



# Data Protector 10.10

## Module 1: Introduction & Use Cases

### Level 310 Technical Deep-Dive

Keith Walls  
Technical Enablement

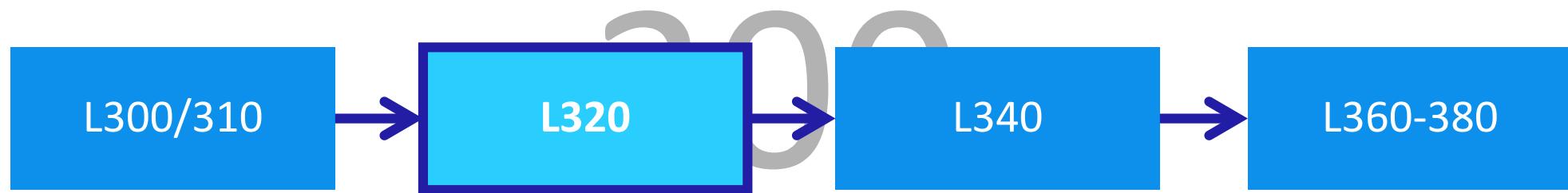
October 2018

You can:

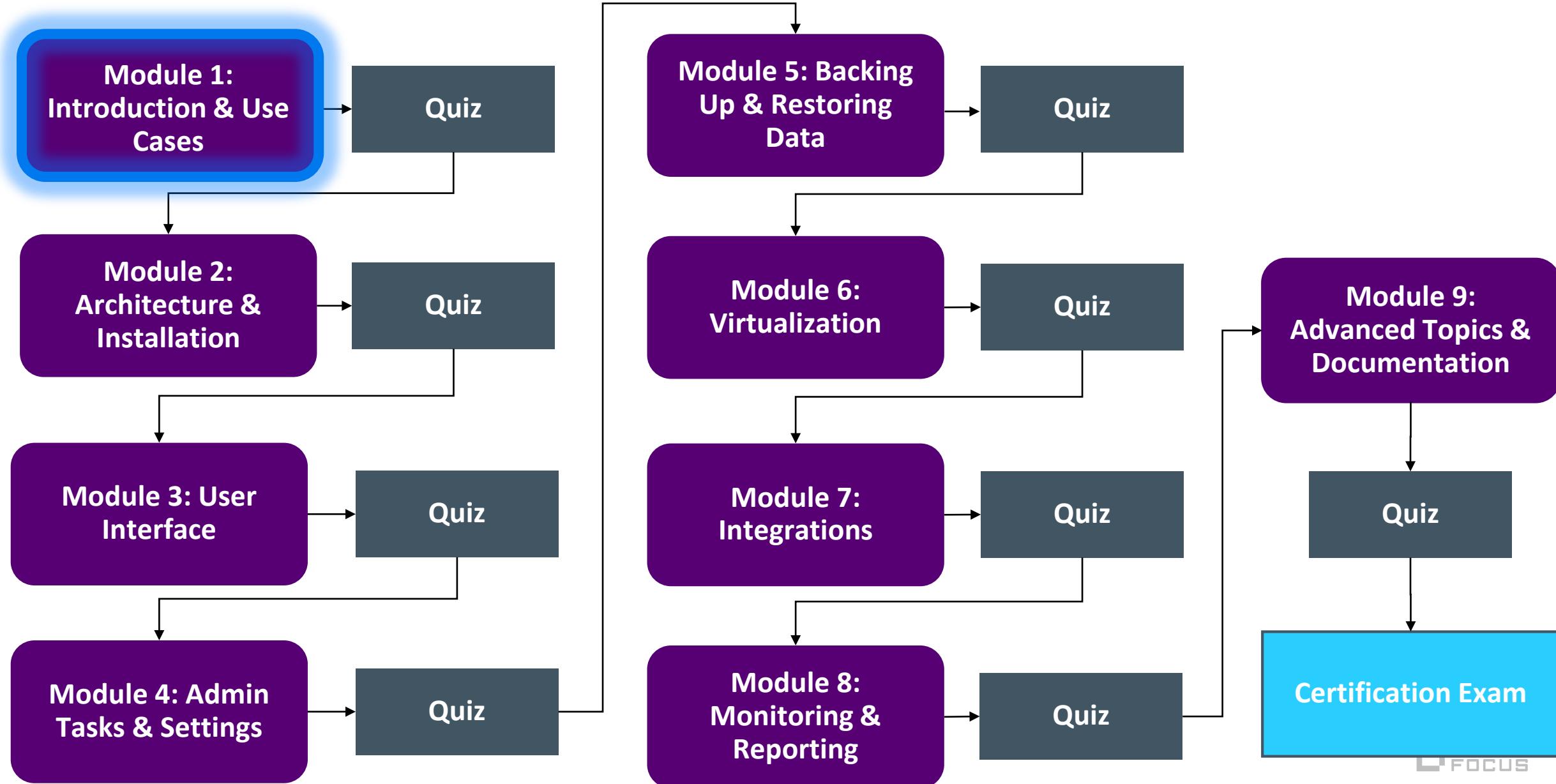
- Download the presentation.
- Download PowerPoint slides & speaker notes.

# Introduction to the 300-Series Curriculum

What is the 300-series Curriculum?



# Data Protector L310 Multi-Module Course



# About Module 1: Introduction & Use Cases

## Introduction

- What is Data Protector?
- What does it do?
- What is its history?
- What is a backup object?

## Use Cases

- Direct attached backup
- Network backup
- SAN attached backup
- Array based replica backup (ZDB)
- Backup to the Cloud

## Module Quiz

- Take a short quiz

# Data Protector Introduction

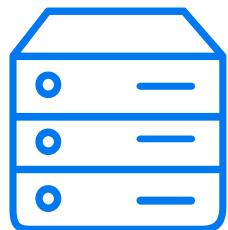
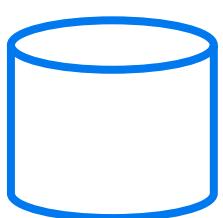
- Overview
- History
- Use Cases

# HP Data Protector software (v10.10)

Rethinking protection for the modern data center

## What is it?

- Automated backup and recovery application.
- Data protection for businesses with 24x7 availability needs.



