

Unit 1

Managing a multi-server Spectrum Protect 7.1.6 environment

Unit objectives

When you complete this unit, you can perform the following tasks:

- Describe Spectrum Protect and its function
- List the components of Spectrum Protect
- Describe Spectrum Protect 7.1 administrative functions and interfaces
- Identify the Spectrum Protect servers set up for this course



IBM Spectrum Protect was formerly known as IBM Tivoli Storage Manager (TSM).

Topics

- Lesson 1: Basic Spectrum Protect concepts
- Lesson 2: Spectrum Protect Operations Center
- Lesson 3: Benefits of a multi-server Spectrum Protect environment
- Lesson 4: The IBM Spectrum storage family

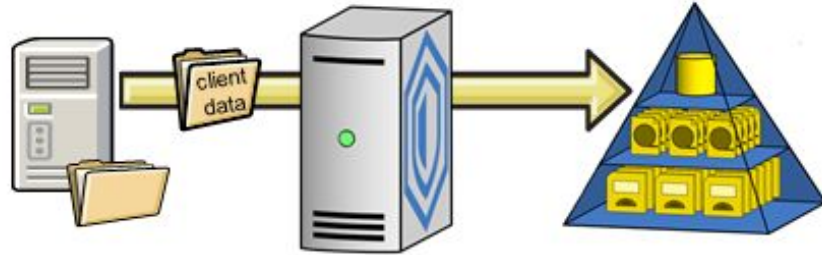
Lesson 1

Basic Spectrum Protect concepts

IBM Spectrum Protect basic functions

Backup:

The backup-archive clients send copies of files to a storage pool or container, and the database makes a record of the transaction.

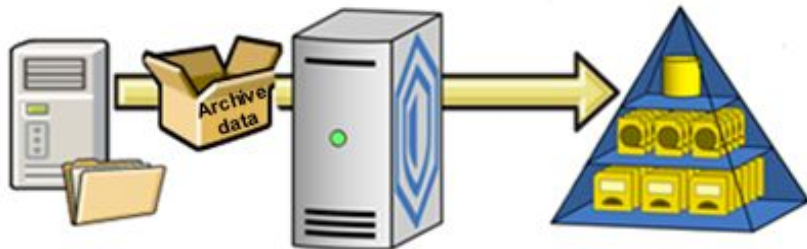


Restore:

Copies of files returns to the backup-archive client by using information in the database.

Archive:

The backup-archive clients send copies of files for retention to Spectrum Protect server.

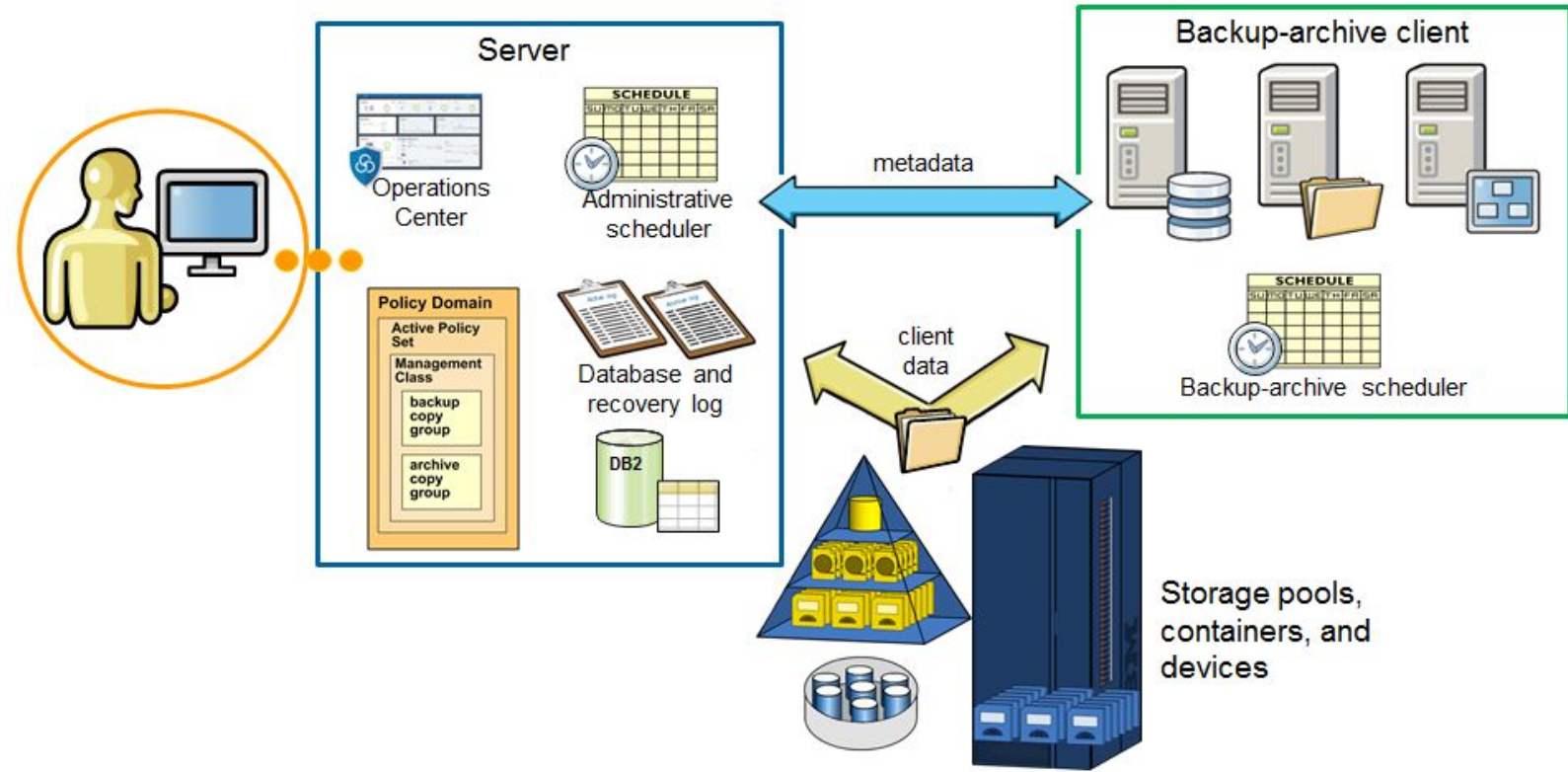


Retrieve:

A copy of the files returns to the backup-archive client.

