

## Key Functions in z/OS V2.1

### IBM Redbooks Solution Guide

This IBM® Redbooks® Solution Guide describes IBM z/OS® V2R1, the latest release of the z/OS operating system. This release provides current hardware support for the zEC12 and zBC12 servers, batch modernization features, enhancements to security, data processing, communications, and other z/OS components. By implementing the key functions in this release you can enhance availability, scalability, and security of your system, simplify batch processing, and improve data management.

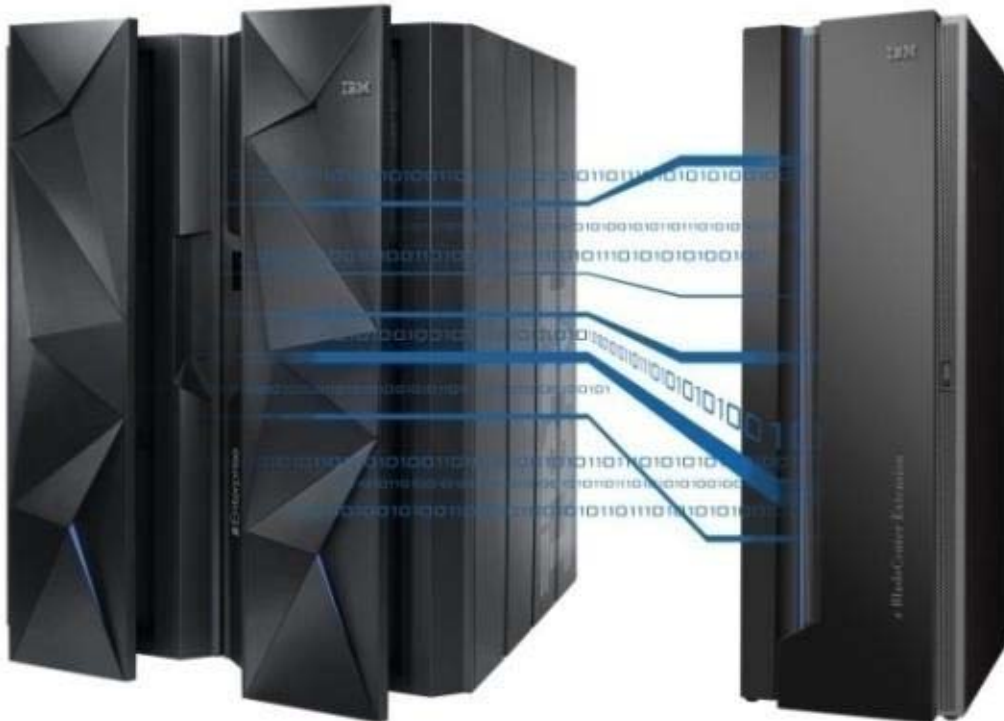


Figure 1. z/OS V2R1 provides hardware support for the zEC12 and zBC12 servers

### Did you know?

IBM z/OS V2R1 is the first release in the two-year release cycle for z/OS. This release will coexist with the next two releases of z/OS, which are planned to be released two years and four years after the z/OS V2R1 availability date of September 2013. The extended release cycle provides you with more time to implement the many new functions included in z/OS V2R1.

Many of the new functions in z/OS V2R1 use the new hardware features exclusive to the zEC12 and zBC12 servers. Support for IBM zEnterprise® Data Compression (zEDC) allows you to compress data with low CPU overhead and low latency. Support for Shared Memory Communications-Remote Direct Memory Access (SMC-R) can help you move data quickly between z/OS images on the same CPC or a

different CPC without requiring changes to applications. Flash Express support improves system availability and responsiveness. Support for CFCC level 19 enhancements improves performance in environments with shared engine coupling facilities.

## Business value

z/OS V2R1 helps you minimize downtime and achieve higher performance and availability. Exploitation of the *coupling facility thin interrupts* can boost performance and drive higher throughput. SMC-R support allows application-transparent networking for the fast exchange of information between systems. Enhancements to VSAM record-level sharing (RLS) improve catalog performance and availability.