## What does it do?

- **Protects data:** Copies data onto a secondary storage device (disk or tape) for easy recovery.
- **Manages media:** Easily manages library catalogues to keep track of all media and data copies for fast recovery

## Most important features

- Scalable and highly flexible architecture
- Easy central administration
- Support of high-availability environments
- Enterprise application protection
- Comprehensive backup and recovery of Virtual Environments
- Zero Downtime Backup
- Instant Recovery

# HP Data Protector history



- HP Acquired Apollo in 1989
- HP released OmniBack II in 1996
- OmniBack II became Data Protector in 2002
- Data Protector 9.00 was released in July 2014
- Data Protector 10.00 was released in June 2017

# What is a BACKUP OBJECT?

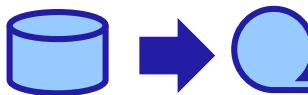
Backup  
Object

- = **Backup bundle or unit containing all items selected for backup from one disk volume (logical disk or mount point)**
- Any number of files, directories, or the entire disk or mount point
  - Database entity
  - Disk image

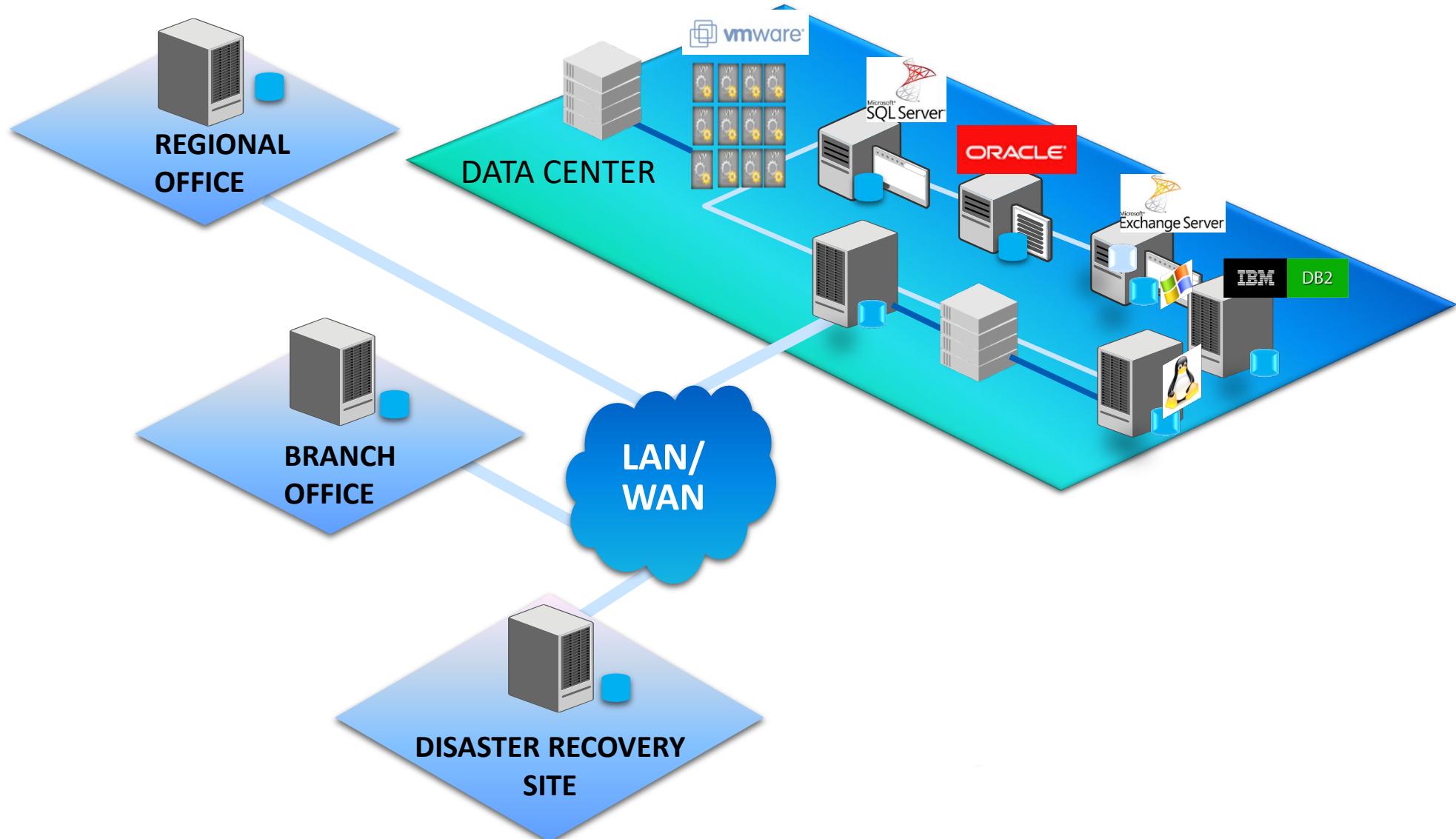
**A backup object is defined by:**

- **Client name:** a hostname of the Data Protector client where the backup object resides.
- **Mount point:** access point in a directory structure (drive on Windows and mount point on UNIX) on the client where the backup object is located.
- **Description:** uniquely defines the backup object with identical client name and mount point. If the description changes, it is considered a new backup object and a full backup will automatically be performed instead of an incremental.
- **Type:** backup object type, for example files system or Oracle.

