenient “**notepad**” in the CF for shared use by applications. Write up to 1024 bytes of application data. Ex: SAP announced use of scratchpad for improving enqueue performance
- New **DISPLAY PPT** command to view current program properties in use by the system

▪ **Global print with World Type Fonts**

- IBM Infoprint® Fonts & World Type fonts, Asian double byte fonts, not previously available in z/OS are now in z/OS to help you print for a global marketplace



Built in management automatically balances workloads and resources to achieve service objectives

z/OSMF offers an intuitive view into configuration management to improve the quality and economics of management.

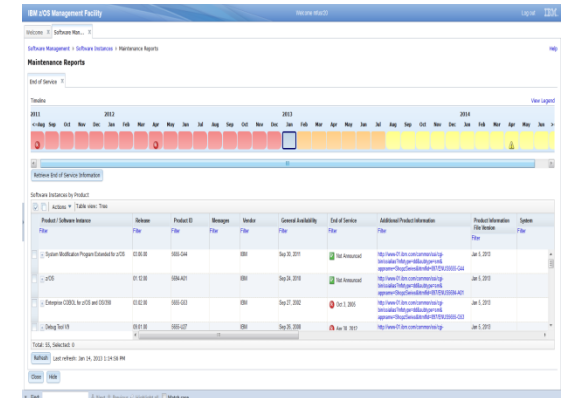
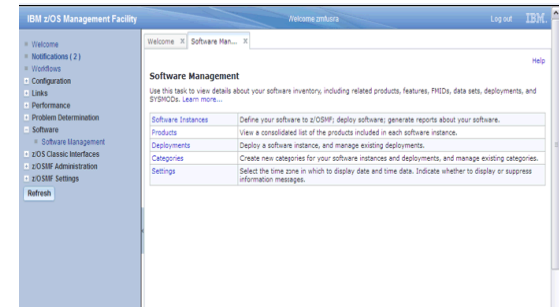
z/OSMF Version 2.1, Intuitive Management for Smarter Computing

- **Keep your System Software assets up to date**
 - Report on software service levels and currency of system software

- **Workflow infrastructure simplifies z/OS configuration tasks**
 - Simplify sequencing of tasks to user roles using new workflow; addressing skills needs as well

- **New Optimized footprint and fast startup**
 - New use of Liberty profile in WebSphere for z/OS to accelerate deployment; faster time to value

- **Enhanced Efficiencies**
 - New z/OSMF z/OS Jobs REST API to submit work, bridging batch and web-based applications



"The z/OS Management Facility initiative has been expanded with a number of new functions available with z/OS V1.13. This product shows great promise of being a great help for the younger z/OS system programmers, who may not have many years of experience with the platform. "

- Bertil Andersson, Senior Enterprise IT Architect, Svenska Handelsbanken

Enabling solutions that drive business value



Banking

- **IBM Smarter Analytics™ Anti-Fraud Infrastructure for zEnterprise:** *Architecture for fraud prevention on System z.*



Insurance

- **IBM Genelco Insurance Administration Solution™:** *Customer-centric and rules-based core Life, Health and Annuity solution.*



Smarter Cities®

- **Intelligent Operations Center:** *Integrated data visualization, real-time collaboration and deep analytics to help city agencies.*
- **Social Services (Curam):** *Secure end-to-end social program service delivery, meeting citizens' needs.*
- **Asset Management (Maximo®):** *Support weapon systems, facilities, transportation and IT assets with a single platform.*



Healthcare

- **IBM Health Plan Integration Hub:** *Code and policy management supporting ICD-10 and future transformations.*
- **IBM Smarter Analytics Signature Solution: Anti-Fraud, Waste and Abuse for Healthcare:** *Analytics to detect suspicious claims before payment.*



Retail

- **IBM zEnterprise Smarter Analytics for Retail:** *Customer analysis and business performance management*

“Our users are getting their reports as much as 70 percent faster ... the solution has the potential to sharpen the company’s competitive edge moving forward.”