Spectrum Protect components

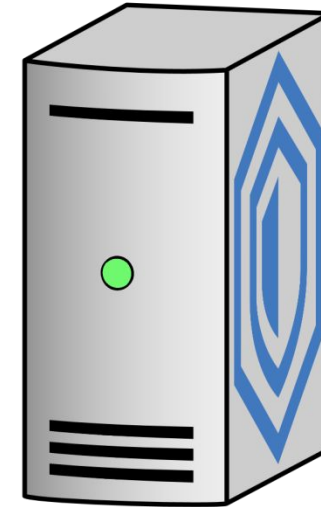
- Server
 - Database and recovery logs
 - Policy
 - Server storage
 - Administrative and client schedules
- Client
 - Administrative client command line
 - Backup-archive GUI
 - Backup-archive command line
 - Web client
 - Application client, for example Spectrum Protect for Mail
 - Application Program Interface (API) customized for applications
- Operations Center



Spectrum Protect server

The Spectrum Protect server consists of the following components:

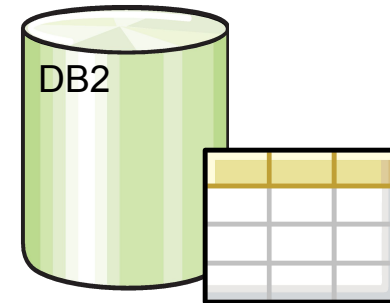
- Database
- Recovery logs
- Server options
- Default policy
 - Standard
- Default storage pool definitions
 - Backuppool
 - Archivepool
 - Spacemgpool



Spectrum Protect database

The Spectrum Protect server has a database that contains information about the following items:

- Policy and schedules
- Activity log and events records
- Data storage inventory
- Client nodes and administrators
 - Connection information
 - Authority



You do not need to be a DB2 database administrator to perform Spectrum Protect DB2 functions. Although the Spectrum Protect database is running on DB2, it has been designed especially for Spectrum Protect. Daily management of the database is always performed using the Spectrum Protect utilities.

Spectrum Protect recovery log

The recovery log is composed of the following files:

- Active log
 - In-flight transactions not yet committed to the database
- Active log mirror
 - Mirror copy of active log
 - Maintains same size as active log
- Archive log
 - Transactions that are complete and committed to the database
- Archive failover log



Server options file

Windows options:

- Communication
- Backup and archive processing
- Restore and retrieve processing
- Scheduling and language
- Format
- Command processing
- Authorization
- Error processing
- Transaction processing

UNIX options:

- Communication
- Backup and archive processing
- Restore and retrieve processing
- Scheduling and language
- Command processing
- Authorization
- Error processing
- Transaction processing

Volume history and device configuration files

Volume history

- This option specifies the names of the files to be automatically updated whenever server sequential volume history information is changed. There is no default for this option.
- You can include one or more volume history options in the **dsmserv.opt** file. When you use multiple volume history options, Spectrum Protect automatically updates and stores a backup copy of the volume history information in each file specified.

Device configuration

- Device configuration information is also stored in the Spectrum Protect database with a **define devclass** command. This information includes drive and library definitions created using the define drive and define library commands.
- Keep copies of **devconfig.out** (UNIX) or **devcnfg.out** (Windows) and **volhist.out** for database recovery purposes by updating the options file.

Communication options

- TCP/IP Version 4 or 6 (enabled by default)
- Named Pipes (enabled by default)
- Shared memory
- Simple network management protocol (SNMP) Distributed Program Interface (DPI)
- Secure Sockets Layer (SSL)



Shared memory can be enabled for database backups.

Policy management

Client



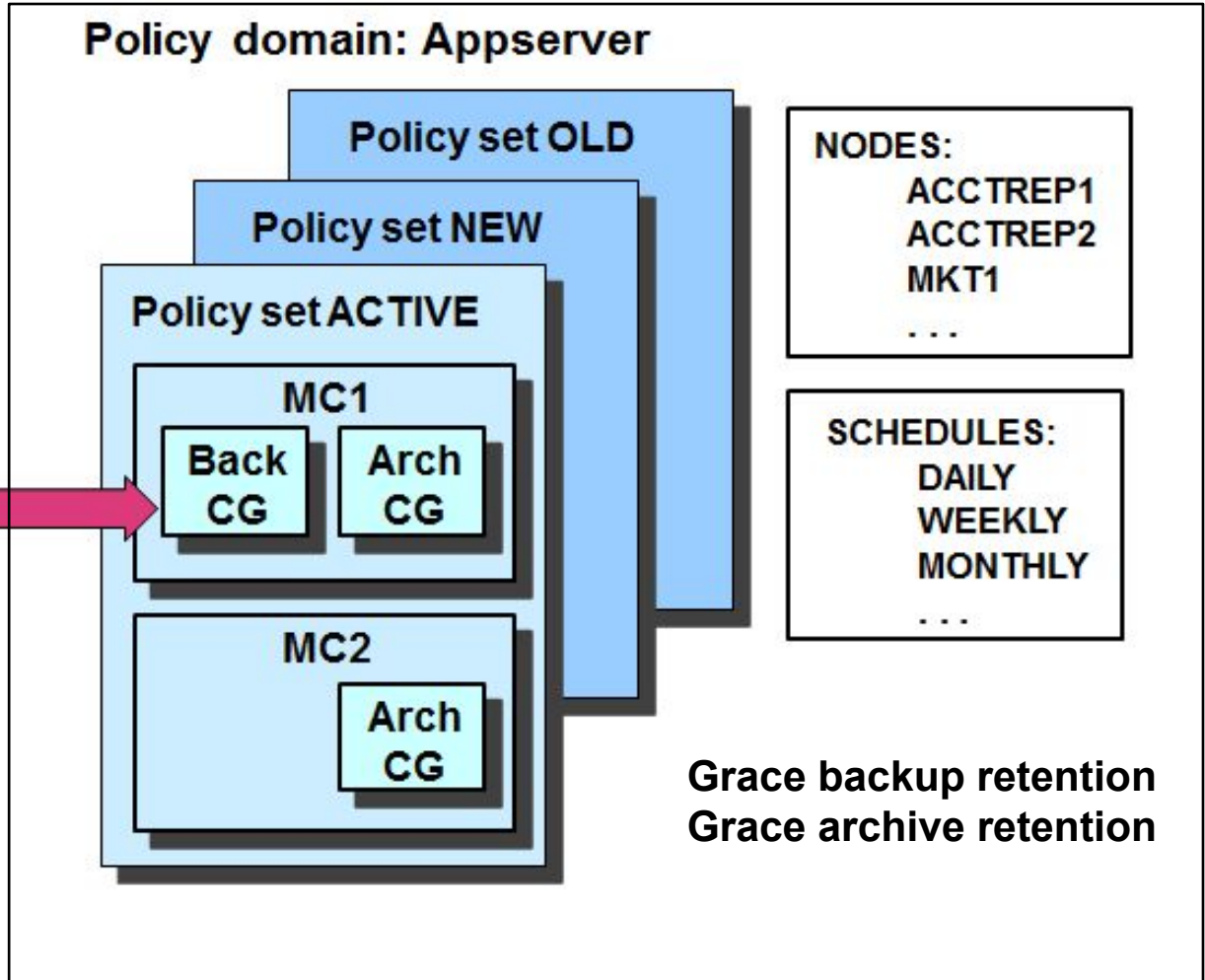
Data retention rules



```
Include c:\taxes\* MC1
```

```
DSMC ARCHIVE -ARCHMC=MC2
```

