

eXtended Recovery System (XRS) for z/OS

General Information

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1. Introduction

Data Management is a vital activity in a modern data centre. The ever increasing amounts of data make it necessary to find easy solutions to manage the backup and recovery process in a IBM z/OS environment. XRS for z/OS and XRS+ simplify the handling of these demands as part of the data management process.

New requirements have also resulted in an increased complexity. These requirements are not technically but rather legally orientated. New legislation (e.g. Sarbanes Oxley aka SOX and the upcoming 8th European Directive aka EuroSox) and the resulting compliance and audit rules now require that companies do business in a transparent and reproducible way, with rules for accounting and reporting.

These changes have had a dramatic knock-on effect as most business processes are handled by IT systems. One major part is data handling and reporting. Companies must now prove that everything possible has been done to secure and maintain data.

Up to now the motto of IT departments has been: "Just Do It!"

With the new regulation it will be: "Do it, Control it, Document it and Prove it!"

XRS for z/OS offers a powerful and comfortable method of collecting data from backups created with IBM DFSMSdss. The gathered information can be used to easily find and recover data using the XRS for z/OS ISPF interface.

The functionality can be further enhanced by using XRS+, which can analyse, report and monitor who did what with your corporate z/OS data. GUI based dataset recovery is also possible.

1.1. Backup and Restore Tools

In a typical IBM data centre, the IBM tool DFSMSHsm (HSM) is used to manage the availability of data. For special datasets (e.g. databases) other tools are generally required. HSM is not an ideal tool if application data needs to be specifically backed up, because the backup process generally runs asynchronously. Also the number of backup versions is restricted.

IBM DFSMSdss (DSS) can on the other hand be used to create backup copies of files at any given time. The created backups can be on disk or tape and are not limited to a certain number of versions. DSS directly complements HSM in a data centre backup strategy. DSS and HSM however do not offer an easy way to manage the created backups.

1.2. eXtended Recovery System

The eXtended Recovery System (XRS) was developed to directly complement backup products like DSS and HSM. XRS supports backups created with DSS and HSM. It can be easily integrated into your backup and restore procedures and gives you an easy, fast and reliable way to manage your backups and recover your data using DSS or HSM.

XRS can also be integrated into your data centre contingency plans.

eXtended Recovery System (XRS) for z/OS

XRS encapsulates the DSS backup utility (physical and logical) and automatically captures detailed dataset information during the normal backup process. The collected data is stored in a repository and can then be used to easily obtain information on backups or to directly create jobs to recover individual datasets or whole volumes.

XRS also offers a direct interface to HSM, which can be used to display and easily recover datasets backed up with HSM.

A special feature within XRS is the ability to easily rebuild volumes from DSS backups. This allows volumes to be recovered even if there isn't an up-to-date full volume backup available.

Expired tape backups can automatically be removed from the XRS repository by using a Tape Management System (TMS) inventory extract. IBM DFSMSrmm (RMM) is directly supported. Other interfaces can easily be implemented.

1.3. XRS+



XRS+ is an enhancement to XRS for z/OS. All collected z/OS DSS backup data is synchronised with a SQL database and can be processed using the XRS+ Java GUI.

XRS+ offers advantages such as:

- Very fast and easy dataset recovery
- Standard reports which can be used to optimise DSS backup processing. Potential benefits are:
 - Improved batch production environment
 - Smaller batch windows
 - Improved efficiency
 - Improved backup data-deduplication
- Audit & report facilities to monitor who accessed your z/OS Data
- Exports for other reporting systems.

Also backup information is still available even if the z/OS systems are not running.

All these factors result in improved quality and reduced costs.

Furthermore XRS+ will be the future platform for the z/OS dataset auditing functions. These will support necessary IT-Compliance requirements.

Starting with version 450, XRS may produce user SMF records for the DFDSS operations DUMP, COPYDUMP, COPY and RESTORE (this is handled via the XRS options module). These SMF records may then be collected by improvIT product XRP (XRS+ Audit Data Collector) and transferred into the XRS+ database.

2. How does XRS work?

XRS consists of two parts:

- Batch interface (wrapper program for DSS)
- Online interface (recovery management application)

The online XRS IBM Interactive System Productivity Facility (ISPF) application allows recovery jobs to be automatically generated, based on information stored in the XRS repository and HSM. If standard recovery procedures are available then XRS can be used to easily obtain the required parameters for the predefined jobs (e.g. volser). The intuitive dialog is designed for use by all data centre staff and not just the storage managers.

XRS only generates jobs which can then be used to recover the required data. XRS never starts a recovery process directly. The decision when to start recovery processing remains solely with the user.

2.1.1. Backup

The module XRSLMAIN is a wrapper for ADRDSSU. The wrapper can always be called instead of ADRDSSU (regardless of the required function). XRSLMAIN recognises if a XRS function was requested and processes the request accordingly. If this is not the case, then control is directly and transparently passed to ADRDSSU.