Enhancements in z/OS V2R1 can help with storage management. Support for zEDC offers CPU-efficient and low latency compression and helps reduce your storage infrastructure costs. DFSMS enhancements such as *catalog alias number constraint relief*, support for catalogs over 4 GB, CA reclaim for VSAM KSDS and PDSE member generations help you manage large amounts of data more efficiently. A new zFS file system version significantly improves performance for file systems with large directories, and a larger maximum file system size of 16 TB for greater scalability.

Communications Server in z/OS V2R1 with the RoCE Express hardware feature supports a new communications protocol, Shared Memory Communications-RDMA (SMC-R). SMC-R provides a significant performance improvement in transferring data as compared to standard TCP/IP communications over the Open Systems Adapter (OSA). Also, the QDIO accelerator function improves performance and security by allowing packets to be directly routed between IBM HiperSockets™ and OSA QDIO connections with IPsec enabled.

Batch modernization enhancements are intended to shorten your batch window with functions such as parallel batch recall and SYSDSN ENQ downgrade. Support for system symbols in JCL and in-stream data sets in JCL procedures, a PARM string longer than 100 characters, and longer job class names help you code more simple, flexible, and reusable JCL for batch processing.

To simplify operations and extend automation, two enhancements are available for synchronous write to operator with reply (WTOR) processing (also referred to as DCCF). The first extends the auto-reply function so it can respond to WTORs displayed through DCCF. The second notifies all locally attached MCS consoles of the current destination of a WTOR displayed by DCCF, which helps operators more easily locate the console on which the response might be entered.

## Solution overview

Many new functions are in z/OS V2R1. This solution concentrates on enhancements in hardware support, communications, security, data management, batch modernization, and other z/OS functions.

Hardware support functions:

- zEnterprise Data Compression (zEDC)
- RoCE Express and SMC-R
- Flash Express and pageable large pages
- Coupling facility thin interrupts
- Coupling facility write-around cache
- Hardware Management Console (HMC) integrated 3270 console

#### Networking and communications functions:

- Communications Server Configuration Assistant rewrite
- Communications Server Interface statement improvements
- Communications Server Inbound workload queuing
- Communications Server sysplex autonomics
- Communications Server Enterprise Extender (EE) health verification
- TCP/IP Profile syntax check command

#### Security functions:

- QDIO Accelerator with IP Security
- Sysplex-wide Security Associations and Policy-based Routing for IPv6
- TCP/IP-based RACF remote sharing facility (RRSF)
- Communications Server Internet Key Exchange Version 2 (IKEv2) and IPSec improvements
- SAF-based authorization for job classes using JESJOBS profiles
- Converting to BPX.UNIQUE.USER from BPX.DEFAULT.USER

#### Data management functions:

- PDSE member generations
- Accessing catalogs for record-level sharing (RLS)
- zFS Version 5 conversion from zFS V4
- Catalog alias number constraint relief
- CA reclaim
- Catalogs larger than 4 GB

#### Batch modernization functions:

- PARM string longer than 100 characters
- 8-character job class names
- SYSDSN ENQ downgrade
- System symbols in JCL and in-stream data sets
- In-stream data sets in JCL procedures
- Parallel Batch Recall
- Control where job converts
- Job Entry Subsystem (JES2) Spool migration

#### Other key functions:

- IBM Language Environment® heap overlay tolerance (HEAPZONES)
- Auto-reply for Synchronous WTORS
- BEGINPARALLEL in IEFSSNxx
- SMF Record Flood Prevention

## Solution architecture

Exploitation of the PCIe hardware functions such as zEDC and SMC-R is provided by the new PCIe support in z/OS V2R1. Two new address spaces are introduced in this release of z/OS; they are PCIE and FPGHWAM. In addition, hardware configuration definition (HCD) is enhanced to define the new PCIe hardware, and PARMLIB member IQPPRMxx is added. New keywords in SMFPRMxx are required to implement zEDC compression for log streams and new keywords in the TCP/IP profile are required for support of SMC-R (Figure 2). RSM is enhanced to support Flash Express. Cross-system coupling facility (XCF) and cross-system extended services (XES) are updated to enable the thin interrupts function in z/OS. Finally, console address space and console services are extended to support the HMC integrated 3270 console for NIP and as a system console.