Server

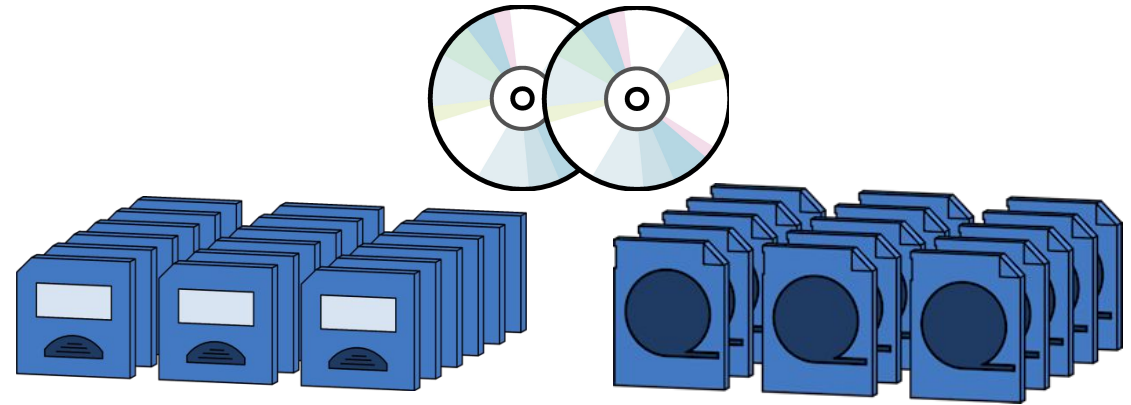


Disk-type storage devices



The DISK device class is predefined.

**Random access
(DISK)**



**Sequential access
(removable media and FILE)**

You can define additional device classes so that they reflect specific devices, media, and procedures. Use the following command:

DEFINE DEVCLASS DEVTYPE=*TYPE of device*

```
▶▶ Define DEVclass device_class_name DEVType = FILE
```

```
▶▶ Define DEVclass device_class_name LIBRARY = library_name
```

```
▶ DEVType = REMOVABLEfile {
    MAXCAPacity = space_remaining
    MAXCAPacity = size
}
```



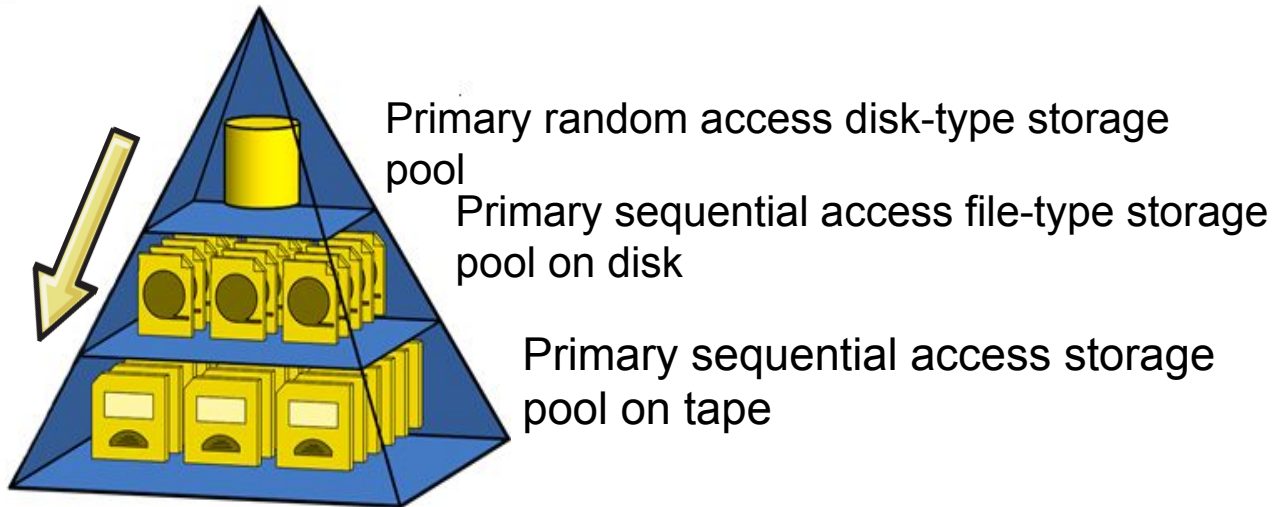
**IBM Tivoli Storage Manager Version 7.1.6
Administrator's Reference.**

Storage pools

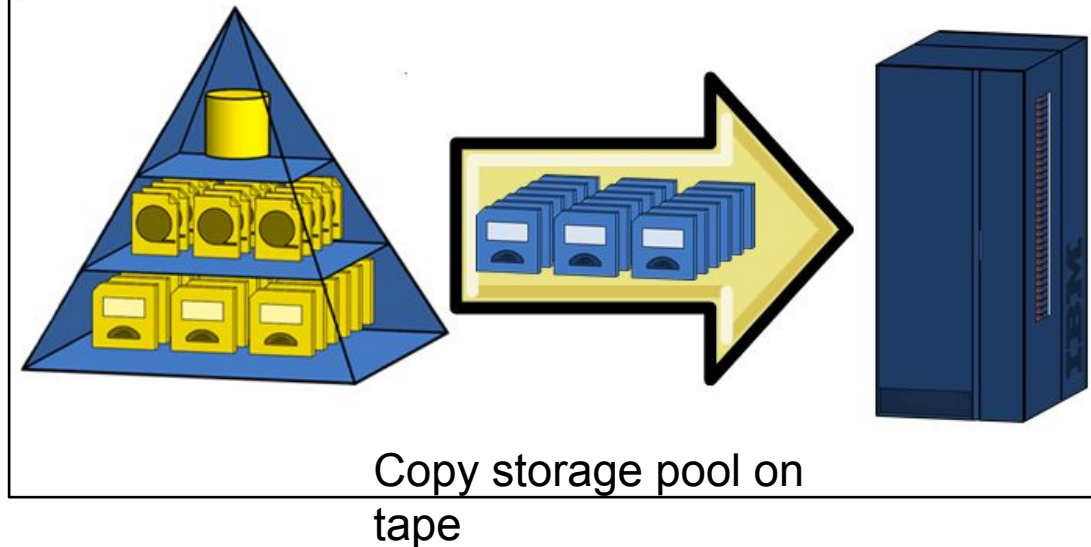
Storage pools are collections of similar media that provide storage for backed up, archived, and migrated files. These pools can be chained to create a storage hierarchy.

Use any supported sequential media in all copy storage pools.

Migration: Data moves from the primary disk pool directly to tape pools.



Copy data: Data moves from the primary storage pools to copy pools on removable media.