**NOTE:** Backed up objects can be restored or copied to different medium.



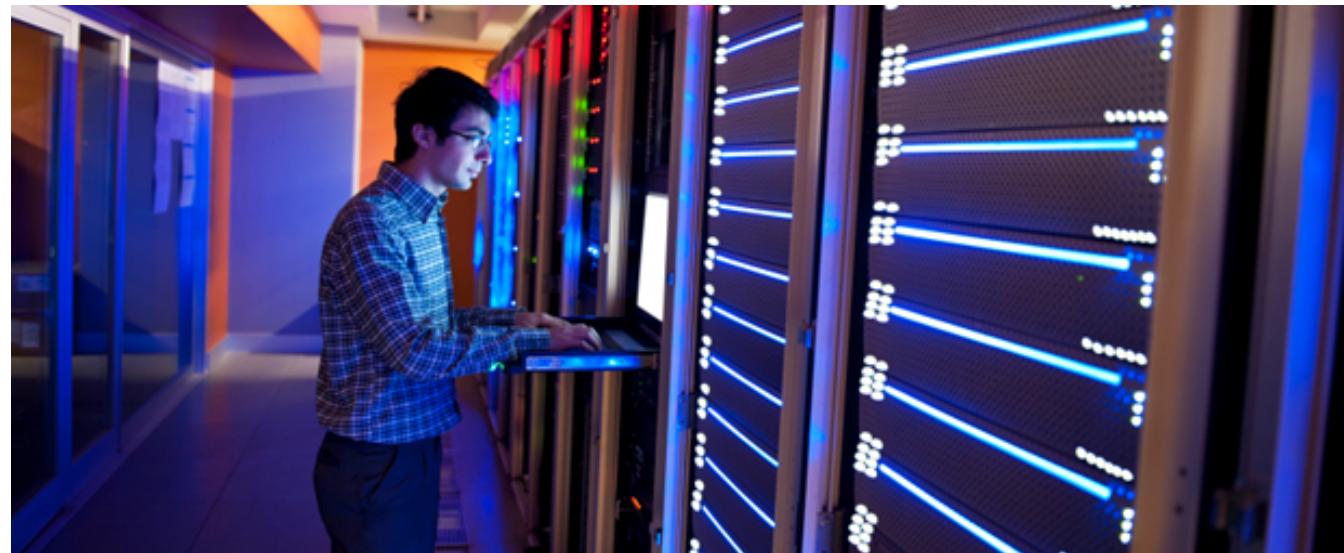
# Data Protector is used in a protected environment



# Available Backup options

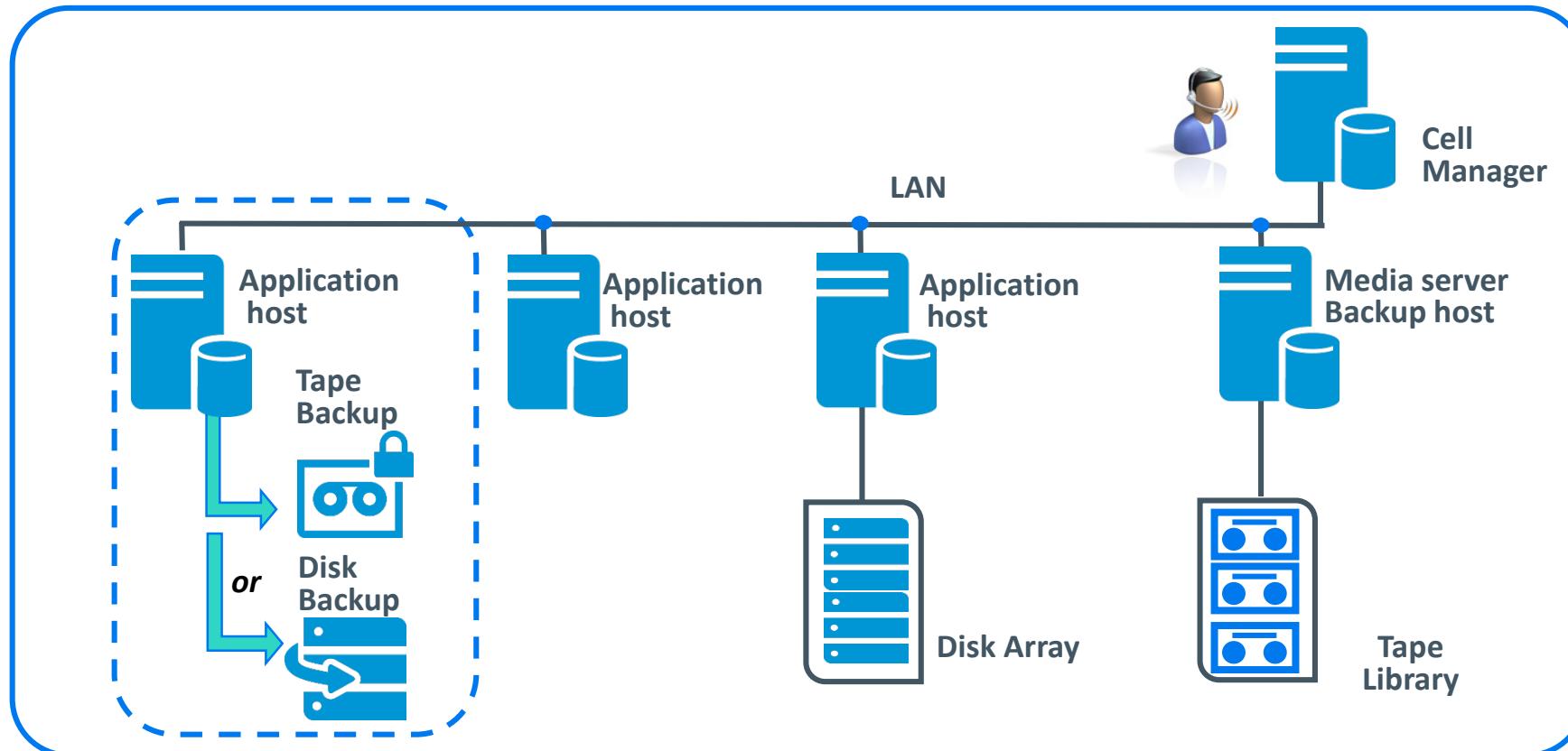
Data Protector supports the following backup options:

- Direct attached backup
- Network backup
- SAN attached backup
- Array based replica backup (ZDB)
- Backup to the Cloud