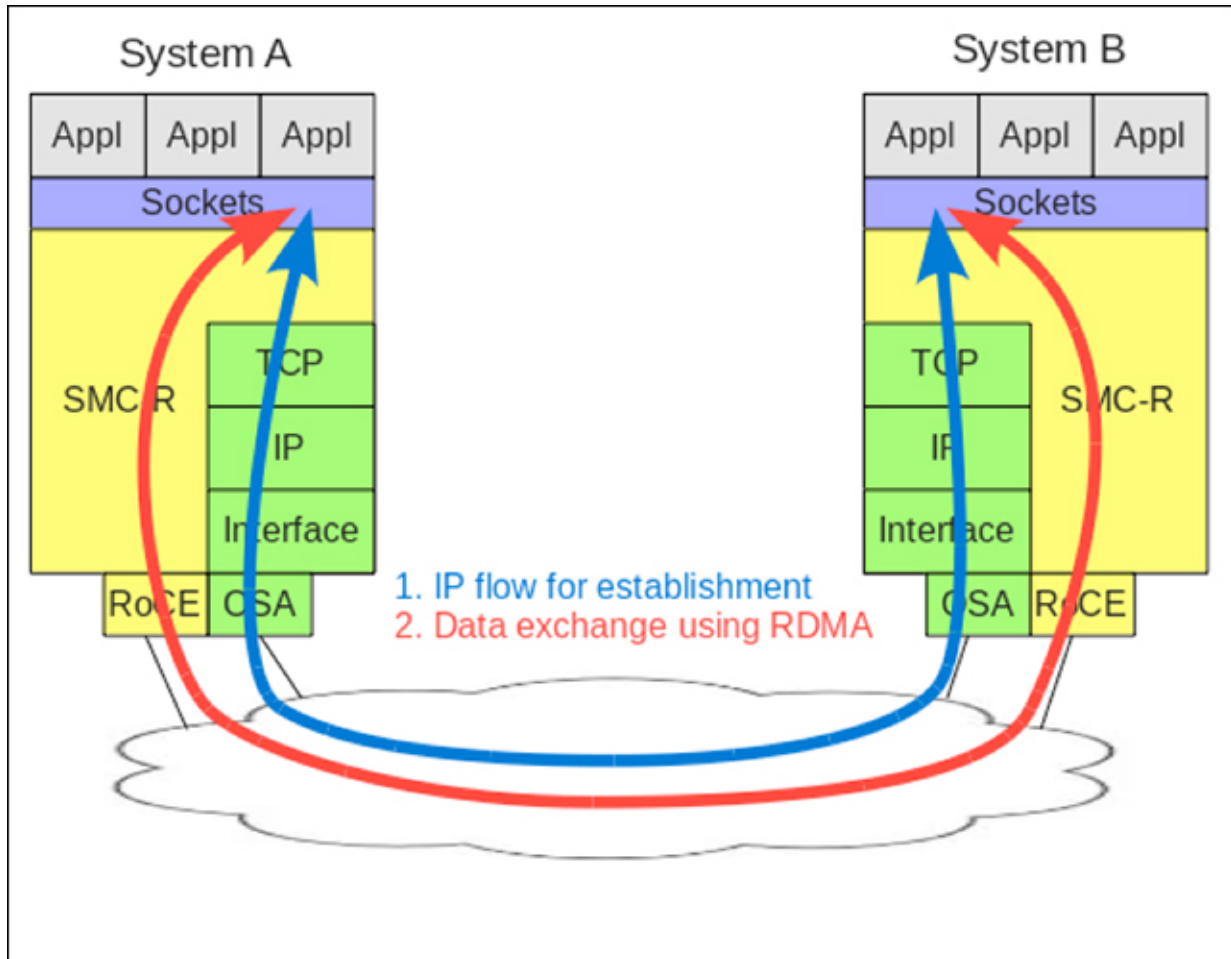


Figure 2. SMC-R support in TCP/IP

New keywords in the TCP/IP profile member of Communications Server are added to improve the INTERFACE statement and inbound workload queuing. With new TCP/IP **VARY** command keywords, you can check the syntax on the TCP/IP profile before activating changes. The Communications Server configuration assistant wizard (Figure 3) is now part of IBM z/OS Management Facility (z/OSMF).