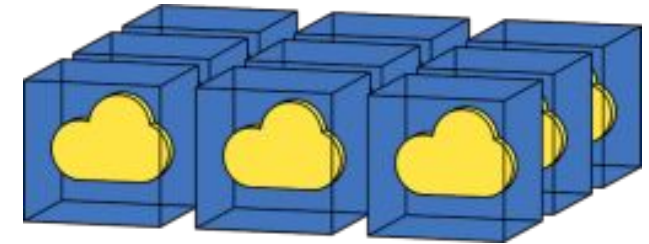


In this course, storage pools are represented by these graphics.

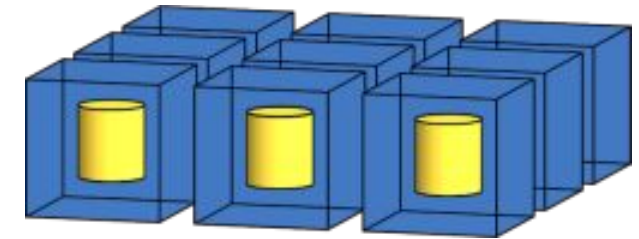
Container type storage pools

Container storage pools provide the following benefits:

- Provides simplified storage management, using directory or cloud containers, not volumes
- Supports public and private clouds
- Optimizes data-deduplication processing
 - Deduplication is enabled when container is created
 - Compression is enabled when container is created
- Reduces database growth and size
- Increases server performance and scalability
- Improves recoverability of damaged extents
- Provides excellent performance for most workloads



Cloud

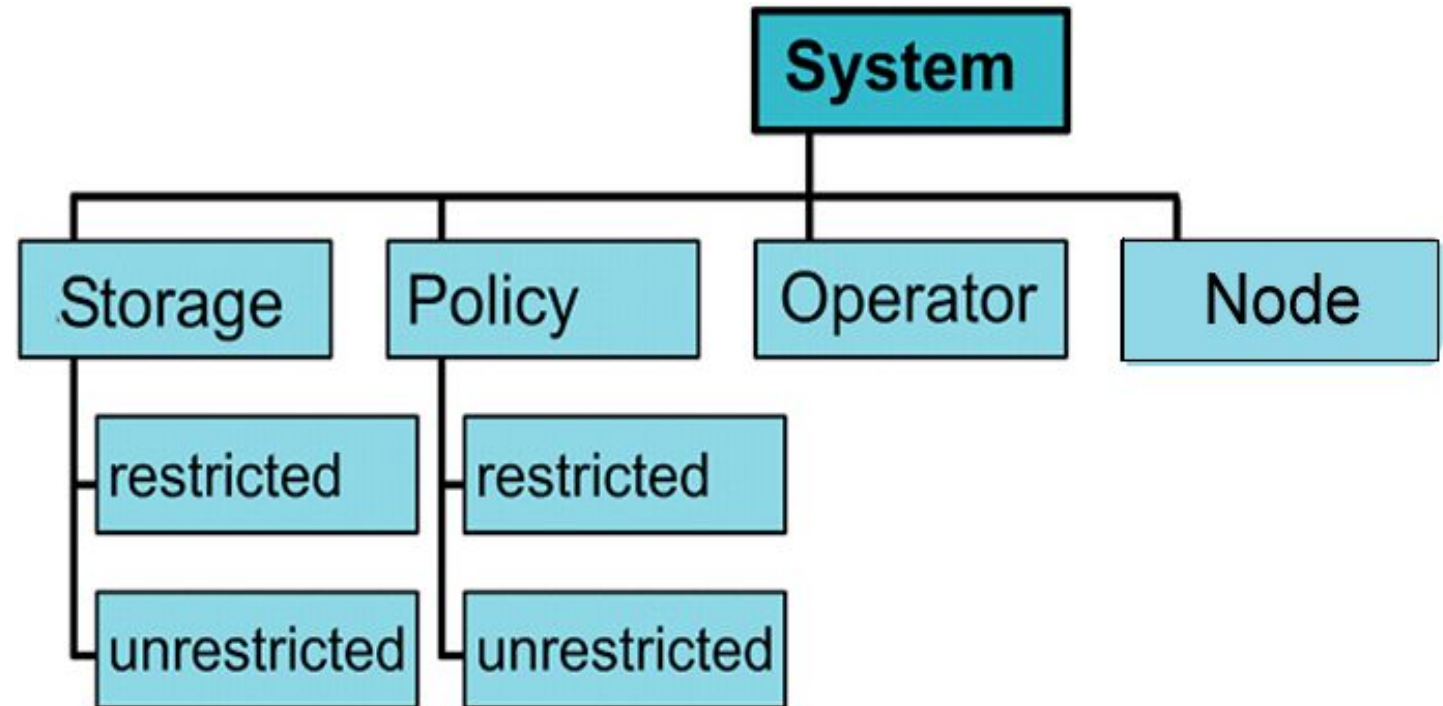


Directory

Administrators

The Spectrum Protect administrators manage the following areas:

- Daily operations
 - Client backups and schedules
 - Server maintenance and schedules
- Administrators and clients
 - Levels of administrative authority
 - Login requirements and server access
- The server performance
- Storage pools and volumes
- Other Spectrum Protect servers
- Disaster recovery
- Troubleshooting



Administrative client options

dsmadm

admin_command

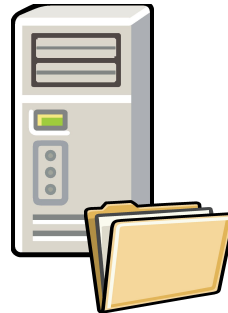
- ID=*USERID*
- PASSWORD=*password*
- NOCONFIRM
- QUIET
- CONSOLEMODE
- MOUNTMODE
- ITEMCOMMIT
- OUTFILE=*filename*
- COMMADELIMITED
- TABDELIMITED
- DATAONLY=*value*
- DISPLAYMODE=*list* or *table*

Backup-archive client

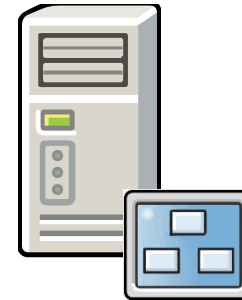
applications
such as database
or mail server



