



# **IBM® TotalStorage® DR550 Backup and Restore**

Ricardo Haragutchi  
Data Replication and Data Retention Product Manager  
E-Mail: [ricardoh@us.ibm.com](mailto:ricardoh@us.ibm.com)

**Covering: Tivoli Storage Manager Disaster Recovery Manager**

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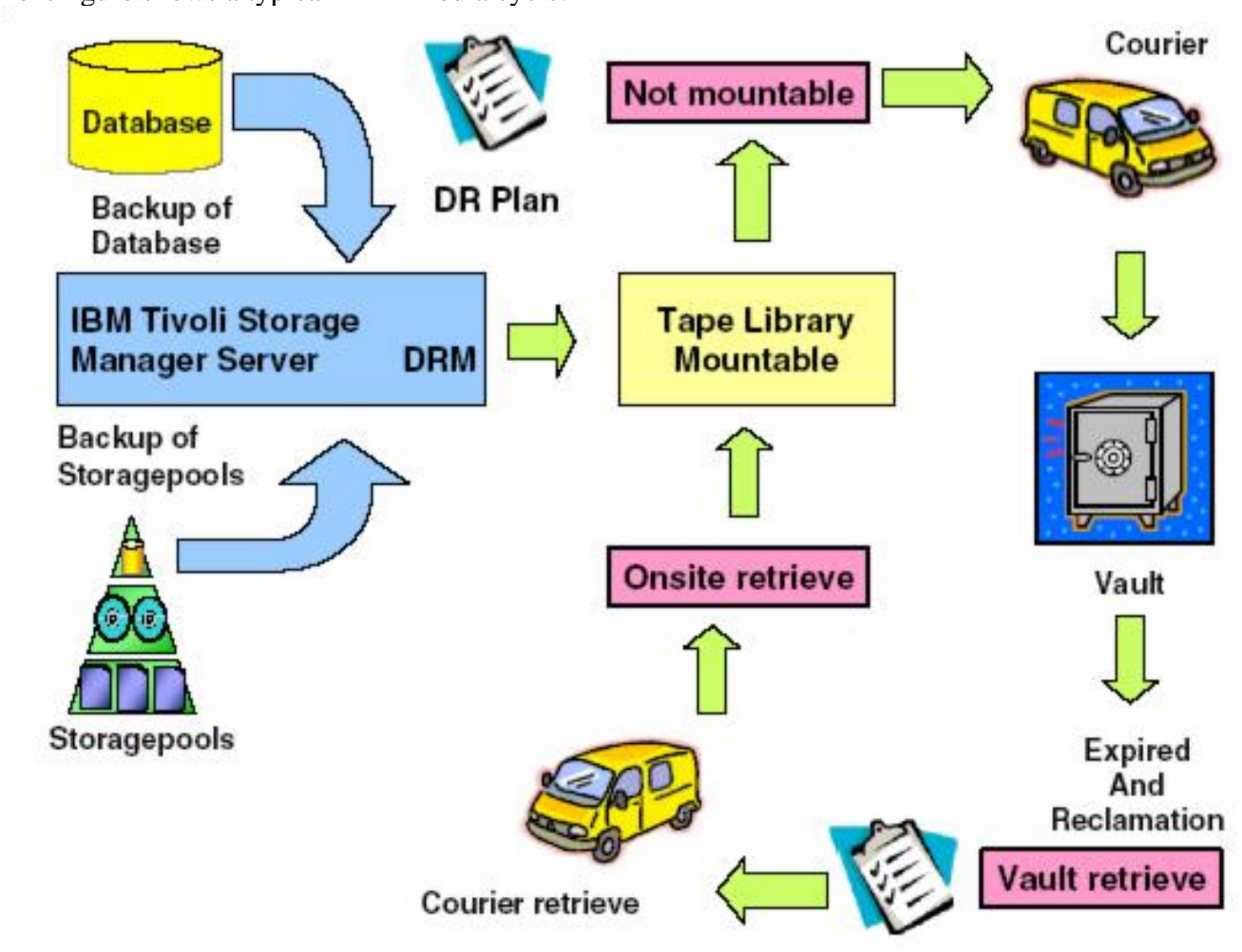
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## Overview