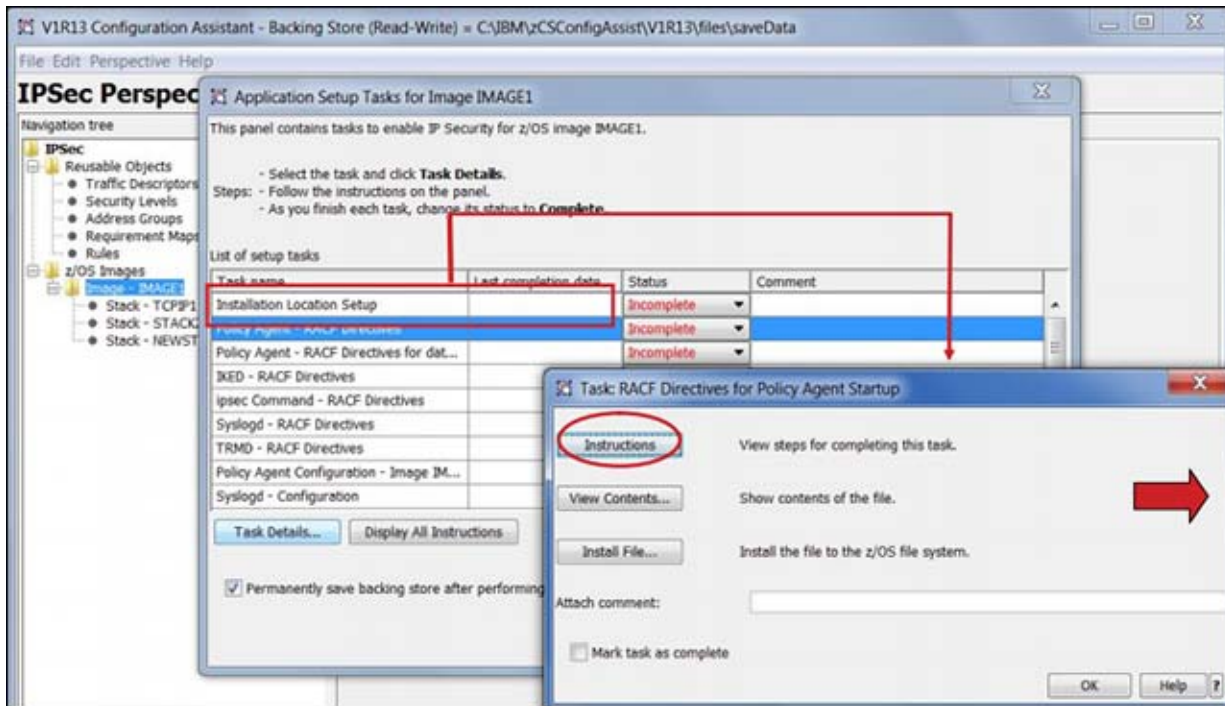


Figure 3. Communications Server configuration assistant in z/OSMF

The security enhancements of QDIO accelerator support for IPSec, sysplex-wide security associations, and IKEv2 IPSec improvements are implemented by using new keywords in TCP/IP configuration files (Figure 4). RRSF over TCP/IP support is implemented in IBM RACF®. SAF-based authorization for job classes is provided by JES2 and JES3; the support for the BPX.UNIQUE.USER profile is provided by z/OS UNIX and RACF.