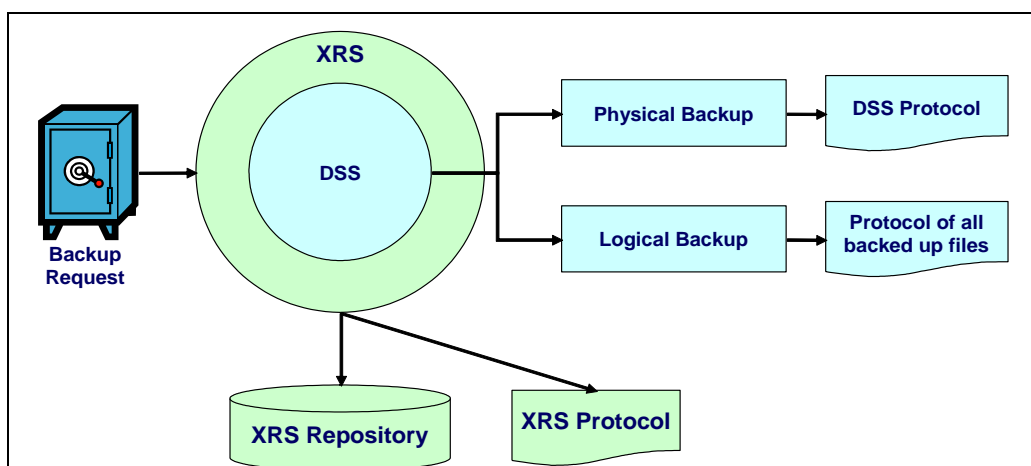
XRS captures information on individual datasets for all DFDSS backup variations.

2.1.1.1. Logical Backups

Here DFDSS collects information and passes these to XRS. The collected information is further enhanced by XRS.

2.1.1.2. Physical Full-Volume Backups

Here XRS collects the same information as for logical backups using system tools.



Graphic 1: XRS Backup Process

All collected information is stored in the XRS Repository. The Repository is a normal sequential dataset.

2.1.1.3. Copydump

XRS also collects information when the DSS Copydump function is used.

XRS saves the "Backup Job Execution Statistics" of the original source dataset backup in the repository entry of the copied backup records, rather than the job statistics of the Copydump job. Additionally the copied records contain the Copydump job timestamp in the "Message" field. XRS SMF records for this action contain the correct original job information.

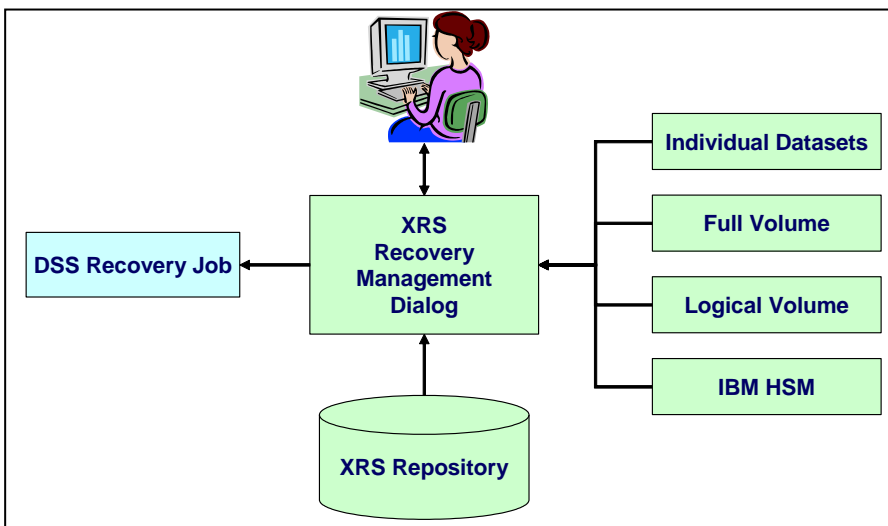
2.1.1.4. Copy and Restore

Starting with version 450 XRS may collect information when DSS functions Copy or Restore are used (set the appropriate bits in the XRS options module). The collected information is only stored in SMF, not in the XRS repository.

2.1.2. Recovery

When recovering datasets, it is not relevant how the dataset was originally backed up. It is always possible to recover datasets, regardless of the used backup methods. XRS supports the following recovery types:

- Individual recovery allows the recovery of one or more individual datasets
- Full volume recovers a volume based on a physical full volume dump
- Logical full volume uses DCollect information to rebuild datasets on a volume using different available backups. Information is shown for datasets without backups.
- An interface to HSM may be used to perform recoveries using HSM methods.



Graphic 2: XRS Recovery Process

All recovery information (except for HSM) is stored in the XRS Repository.

2.1.3. Multi-Volume File Support

Starting with version 4, XRS collects additional information when physically backing up multi-volume datasets (VSAM and sequential). If during recovery a dataset fragment is found, then available information relating to the other fragments is shown in the recovery dialog and job. VSAM information is also shown if appropriate. This multi-volume information is only available for full-volume dumps, not for physical dumps with dataset filtering.

The described multi-volume support does not apply when multi-volume datasets are logically backed up. When datasets are logically backed up, all parts of the multi-volume datasets are automatically included in the backup file.

Multi-volume information is only available, if the system on which the backup was executed, could access the corresponding dataset catalog. Furthermore, XRS does not recover other multi-volume dataset fragments automatically. This must be performed by the user as otherwise data corruption can occur.

3. Contact

For further information regarding the eXtended Recovery System please contact:

improvIT Software Innovations GmbH

Große Elbstraße 141 a

D-22767 Hamburg

Germany

Telephone: +49 (0)40 540 90 29 - 7

Fax: +49 (0)40 540 90 29 - 9

Email: Contact@improvIT-Software-Innovations.de

Web: www.improvIT-Software-Innovations.de

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