file server



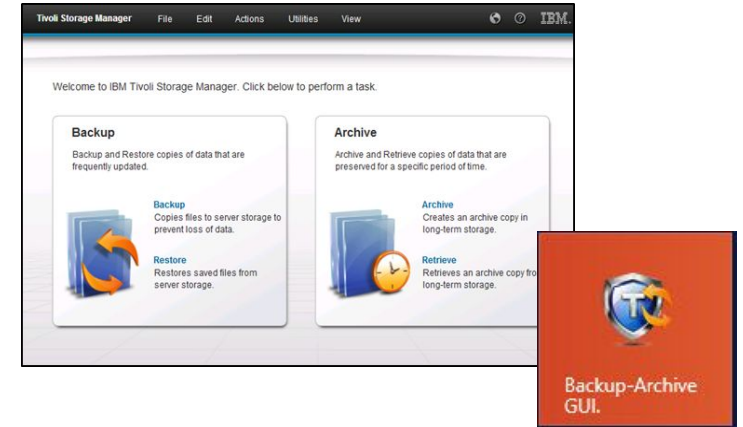
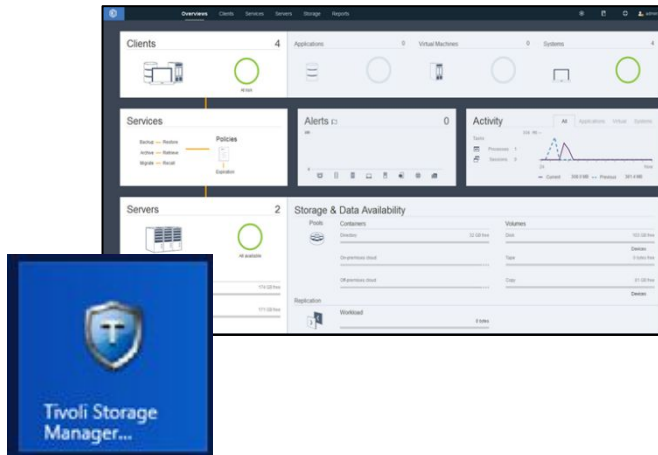
VM or Hyper-V



A *client node* is equivalent to a computer, virtual machine, or application, such as a Spectrum Protect backup-archive client that is installed on a file server for data backups.

In this course, the client instance is represented by these graphics.

Interfaces



Interface	Interface access
Operations Center	Web browser and default secure port 11090
Backup-archive client GUI	dsm (Windows) dsmj (UNIX)
Web client GUI	Web browser and default port 1581
Backup-archive command line	dsmc
Spectrum Protect server command line	dsmadm , Operations Center Command Builder, and server console

Lesson 2

Spectrum Protect Operations Center

Operations Center, Overview page

The screenshot shows the IBM Operations Center Overview page. At the top is a navigation bar with tabs for Overview, Clients, Services, Servers, Storage, and Reports. The main content area is divided into several sections:

- Clients:** 4 clients, status "At risk" (green circle).
- Applications:** 0 applications, status "At risk" (grey circle).
- Virtual Machines:** 0 VMs, status "At risk" (grey circle).
- Systems:** 4 systems, status "At risk" (green circle).
- Services:** Backup, Restore, Archive, Retrieve, Migrate, Recall, Policies, Expiration.
- Alerts:** 5 alerts, bar chart showing alert counts.
- Activity:** Tasks, Processes (1), Sessions (0), graph showing activity over time.
- Servers:** 2 servers, status "All available" (green circle).
- Inventory:** Database space (180 GB free), Archive log space (176 GB free).
- Storage & Data Availability:** Pools, Containers (Directory: 52 GB free, On-premises cloud, Off-premises cloud), Volumes (Disk: 102 GB free, Tape: 0 bytes free, Copy: 84 GB free), Replication, Workload (241.2 MB).

} banner

} pod

} pod

The banner

Return to Overview page



White font = active selection

Hovering over the tabs in the banner displays the available functions for that tab.

Overviews

- Overviews
- Alerts

Clients

- Clients
- Schedules

Servers

- Servers
- Maintenance

Storage

- Storage Pools
- Disk Devices
- Tape Devices
- Replication

Reports

- Documentation
- What's New
- About the Operations Center

Command Builder

- Licensing
- Settings

Operations Center, new features for 7.1.4 and 7.1.5

The following enhancements were made to the Operations Center for Spectrum Protect 7.1.4:

- You can complete the following tasks with the Reports page:
 - Configure and manage a general operations report and a license compliance report. These predefined reports are available by default.
 - Configure and manage custom reports, which use SQL SELECT statements to query one or more managed servers.
 - Schedule reports to be sent automatically, or manually send a report.
- You can complete the following tasks for NAS file servers:
 - View capacity and status information for NAS file servers that are registered as Tivoli Storage Manager clients.
 - View the capacity of volumes that are defined on NAS file servers.
 - Track the status and performance of full and differential volume backups.

The following enhancements were made to the Operations Center for Spectrum Protect 7.1.5:

- You can use the Add Storage Pool wizard to create a cloud-container storage pool that backs up data to IBM Cloud Object Storage System, formerly known as Cleversafe, an IBM object storage system, using the Simple Storage Service (S3) protocol.
- You can use inline compression with a directory-container storage pool to maximize storage pool space. You can complete the following tasks:
 - Specify whether data that is stored to a directory-container storage pool is compressed.
 - View how much space was saved in a storage pool by deduplicating and compressing data. The savings from both client-side and server-side compression are shown.

Operations Center, new features for 7.1.6

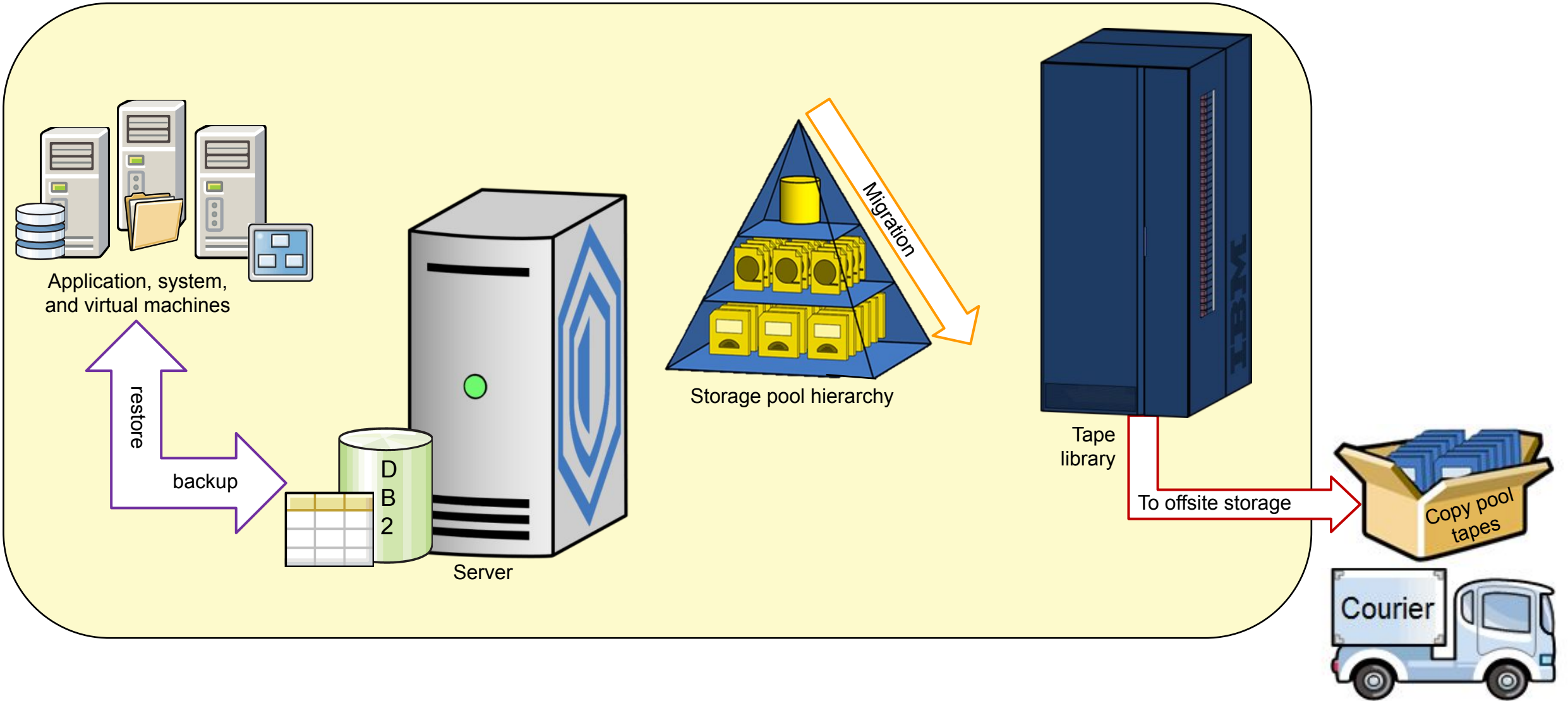
The following enhancements were made to the Operations Center for Spectrum Protect 7.1.6:

- You can use the new Convert Storage Pool wizard to move data from a primary storage pool that uses the FILE device class or a virtual tape library (VTL) to a directory-container storage pool. Directory-container storage pools provide inline data deduplication and compression, and are typically easier to manage than volume-based pools.
- You can view status, capacity, and configuration information for tape libraries. You can complete the following tasks:
 - View the status of library robotics, drives, and paths.
 - View the number of available scratch tape volumes and private tape volumes for each server.
 - View a library's overall tape capacity and tape usage over two weeks.
 - For shared libraries, identify which server is the library manager and which servers are library clients.
 - View the configuration and state of tape drives, including currently loaded tapes.
 - Specify which drives are available for server operations by taking them offline or bringing them online.
- You can use the Add Server Pair wizard to enable Aspera FASP technology for replication processes. Aspera FASP technology is available when you purchase the IBM Spectrum Protect High Speed Data Transfer product. An evaluation license is available by request.

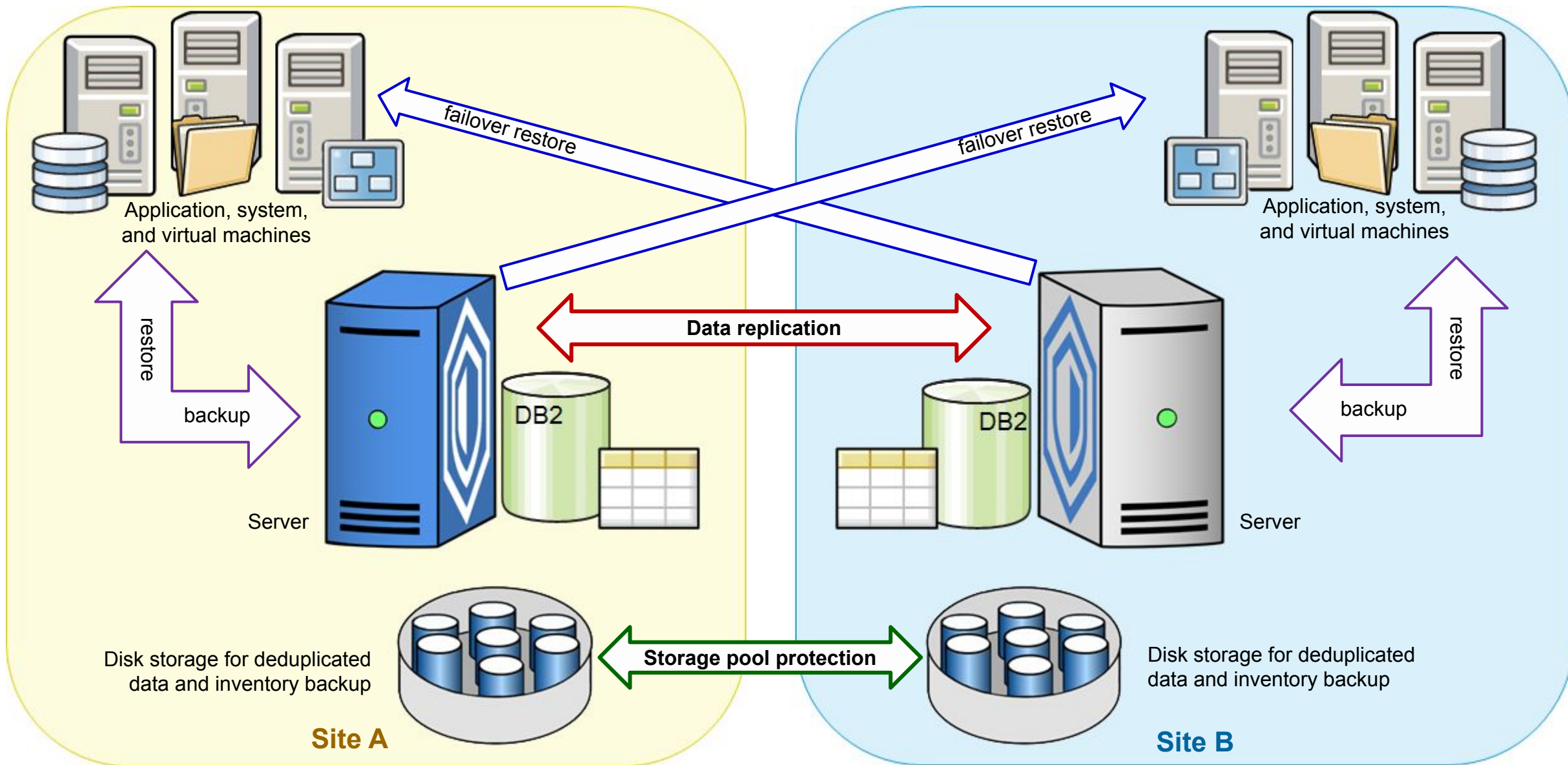
Lesson 3

Benefits of a multi-server Spectrum Protect environment

Traditional disk to tape



Multi-site disk environment overview



Lesson 4

The IBM Spectrum Protect storage family

IBM Spectrum Protect products

Spectrum Protect

- Spectrum Protect
 - Backup and Restore
 - Archive and Retrieve
 - Operations Center
 - Data Reduction (deduplication)
- Spectrum Protect Extended Edition (Basic plus..)
 - Advanced disaster recovery management
 - Backup via NDMP for NAS
 - Large libraries, additional tape support
 - Node replication
- IBM Spectrum Protect for SAN