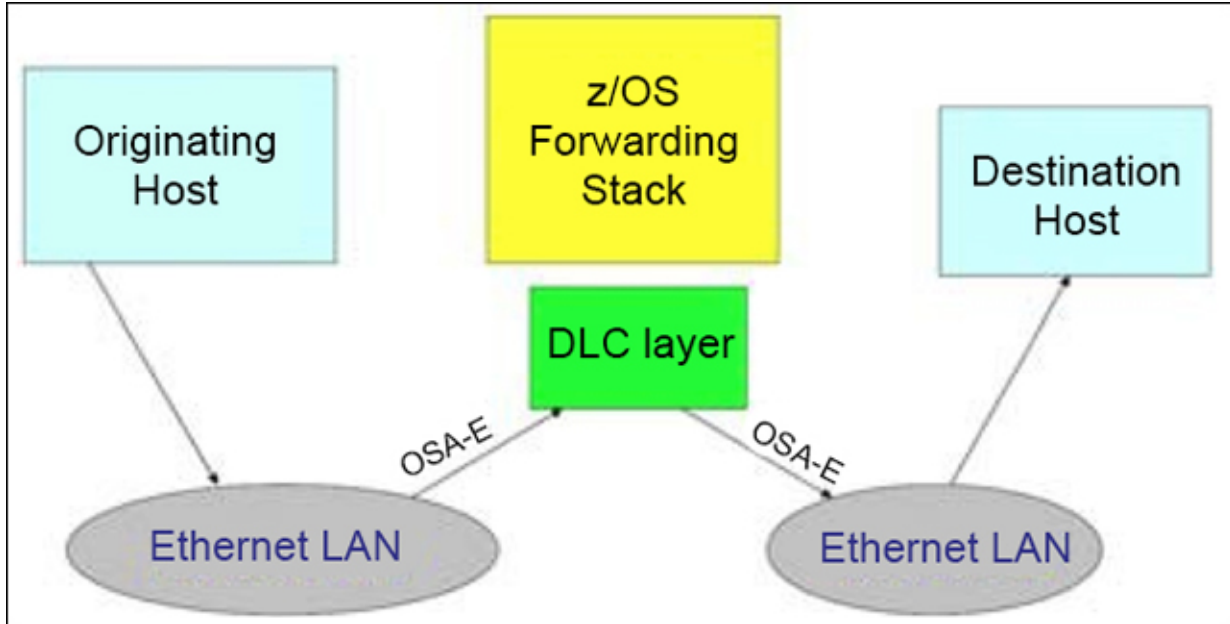


Figure 4. QDIO accelerator support for IPSec

Catalogs larger than 4 GB are now supported through the VSAM extended addressability (EA) support (Figure 5). Also, catalogs are now enabled for VSAM RLS. A new catalog entry type allows defining up to about 500,000 aliases to a catalog instead of the old limit. VSAM processing is enhanced to support CA reclaim with a new option in the SMS data class construct and new keywords in the IGDSMSxx PARMLIB member. New JCL keywords allow allocating PDSE version 2 data sets. Interactive System Productivity Facility (ISPF) is also enhanced to allocate PDSE version 2 data sets with member generations and to edit and save member generations using ISPF services.