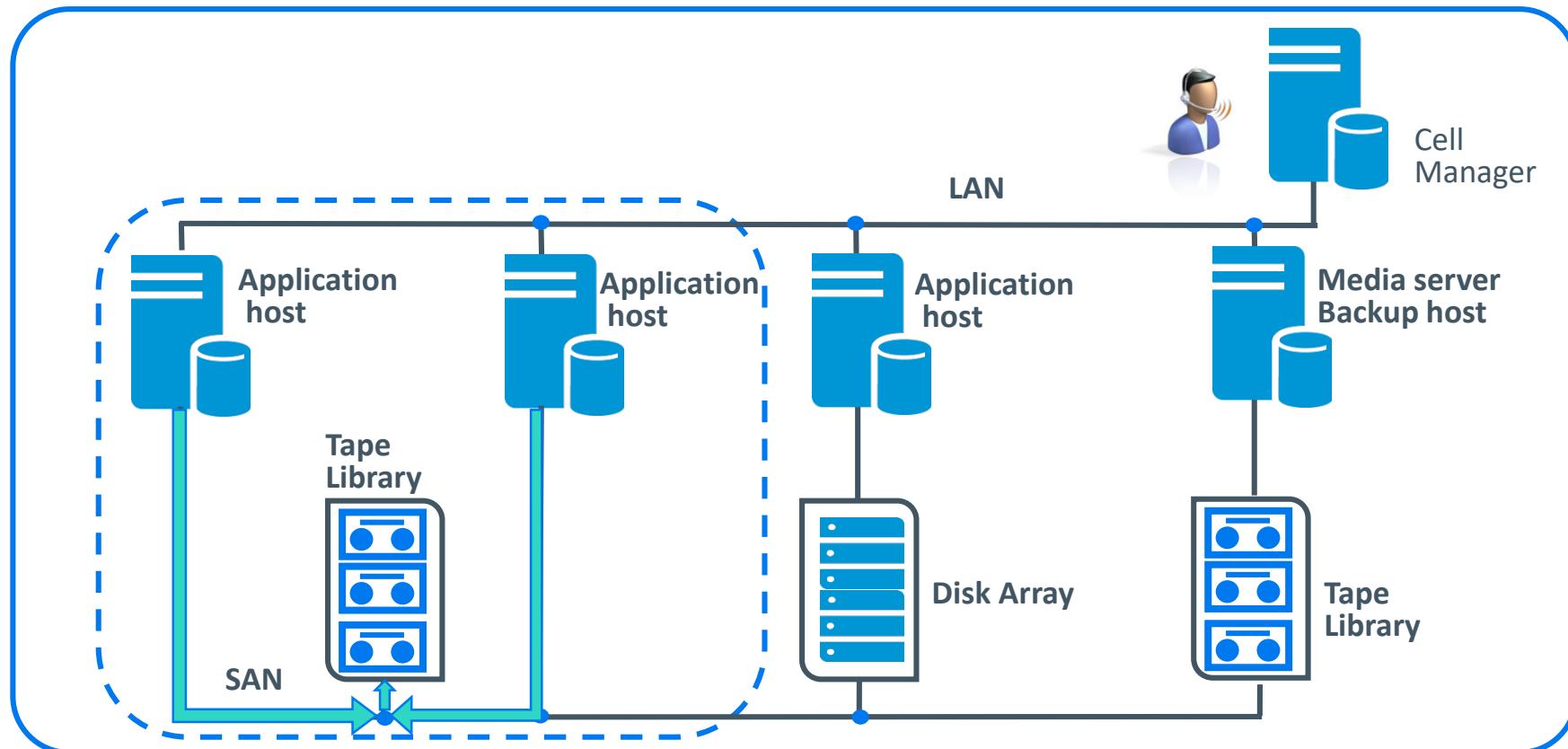
# Direct attached backup

- Direct attached backup device required
- No other host is part of the backup process
- Data is transferred from application disk to backup device



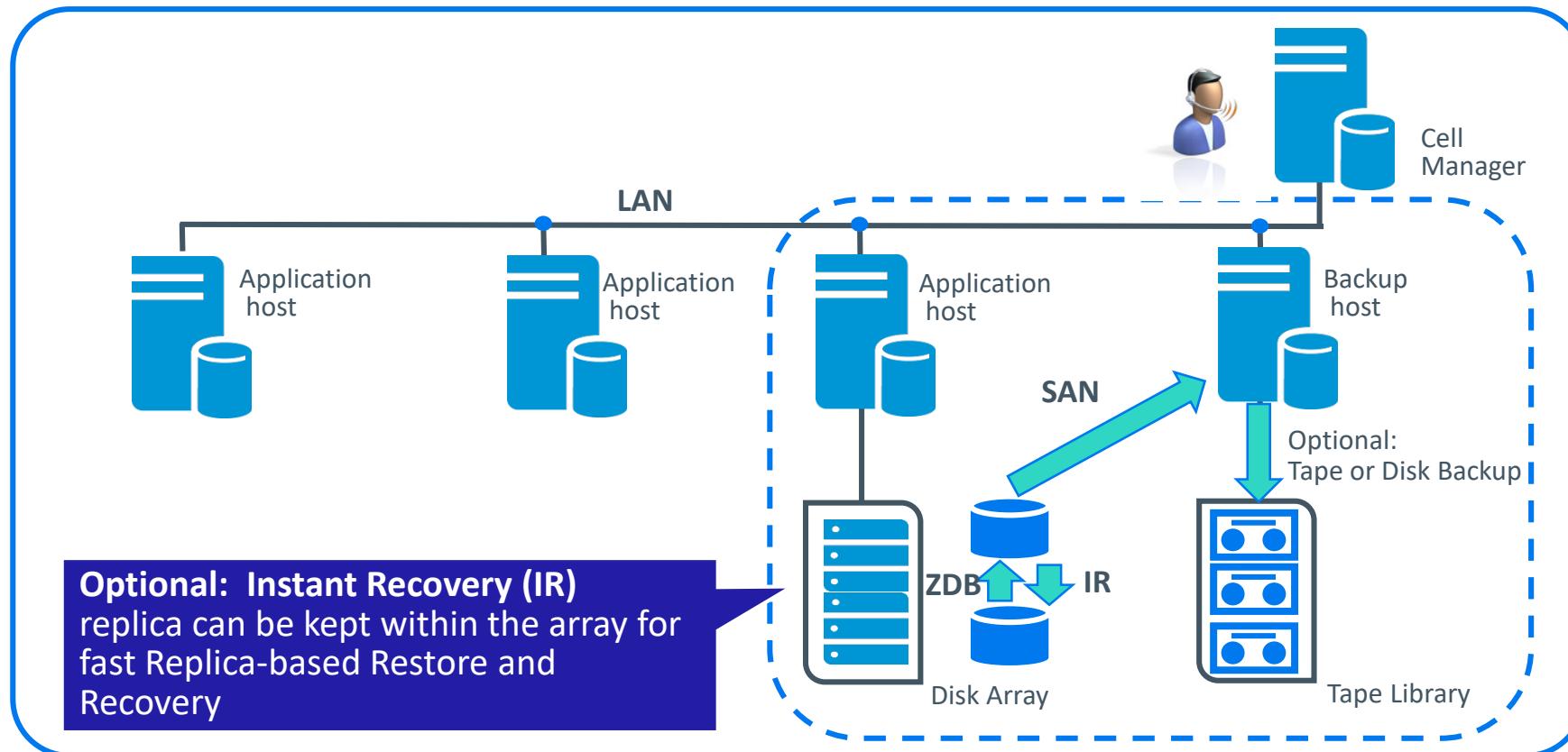
# SAN attached backup

- SAN attached backup device is required
- No other host is part of backup process
- Data is transferred from application host to the backup device