This document explains the underlying concepts of the Disaster Recovery Manager (DRM) feature of the Tivoli Storage Manager software used by the IBM TotalStorage DR550 solution. It shows how DRM can be used in combination with other facilities to create an AIX image to backup and restore the DR550 operating system, the Tivoli Storage Manager server database and to archive data.

DRM is a feature of IBM Tivoli Storage Manager Extended Edition and is designed to coordinate and automate the process of recovering from a disaster. It supports off-site media management, automated restore of the Tivoli Storage Manager server, and managed client recovery. DRM is also designed to automatically capture information required to recover the Tivoli Storage Manager server after a disaster. It can assist in preparing a plan that allows recovery in an expedient manner.

The disaster recovery plan can contain information, scripts, and procedures needed to automate server restoration and support quick recovery of your data after a disaster. DRM can also help manage and track the movement of off-site media to reduce the time required to recover in the event of a disaster. It is able to track media that are stored on-site, in-transit, or off-site in a vault, no matter whether it is a manual or electronic vault, so data can be more easily located if disaster strikes. This next figure shows a typical DRM media cycle:



Client recovery is not considered in the context of the IBM TotalStorage DR550. When the server database backup is done, the latest generated volumes are sent to a safe location, and a recovery plan file is regenerated by Disaster Recovery Manager which includes the latest information. As data expires from the on-site pools, it also expires from the off-site pools and unneeded database backups. Disaster Recovery Manager also tracks such media as they become empty so that you can report on free tapes that can be brought back on-site for reuse.

### **Volume tracking**

Disaster Recovery Manager supports several levels of volume tracking. Disaster Recovery Manager volume management includes:

- Identifying which off-site volumes are needed for a given recovery: Disaster Recovery Manager is able to track the volumes that are associated with each primary Tivoli Storage Manager server so that you can initiate a complete recovery of all storage pools, or only a partial recovery, depending on the extent of the disaster.
- Integrating with tape management systems: Because Disaster Recovery Manager is integrated with tape management, every time a new tape is created in the corresponding copy storage pools, it is automatically eligible for off-site movement.
- Recycling partially filled volumes: Disaster Recovery Manager can allow you to see which volumes have reached an empty state because of reclamation so that you can request them to be returned on-site. This feature is not applicable for WORM media pools, where space reclamation is not enabled.

### **Tracking off-site volumes**

Disaster Recovery Manager manages tapes by assigning a special, predefined set of states to each off-site tape. There are two possible directions for a tape: from on-site to off-site and from off-site to on-site.

### **On-site to off-site**

Tapes are transitioned in the following order:

1. Mountable: Newly created copy storage pool and database backup tapes are in a mountable state as long as they are still online in the tape library. Disaster Recovery Manager knows that these tapes are not part of the recovery set when creating its recovery plan.
2. NotMountable: The volumes are still in the on-site location, but are not online to Tivoli Storage Manager. They are still on-site and it is assumed that they would also be destroyed in a disaster.
3. Courier: An intermediate situation in which you consider the tapes as being in transit. This means that you are still considering the physical transition from your on-site location to the vault as a potential risk.

4. Vault: After you have acknowledgement that the volumes have been safely received, you can change them to the Vault state, which is the final state.

## Off-site to on-site

Tapes are returned on-site in the following order:

1. VaultRetrieve: When all data in an off-site tape is no longer valid, the tape state is automatically changed to VaultRetrieve, meaning that it is available to be brought back on-site for usage.
2. CourierRetrieve: The tape has been taken from the vault and is in transit back on-site. Similar to the Courier state, these tapes may or may not be preserved safely in the event of a disaster.
3. OnsiteRetrieve: After the volumes are back on-site, you can use them as scratch tapes.