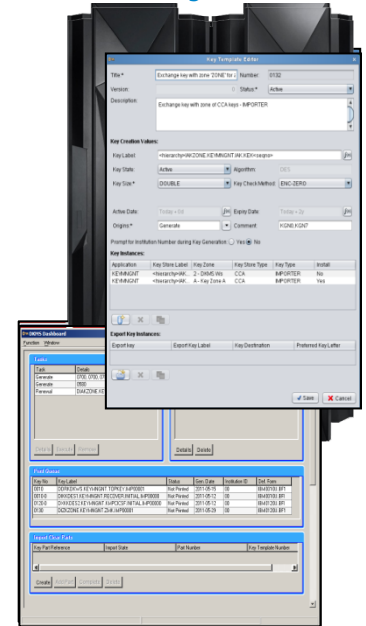
Swiss Re



New Solution! IBM Enterprise Key Management Foundation (EKMF) Solution

EKMF leverages System z Hardware Cryptography for protection of sensitive keys

- **What's new:**
 - EKMF is a flexible and highly secure key management system for the enterprise
 - Offers centralized key management on zEnterprise and across distributed platforms
 - Well-suited for banks, payment card processors and other businesses
- **Features / Business Value:**
 - Uses IBM Hardware cryptography for the ultimate protection of sensitive keys
 - Centralized key management–facilitates standardized procedures
 - Comprehensive support in the payment card area
- **Client Benefits:**
 - Efficient key management and automation for high QoS
 - Improved productivity, auditability for Key Custodians
 - Simple dash board with automated management tasks to simplify operations
- **Enabling Centralized Key Management on zEnterprise**
 - **Ultimate Data Protection** – “ Only the System z server provides an integrated encryption infrastructure –from the server, to the z/OS operating system, and protecting sensitive data over the internet, on databases, and tape.”
 - **Transaction Processing – Vantiv** is the #1 Largest processor of PIN Debit transactions in the US*. Vantiv is performing over 2 billion crypto transactions per month



“The cryptographic coprocessors provide the ability to create tremendous encryption capacity for all operating platforms. Our use of the Crypto Express processors has expanded beyond a single purpose, mainframe-only solution, to an enterprise-wide encryption service” - Vantiv

Learn More: http://www.03.ibm.com/systems/services/labservices/platforms/labservices_z.html

*Nielsen Report, March 2012

Some Representative ISV Quotes for z/OS 2.1

Our customers are able to take immediate advantage of the strong scalability and performance improvements offered by IBM z/OS V2.1, with our commitment to Day One support. CA Technologies will continue to work closely with IBM to help maximize the ROI of our shared customers' investment in the z/OS software and zEnterprise hardware, while fostering innovation for the platform.

Mark Combs
Distinguished Senior Vice President,
CA Mainframe Customer Solutions Unit



Commitment to our customers is the driving force behind what we do at GT Software. The foundation for IBM's z/OS V2.1 provides for continued modernization will allow clients, IBM and GT Software to offer even more innovative solutions faster based on the many enhancements of the IBM System z platform. In addition, z/OS modernization helps us improve the quality and speed of software development helping us get new solutions to our customers.

Steve Able
VP, Strategic Software Innovation



We at Software AG are very excited about the Enhancements to Large Page Support and zHPF that will be released with IBM z/OS V2.1 in 2013 as they helped improve overall performance which is an advantage for our customers. Software AG has tested and is also keen on the new Flash Express functionality on the EC12 for z/OS which is a performance enhancement to z/OS page management. As with Large Page Support and zHPF, Software AG feels that Flash Express will benefit our joint customers.

Bruce Beaman
Senior Director, Product Marketing



IBM's new z/OS V2.1 memory and file system performance enhancements look very promising for our data intensive customers running SAS® Analytics and Business Intelligence solutions on the mainframe. Partners for more than 35 years, SAS and IBM remain dedicated to deliver SAS solutions on IBM industry leading infrastructure for the benefit of our customers.

Cheryl Doninger
Senior Director, SAS Research and Development



The IBM z/OS V2.1 enhancements certainly will be valuable. We look forward to z/OS V2.1 availability and performance enhancements to the Coupling Facility and VSAM, and to improved integration capabilities like the new z/OS font collection and pre-initialized Language Environment enhancements.

Jean-Michel Saby
Director of Research and Development



Around the globe, our customers continue to rely on the mainframe as the foundation for running their IT workloads, and the new IBM z/OS V2.1 and IBM zEC12 clearly demonstrate IBM's commitment to addressing the ever-evolving IT challenges enterprise customers face. BMC Software applauds and shares that commitment. Rooted in more than 25 years of mainframe expertise, our innovative solutions continue to ensure customers are able to fully and cost-efficiently harness the security, scalability and performance superiority of the IBM mainframe.

Bill Miller, President
Mainframe Service Management



Support and Service



▪ New! a longer support structure

- z/OS V1.12 support is planned to be increased from three years to four years. Thus, support for Version 1.12 is planned to be extended from September 30, 2013, to September 30, 2014.
- z/OS V1.13 support is planned to be increased from three years to five years. Thus, support for Version 1.13 is planned to be extended from September 30, 2014, to September 30, 2016.
- No changes are planned for z/OS V1.11 support, which is planned to withdraw program services on September 30, 2012.
- In addition, to allow z/OS V1.11 and z/OS V1.12 customers to upgrade to z/OS V1.13, IBM plans to continue to make z/OS V1.13 available for ordering until z/OS V2.1 general availability.