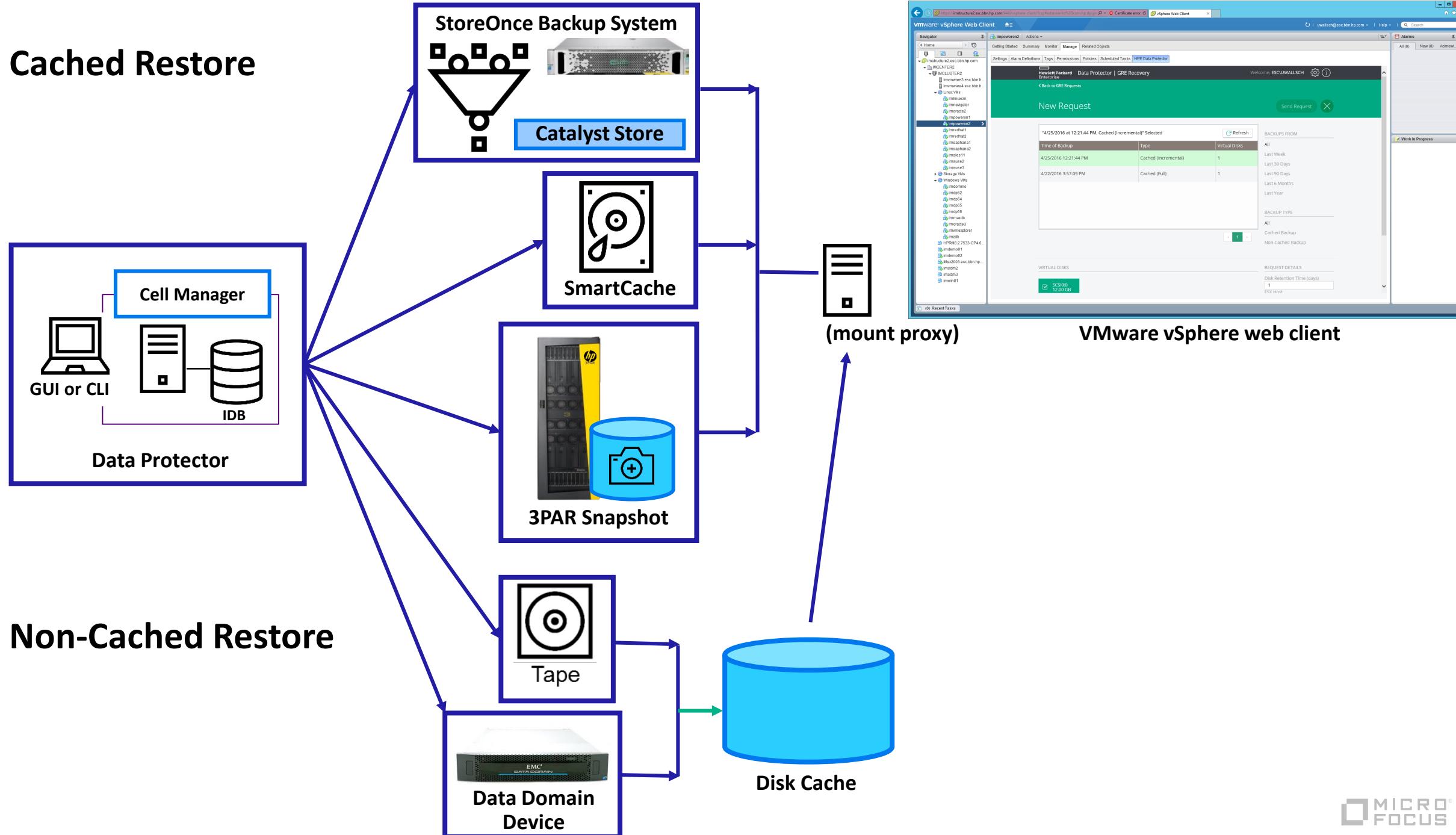


# Array based replica backup (ZDB)

- Disk array functionality is used to create a replica (Snapshot/Mirror)
- Replica is mounted on a dedicated backup host and data is backed up from there to a backup device, so there is no impact on application host (Zero Downtime Backup - ZDB)



# Cached Restore



# Non-Cached Restore



# Wrap-Up

- Summary
- Module Quiz

# Quick Summary

Here's what you learned ...



- Has a long history as a quality product
- Provides excellent data protection and media management
- Works well in a variety of backup situations
- Backs up to different media as needed
- Works for virtual environments
- Supports Zero Downtime Backups and Instant Recovery



## Module 1 Quiz

Pause now to take a short interactive quiz to gauge your understanding of what you learned in this module.

# Congratulations!

You completed Module 1.

Stay tuned for Module 2: Architecture & Installation.