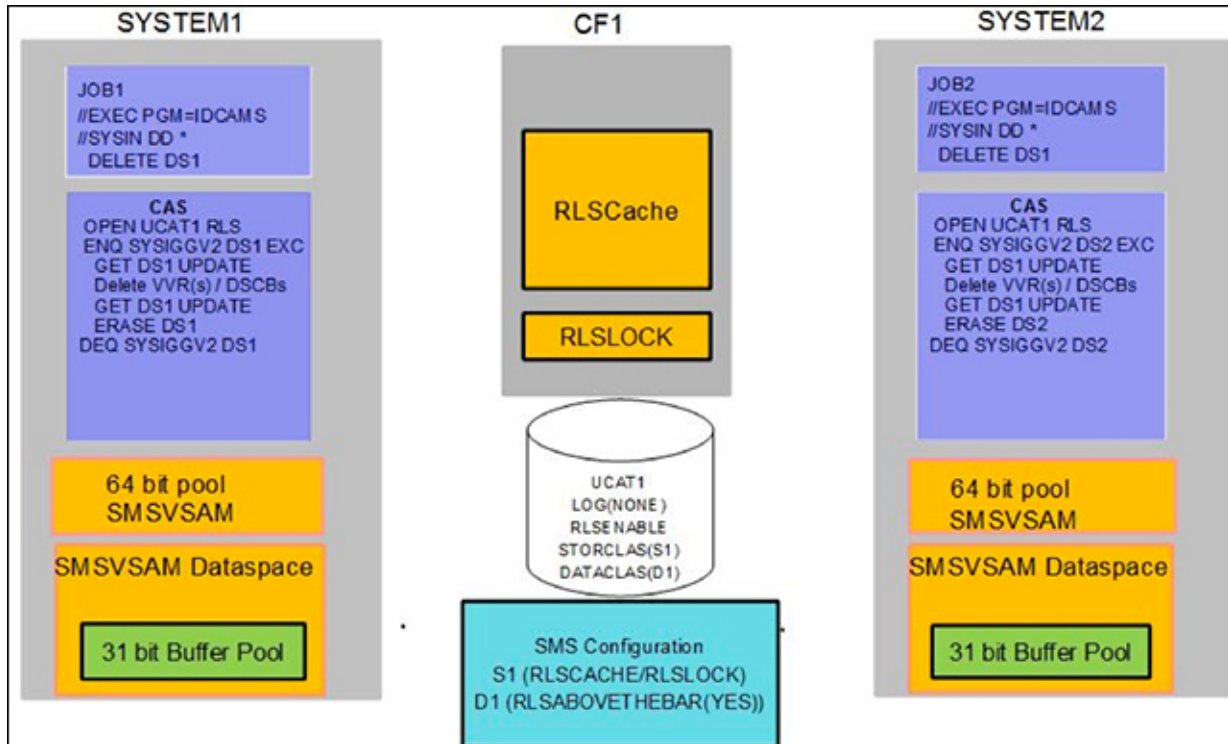


Figure 5. VSAM RLS support for catalogs

New JCL statements allow the use of system symbols and JCL symbols anywhere in JCL, including in-stream data sets, and allow applications to access symbols during the job's execution phase (Figure 6). By using another new JCL statement, you can pass parm strings longer than 100 characters. Additional symbols support is provided by new JES symbol services and new JES2 job class definitions. JES2 is enhanced to support class names up to eight characters and also new common JCL statements instead of JES-specific JECL statements. Global resource serialization (GRS) provides new options to allow SYSDNS ENQ downgrade, which is started by JES2. Allocation is updated to support parallel batch-recall using a keyword in ALLOCxx.