## Recovery strategy for the server

To make the creation and maintenance of the server disaster recovery plan easier, the **prepare** command automatically queries the required information from the Tivoli Storage Manager server and creates the recovery plan file. The **prepare** command can be scheduled using the Tivoli Storage Manager central scheduling capabilities.

## Auditable plan for Tivoli Storage Manager Server

The recovery plan file contains the information and procedures necessary to assist with the recovery of the Tivoli Storage Manager server. The information in the plan file includes site-specific server recovery instructions and information as defined by the administrator (for example, contact names and telephone numbers for critical people and their backups).

The requirements necessary to recover a Tivoli Storage Manager server are:

- List of Tivoli Storage Manager database backup and copy storage pool volumes required to perform the recovery (including the off-site location where the volumes reside)
- Devices required to read the database backup and copy storage pool volumes
- Space requirements for the Tivoli Storage Manager database and recovery log
- Copy of Tivoli Storage Manager server options file, device configuration file, and volume history information file
- Shell scripts (on UNIX) and Tivoli Storage Manager macros for performing server database recovery and primary storage pool recovery

## Off-site recovery media management

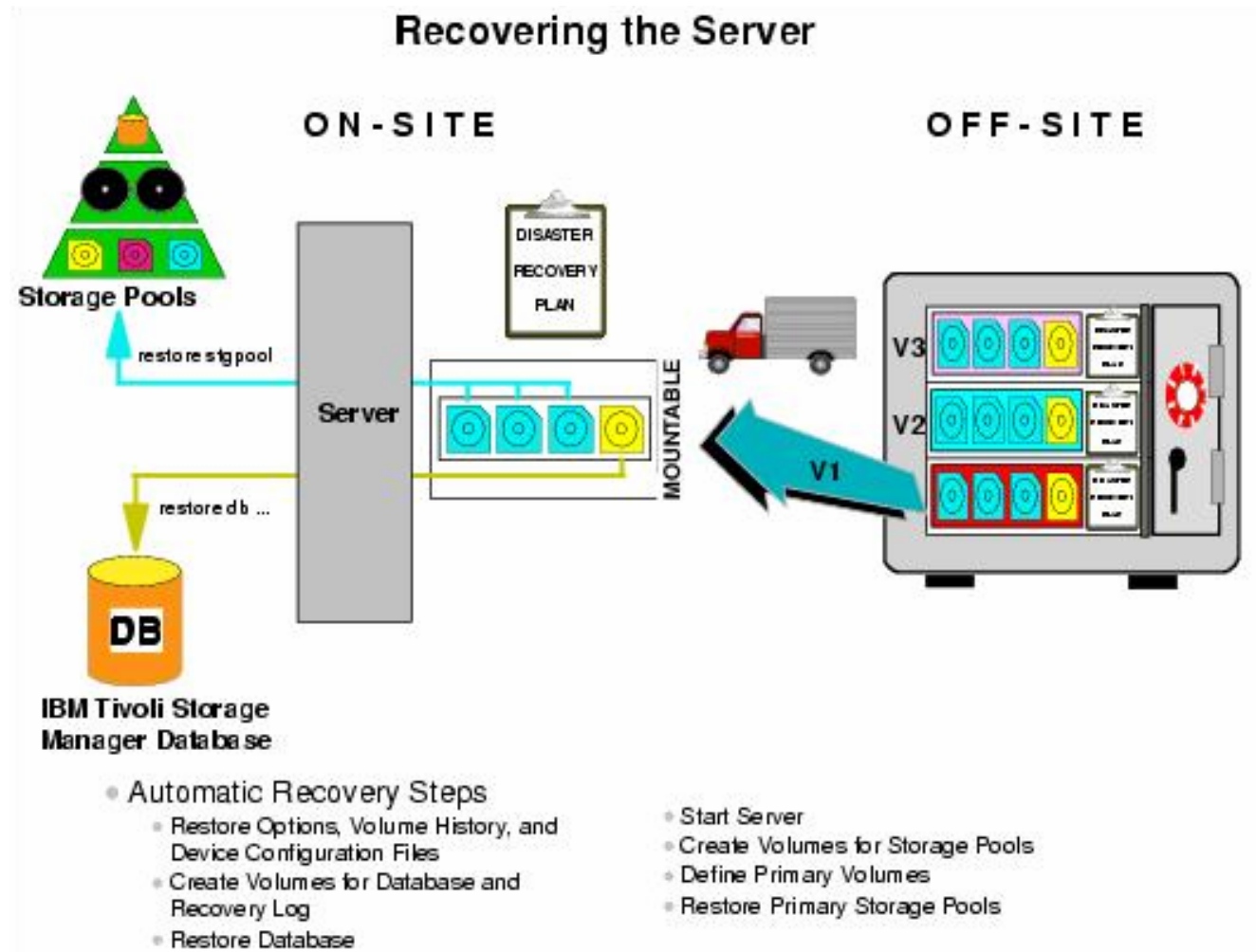
Knowing the location of off-site recovery media is critical to the successful implementation of a disaster recovery management plan. The off-site recovery media management function provides:

## IBM TotalStorage DR550 Backup and Restore

- Determination of which database and copy storage pool volumes need to be moved off-site and back on-site
- Automatic ejection of volumes from an automated library
- Tracking of the media location and state in the Tivoli Storage Manager database

This function allows database backup volumes and copy storage pool volumes to be treated as logical collections that are selected to move off-site for safekeeping and on-site for use. The reclamation of off-site volumes includes the capability to specify the number of days to retain a Tivoli Storage Manager database backup series. After the expiration interval is reached, the data on the media is no longer considered to be valid. The media can then be reused (or disposed of).

This next figure illustrates how your off-site data could be used to recover your environment. Note that V1 is the point in time requested; therefore, you cannot only rebuild the latest one, but also data from any specific point in time that you still have saved. The execution of the recovery scripts (which perform the Automatic Recovery Steps in the figure) starts after you have reinstalled the operating system and Tivoli Storage Manager server code on your replacement server hardware.



## Additional disaster recovery issues

Disaster recovery goes far beyond simple technical measures. To have a fully operational and prepared environment, you must also pay attention to additional issues, as described in the following two sections.

### Hardware system requirements

Disaster Recovery Manager creates a recovery plan file based on the information and space allocation on the Tivoli Storage Manager production server machine. This means that you must evaluate whether to have a similar machine for off-site recovery and make the changes to fit the new environment.

### Additional operating system recovery steps

Depending on the operating system on which Tivoli Storage Manager is installed, you might need to send special CD or tape images (for the specific OS recovery steps) to the off-site location. For example, this would be fully supported on an AIX machine by using the **mksysb** operating system command to produce a valid, bootable tape or DVD image of your present configuration.



## Summary

A recovery solution must be tested before it is actually needed. A good approach is to create all documents, operating system tapes, special hardware requirements, and installation scripts, and send them to the off-site location labeled as a "Disaster Recovery starter kit." Then, perform a complete recovery test once a year to confirm that the documents are accurate for recovery and incorporate any changes that were uncovered during your test.

Further information about disaster recovery concepts, and especially the DRM, can be found in the IBM Redbook *IBM Tivoli Storage Management Concepts*, SG24-4877, available at:

<http://www.redbooks.ibm.com/abstracts/sg244877.html>

A step by step backup/restore procedure on the IBM TotalStorage DR550 can be found on Chapter 7.4 in the IBM Redbook *Understanding the IBM TotalStorage DR550*, SG24-7091, available at:

<http://www.redbooks.ibm.com/abstracts/sg247091.html>