## What's next?

[Move on to the next module.](#)





# Data Protector 10.10

## Module 2: Architecture & Installation

### Level 310 Technical Deep-Dive

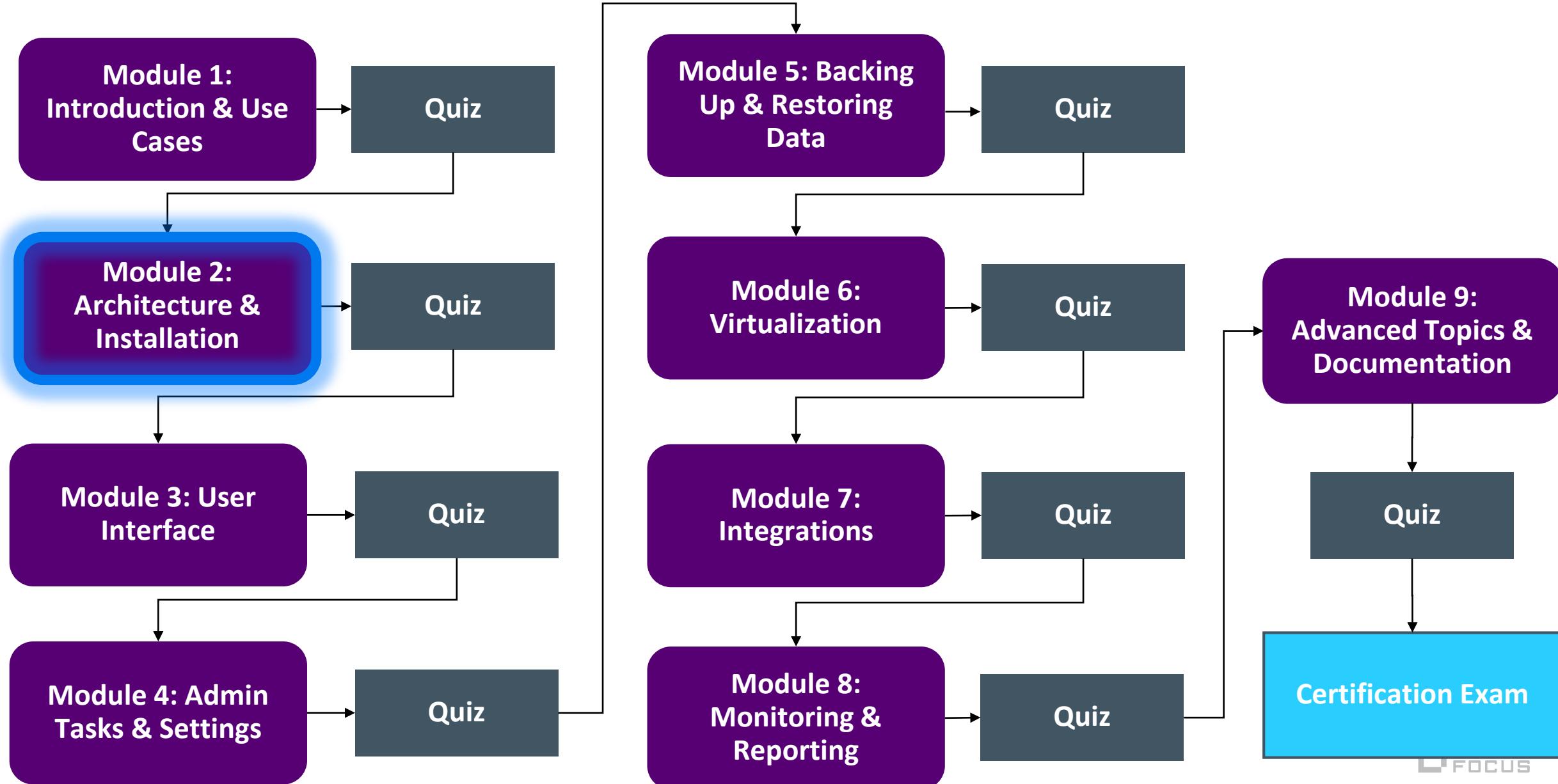
Keith Walls  
Technical Enablement

October 2018

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# Level 310 Multi-Module Course



# About Module 2: Architecture & Installation

## Architecture

- The Cell
- Server-Client Architecture
- Cell Manager
- Disk Agent
- Media Agent
- Integration Agent

## Installation

- Platform Support
- Documentation
- Planning & Requirements
- Installation Process
- Remote Push Installation
- Import/Export Clients