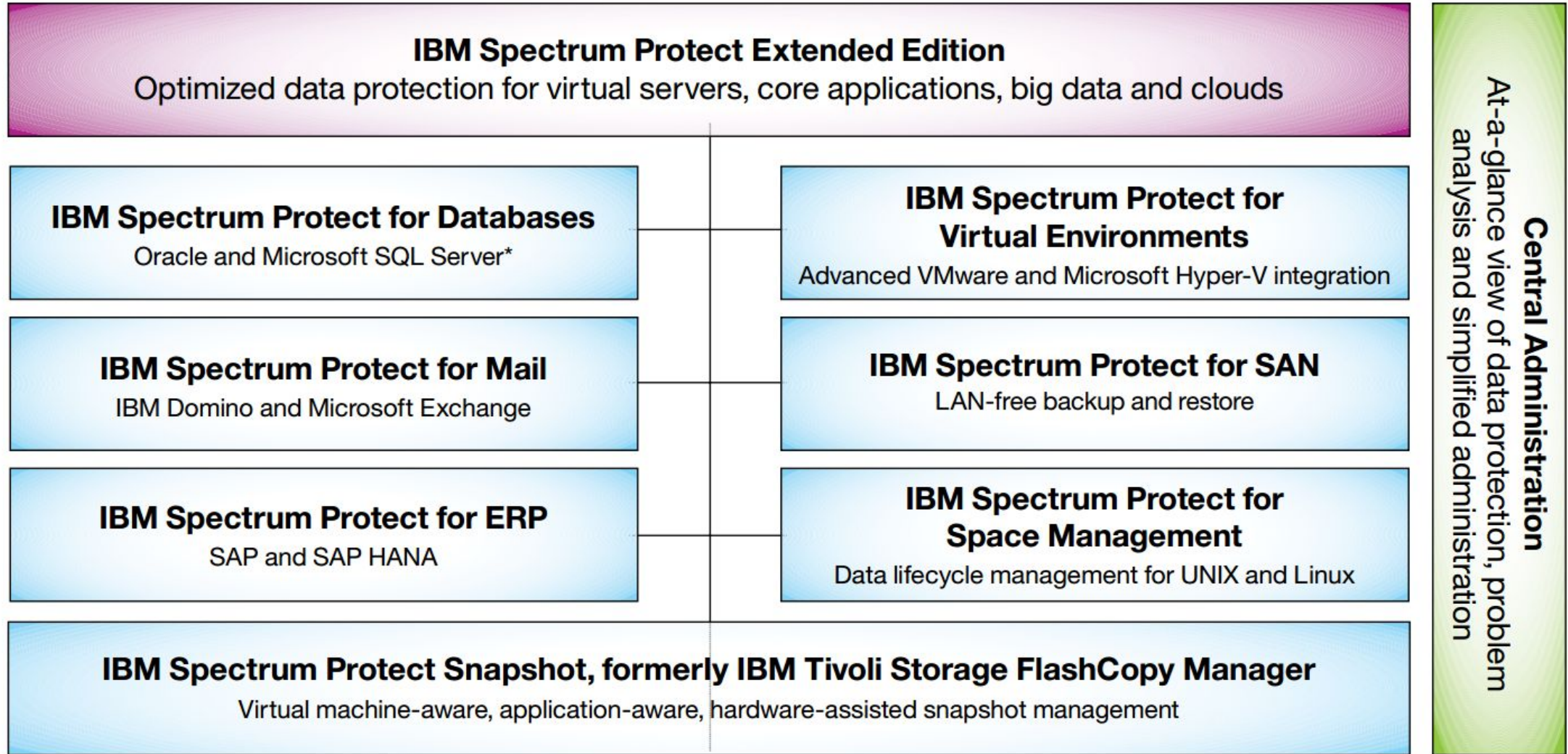
Spectrum Scale

- Formerly known as GPFS
- Spectrum Scale file systems balances the workload and capacity for all Spectrum Protect instances on disk
- Provides standardized, scalable and easy to use storage infrastructure for the multiple instances

Application Protection

- Advanced Agents for Core Applications
 - Mail agents support Microsoft® Exchange and Lotus® Domino®.
 - Database agents support Oracle® and Microsoft® SQL.
 - Enterprise Resource Planning agent supports SAP® on Oracle, and SAP HANA environments.
- Advanced Agent for Virtual Environments
 - VMWare
 - Hyper-V
- Snapshot Management
 - Oracle
 - DB2
 - SAP Oracle/DB2
 - VMWare
- Space Management

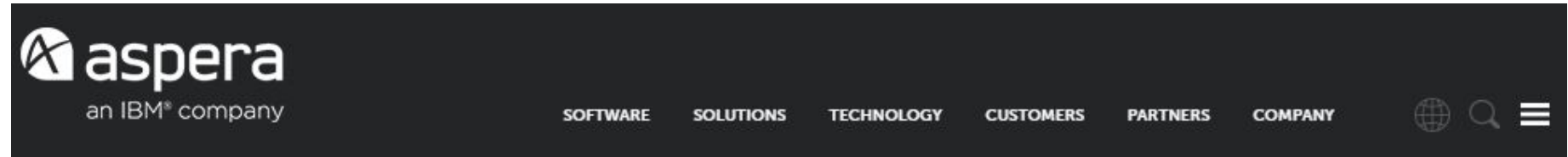
IBM Spectrum Protect Suite



* IBM DB2 and IBM Informix include IBM Spectrum Protect backup agents.

Aspera

<http://asperasoft.com/>



THE NEXT GENERATION OF THE ASPERA TRANSFER PLATFORM

- High-performance Streaming
- Major Core FASP® Transport Enhancements
- New SaaS, Cloud, Collaboration & Management Offerings
- Performance breakthroughs beyond 10 Gbps

“Aspera’s unwavering mission is to create the next-generation software technologies that move the world’s data at maximum speed, regardless of file size, transfer distance and network conditions. Our patented, highly efficient bulk data transport technology FASP™ is unique and core to all Aspera high-performance file transfer software. Organizations across a variety of industries on six continents rely on Aspera software for the business-critical transport of their digital assets.”

Spectrum Protect high speed data transfer with Aspera

Requirements for each source and target server to run IBM Spectrum Protect High Speed Data Transfer

- Running IBM Spectrum Protect 7.1.6 (or later)
- Running on Linux for System x platform
- Using directory container pools
- Using PROTECT STGPOOL and/or REPLICATION to transfer data
- Have a valid license

When **adding a server pair** with the wizard in the Operations Center, Aspera FASP can be enabled with the **transfer protocol** step once the license is installed on the target and source servers.

TCP/IP is effective for networks with low latency and low packet loss. On a wide area network with data transfer delays or high packet loss, you might improve performance by using Aspera Fast Adaptive Secure Protocol (FASP) technology.

Aspera FASP

Enable

Cloud-based storage solution

IBM Cloud and Software Defined Storage software solutions can:

- Manage data growth
 - Better prepare for future storage demands with an optimized, integrated and virtualized storage environment designed to help reduce complexity, costs and underutilized assets
- Increase reliability
 - IBM storage specialists help reduce risks by using time-tested processes and drawing on years of experience implementing, migrating and managing storage environments
- Enable innovation
 - Create a more efficient storage infrastructure that can support new business growth opportunities

IBM provides a broad portfolio of storage services designed to help you keep up with explosive data growth and the latest technology advancements.