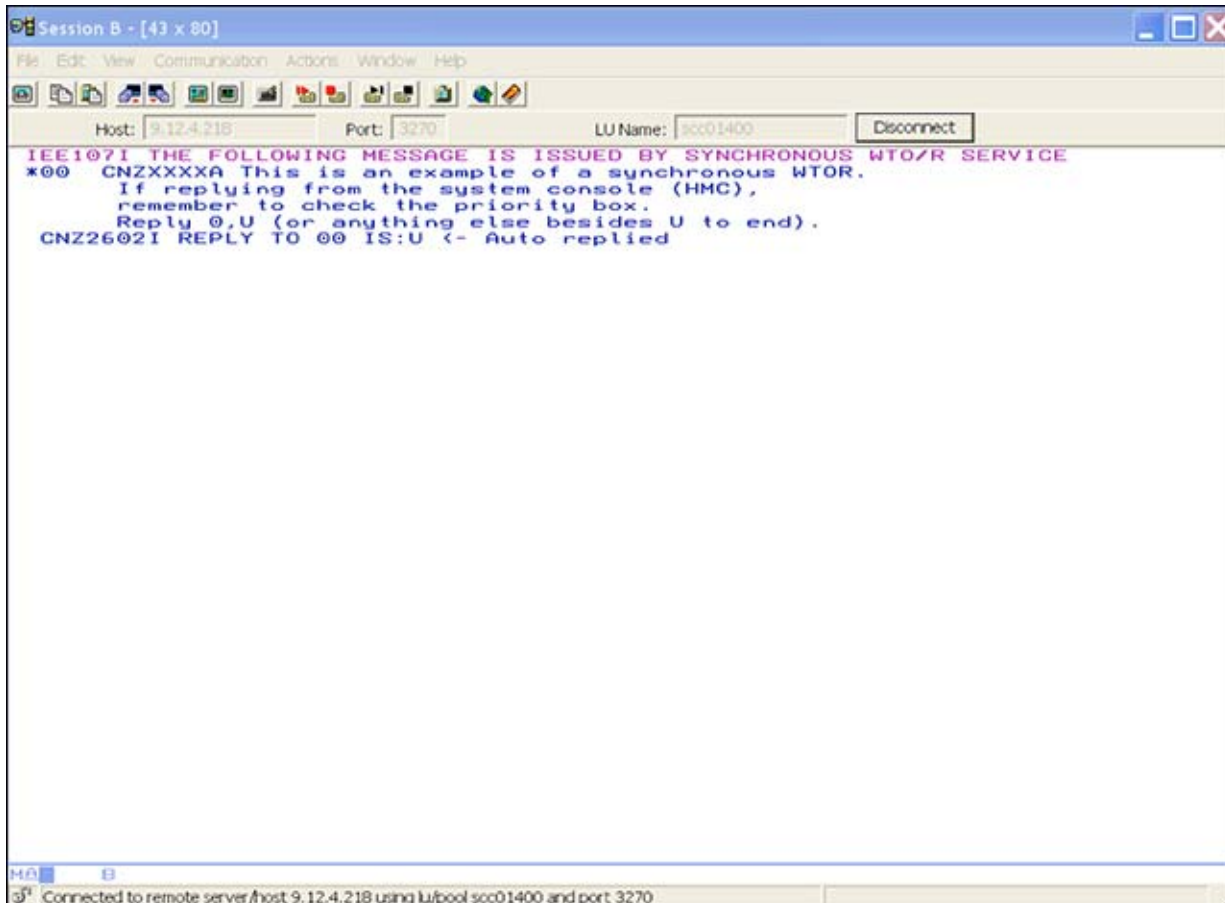


Figure 6. Auto-reply for synchronous WTORs

## Usage scenarios

One use of the zEDC function is to compress SMF records written to log stream (Figure 7). After an SMF log stream is defined in SMFPRMxx to be compressed, SMF invokes the zEDC function to compress the new SMF record before writing it to the log stream. The log stream contains only compressed SMF records, saving space in the coupling facility (CF) and on DASD. SMF records are decompressed when the IFASMF DL program is used to dump records from the log stream to a data set. The elapsed time to extract SMF records using IFASMF DL is also reduced.