## Module Quiz

- Take a quick interactive quiz

# Architecture

- Cells
- Cell Manager
- Device Agent
- Media Agent
- Integration Agent

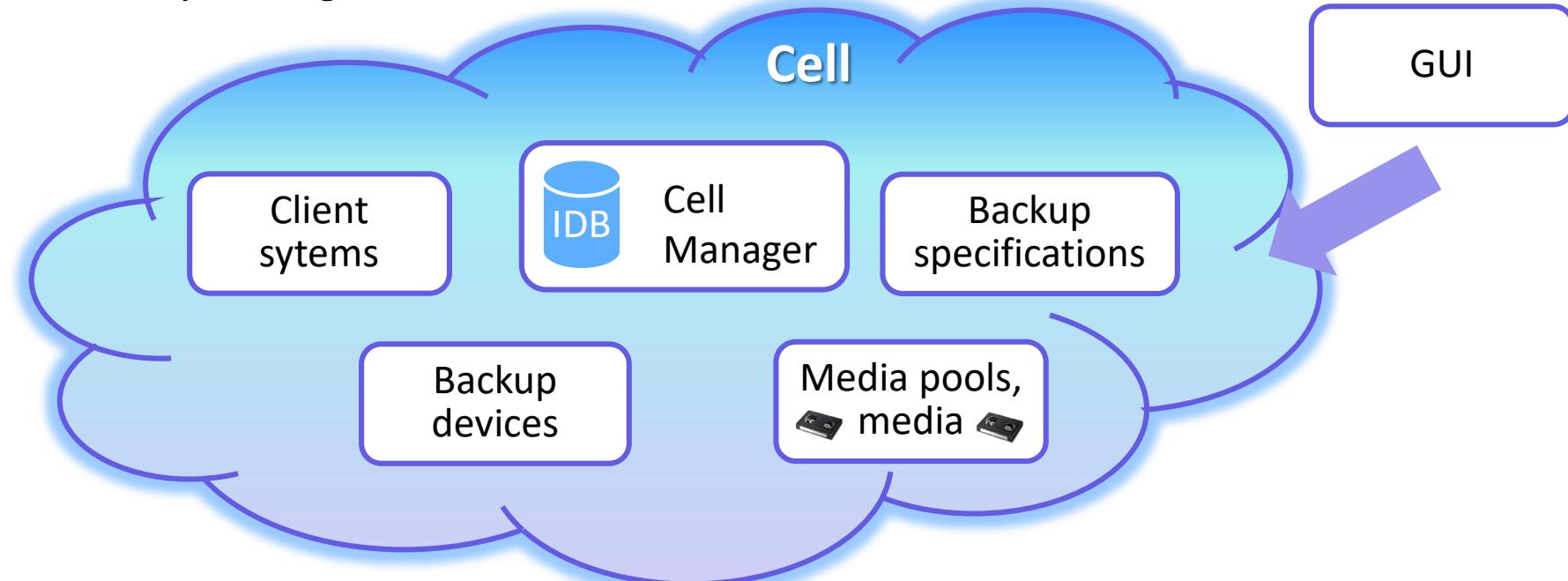
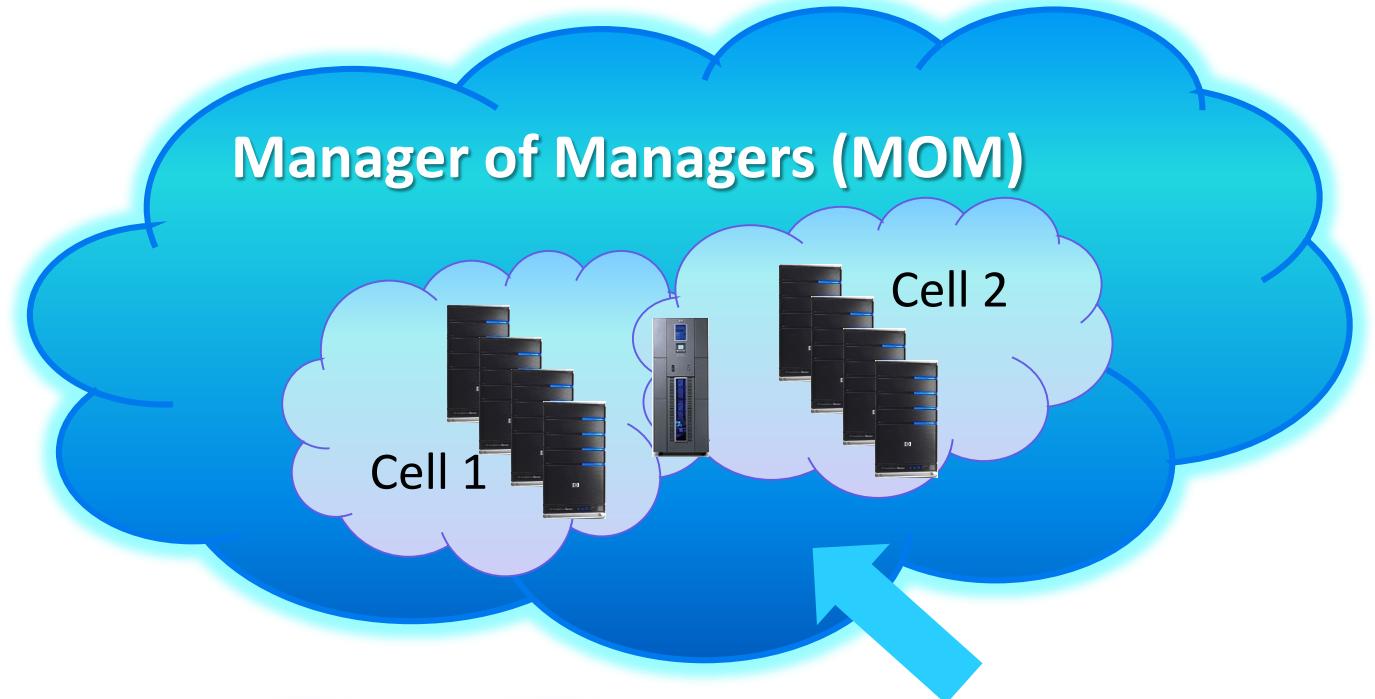
# Architecture Overview

## Data Protector Architecture is:

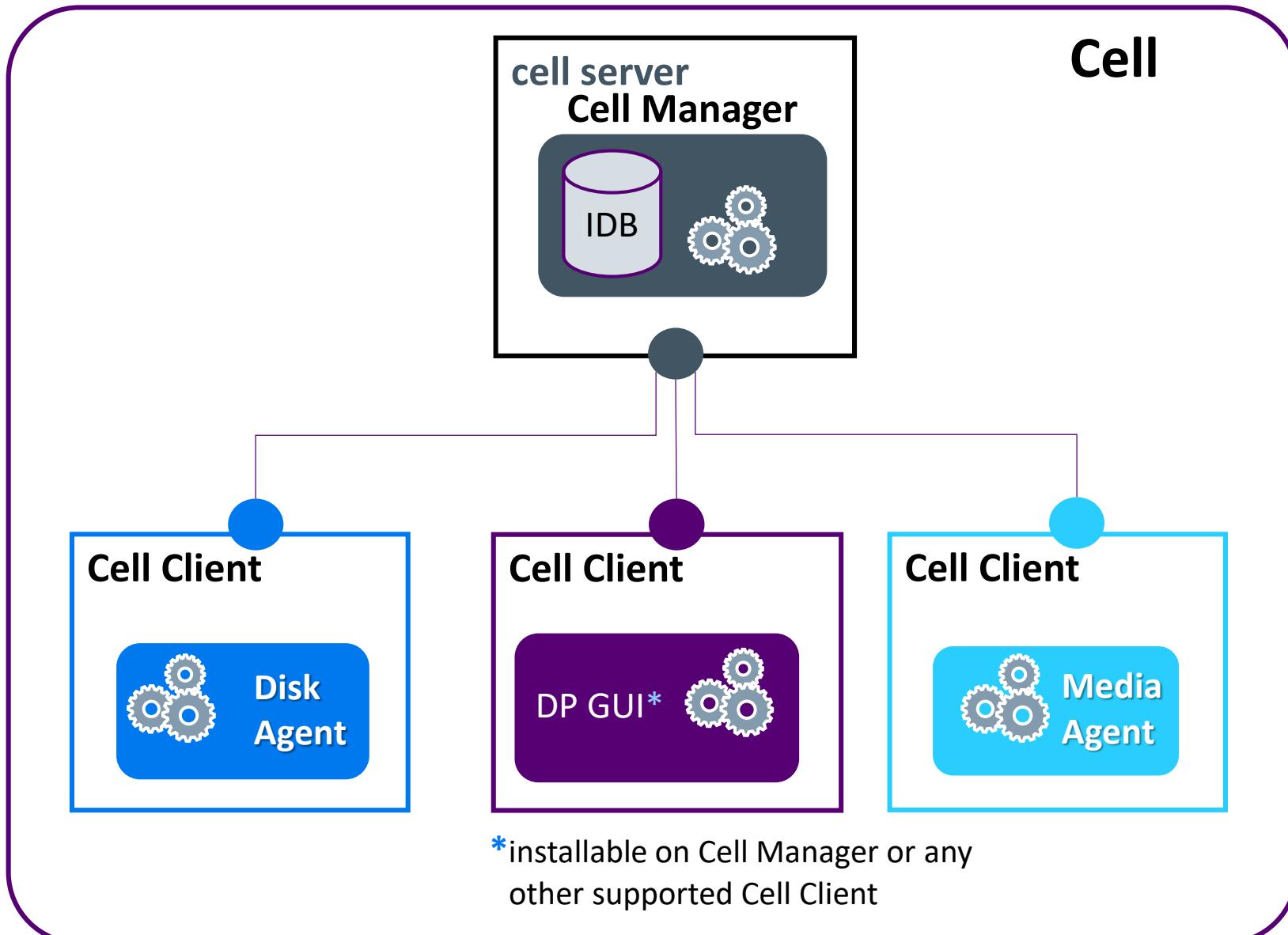
- ✓ ▪ Scalable, flexible, centrally managed
- ✓ ▪ Works in mixed environments, on multiple platforms
- ✓ ▪ Easy to install
- ✓ ▪ Backs up various applications
- ✓ ▪ Supports wide variety of hardware
- ✓ ▪ Offers automated and unattended operations and reporting.