▪ Migration and Support

- Planned Two Year Release Cycle
- Maintaining “n+2” migration paths

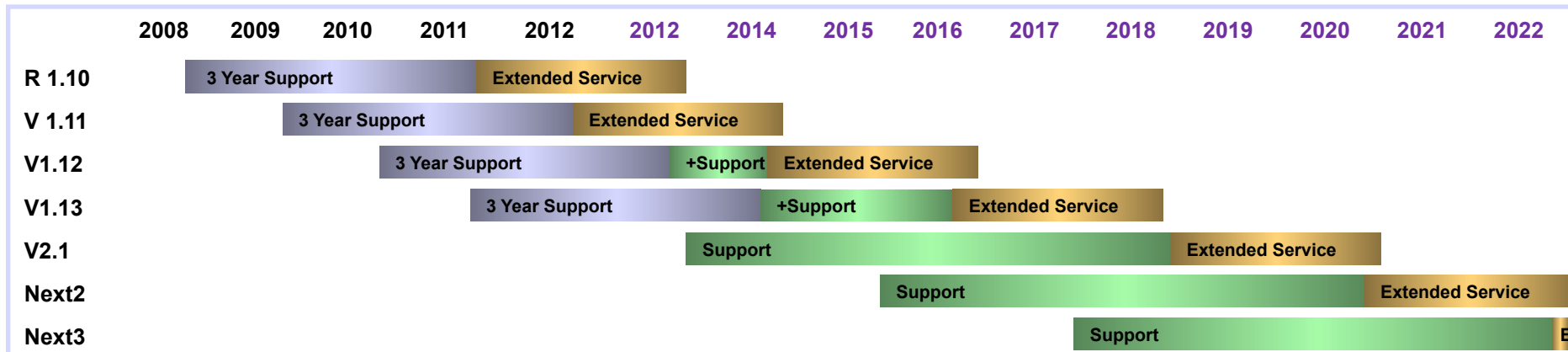


Chart represents current IBM plans, please refer to IBM announcements for finalized dates

Reminder: Supported Architecture for z/OS V2.1

Architectural Level Set :

- **Supports the following System z servers and later models:**

- IBM System z9[®] Enterprise Class
- IBM System z9 Business Class
- IBM System z10[®] Enterprise Class
- IBM System z10 Business Class[™]
- IBM zEnterprise 196
- IBM zEnterprise 114
- IBM zEnterprise EC12

- **Requires these DASD Control Units or later**

- 3990 Model 3 or 3990 Model 6
- 9393
- 2105
- 2107
- 2421, 2422, 2423, or 2424

Current z/OS and Servers Supported

Release	z10 EC z10 BC**	z196	z114	zEC12	End of Service	Extended Defect Support ¹
z/OS V1.9					9/10 ¹	9/12 ¹
z/OS V1.10	X	X	X	X	9/11 ¹	9/13 ^{1*}
z/OS V1.11	X	X	X	X	9/12 ¹	9/14 ^{1*}
z/OS V1.12	X	X	X	X	9/14 [*]	9/16 ^{3*}
z/OS V1.13	X	X	X	X	9/16 [*]	9/19 ^{3*}
z/OS V2.14[*]	X	X	X	X	9/18 [*]	9/21 ^{3*}

1 The IBM Lifecycle Extension for z/OS allows customers to purchase extended defect support for that release of z/OS for up to 24 months after the z/OS release's EoS

2 See IBM GTS services for additional fee-based extended service

3 Optional extended service is planned to be offered

4 z/OS V2.1 preview of availability

* Planned. All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice.

** Server withdrawn from Marketing

Legend

Lifecycle Extension for z/OS not in effect²

Lifecycle Extension for z/OS for PTFs and Defect Support

Generally supported

Note Lifecycle Extension is needed for zEC12 PTFs for z/OS V1.10, and any z/OS V1.11 zEC12 related PTFs that became available after 9/30/2012

Additional Information

- **z/OS Page**
<http://www.ibm.com/servers/eserver/zseries/z/OS/>

- **Favorites for System z**
<http://www.ibm.com/servers/eserver/zseries/z/OS/zfavorites/>

- **z/OS Internet Library**
<http://www.ibm.com/servers/eserver/zseries/z/OS/bkserv/>

- **IBM System z page**
<http://www.ibm.com/systems/z/>

- **IBM Redbooks®**
<http://www.redbooks.ibm.com/>



© **Copyright IBM Corporation 2013. All rights reserved.** The information contained in these materials is provided for informational purposes only, and is provided AS IS without warranty of any kind, express or implied. IBM shall not be responsible for any damages arising out of the use of, or otherwise related to, these materials. Nothing contained in these materials is intended to, nor shall have the effect of, creating any warranties or representations from IBM or its suppliers or licensors, or altering the terms and conditions of the applicable license agreement governing the use of IBM software. References in these materials to IBM products, programs, or services do not imply that they will be available in all countries in which IBM operates. Product release dates and/or capabilities referenced in these materials may change at any time at IBM's sole discretion based on market opportunities or other factors, and are not intended to be a commitment to future product or feature availability in any way. IBM, the IBM logo, and other IBM products and services are trademarks of the International Business Machines Corporation, in the United States, other countries or both. Other company, product, or service names may be trademarks or service marks of others.