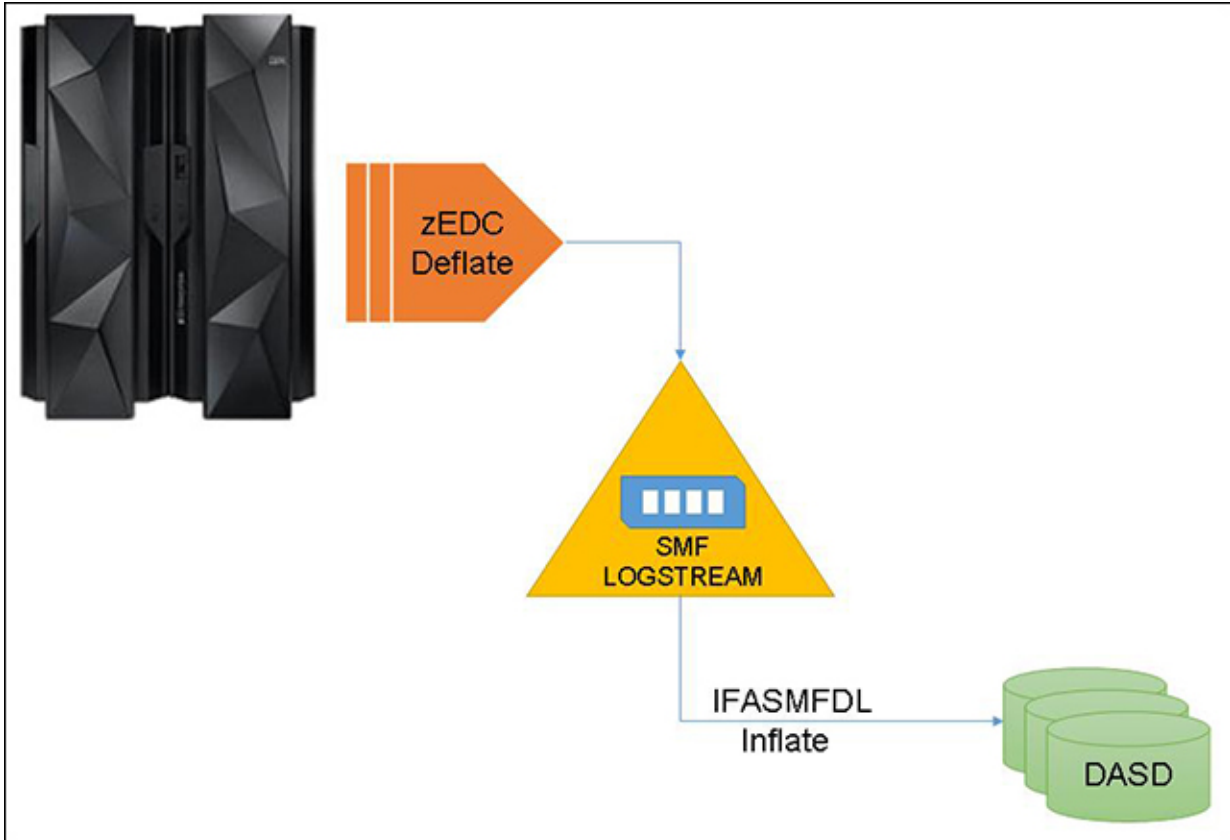


Figure 7. Using zEDC to compress SMF records

Another example is using SMC-R to reduce transfer time and CPU usage when transferring large amounts of data by using FTP between two z/OS systems. When the two systems are located on different zEC12 or zBC12 servers, they can use SMC-R for the transfer (Figure 8).

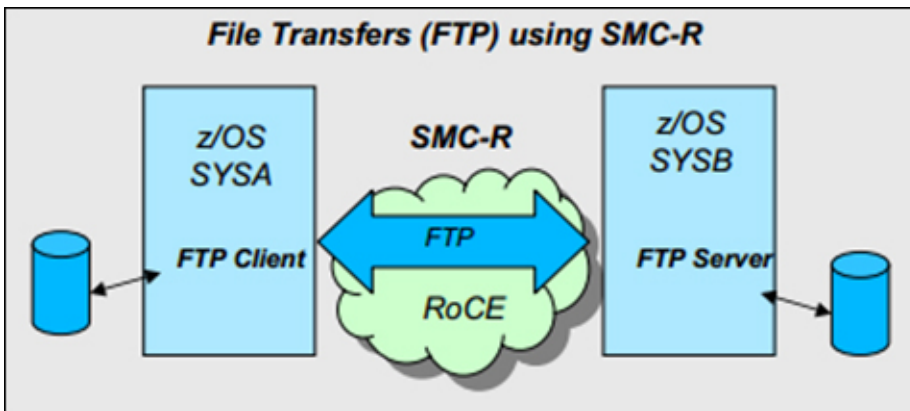


Figure 8. File transfers using SMC-R

## Integration

z/OS V2R1 supports the two previous releases for coexistence, fallback, and migration. You can upgrade from either z/OS V1R12 or z/OS V1R13 directly to z/OS V2R1 with full coexistence, migration, and fallback support. Migration forward from z/OS V2R1 is also planned for the next two releases of z/OS.

Middleware products such as IBM DB2®, CICS®, IMS™, and WebSphere® MQ, and also other IBM or ISV products might require compatibility program temporary fixes (PTFs) for coexistence and support with z/OS V2R1.

## Supported platforms

z/OS V2R1 runs on these IBM System z servers:

- IBM zEnterprise EC12 (zEC12)
- IBM zEnterprise BC12 (zBC12)
- IBM zEnterprise 196 (z196)
- IBM zEnterprise 114 (z114)
- IBM System z10 (z10 EC, z10 BC)
- IBM System z9 (z9 EC, z9 BC)

The following hardware features are separately orderable:

- zEnterprise Data Compression (zEDC)
- RoCE Express
- Flash Express

## Ordering information

For ordering information, see the following web page:

<http://ibm.co/1nd3RZx>

## Related information

For more information, see the following resources:

- *Implementing Key Functions in z/OS V2R1*, SG24-8252  
<http://www.redbooks.ibm.com/abstracts/sg248252.html>
- z/OS V2R1 information center  
<http://pic.dhe.ibm.com/infocenter/zos/v2r1/index.jsp>

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This document was created or updated on October 6, 2014.

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