Unit glossary

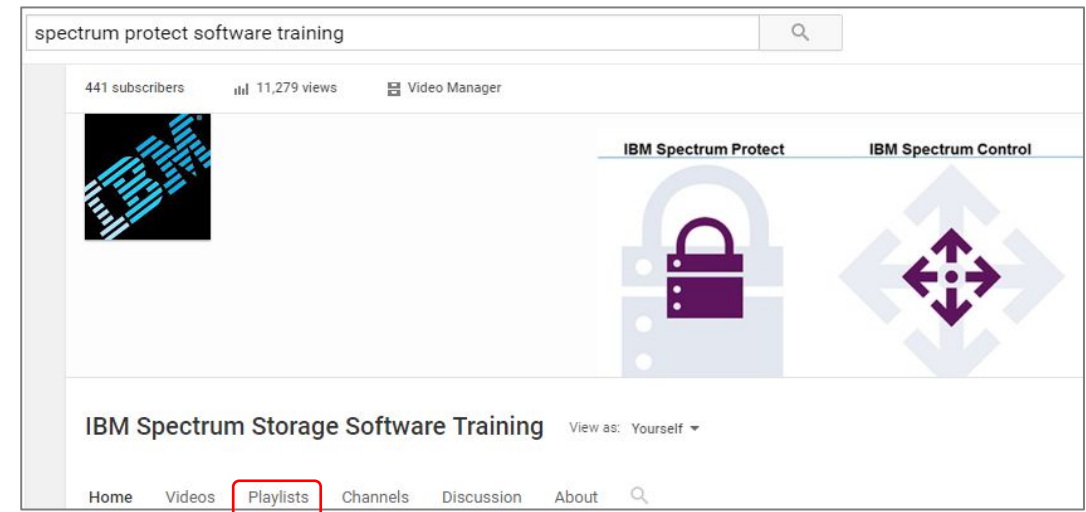
Review the key words and concepts for this unit:

- Spectrum Protect Extended Edition
- Database
- Recovery logs
- Server options
- Default policy
- Archive log
- Active log
- Volume history
- Device configuration



For additional training on IBM Spectrum Protect concepts and basic functions, visit our YouTube channel.

Go to **youtube.com** and search for **Spectrum Protect Software Training**. Click **Playlists** to access the **TSM/Spectrum Protect 101** series.



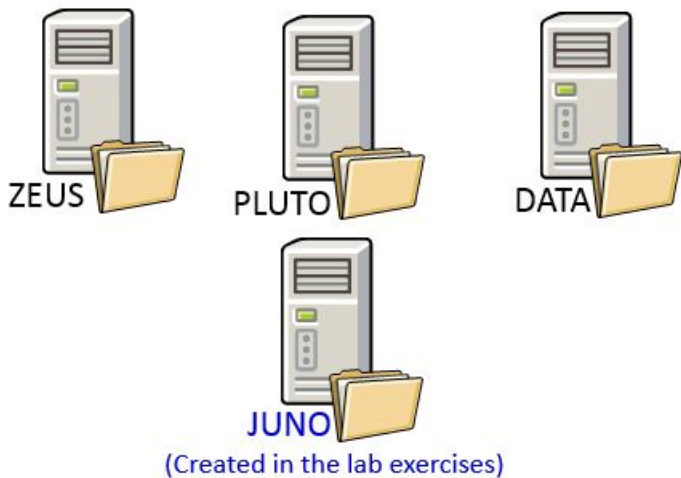
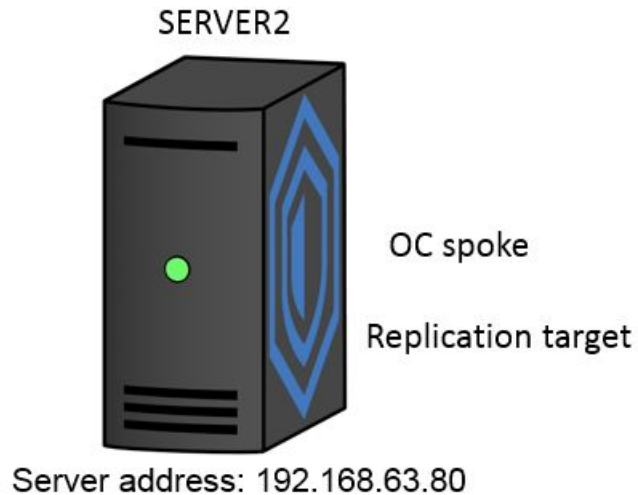
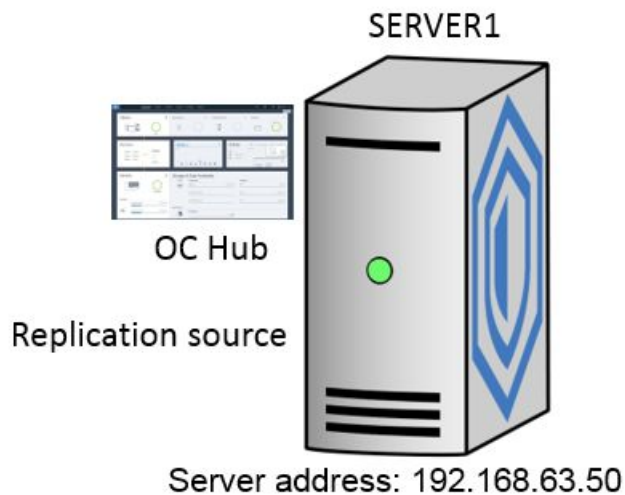
Review questions



1. True or false: The Spectrum Protect administrative command line, which is used for issuing commands for the server, is automatically installed with the Spectrum Protect server.
2. True or false: Shared memory can be enabled for database backups.
3. True or false: You need to be a DB2 database administrator to perform Spectrum Protect DB2 functions.
4. Which type of storage pools optimizes data-deduplication processing?
5. What is a benefit of using a multi-server disk environment?

Exercises for Unit 1

Lab environment



system	login ID	password
SERVER1	admin1	admin1
SERVER2	admin1	admin1
ZEUS	ZEUS	zeus
DATA	DATA	data
PLUTO	PLUTO	pluto
JUNO	JUNO	juno
MARS	MARS	mars

Exercise introduction



You will perform the following exercises:

- Log on and verify the system
- Use the Spectrum Protect administrative command line interfaces
- Add a spoke in the Operations Center
- View status and use Command Builder in the Operations Center

Unit summary

Now that you have complete this unit, you can perform the following tasks:

- Describe Spectrum Protect and its function
- List the components of Spectrum Protect
- Describe Spectrum Protect 7.1 administrative functions and interfaces
- Identify the Spectrum Protect servers set up for this course