# Cell concept

- Backup domain
- Logical organization of systems
- Can match the organization or geographical region
- Heterogeneous system support
- Independent, but centrally managed



# Client–server architecture



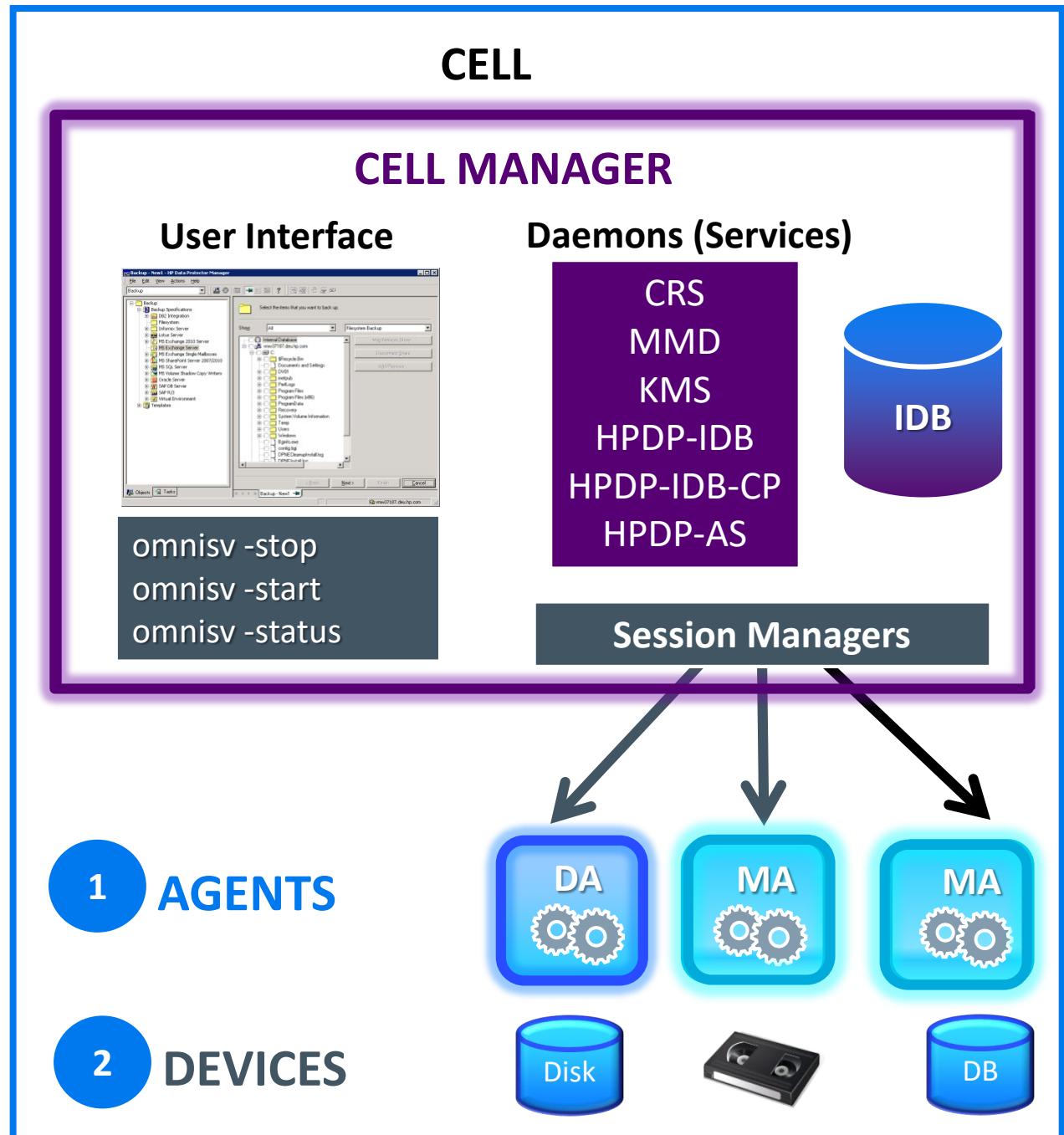
# Cell Manager (CM)

Supported on: HP-UX, Windows, Linux

Always requires a local installation

Cell Manager contains:

- Cell Services (daemons)
- Session managers
- Internal database (IDB)
- Scheduler and Configuration files
- Agents and User Interface (CLI/GUI/Web GUI)
- Installation server (optional)
- managed via "omnisv" commands



## Cell Console

CLI

UX, Win

GUI

Win

Web reporting

New in DP10-  
Web GUI

## Cell Manager

1

CRS

Cell Request  
Server

2

MMD

Media  
Management  
Daemon

5

xSM

Session  
Managers:  
Backup (BSM)  
Restore (RSM)  
Database (DBSM)

4

KMS

Key  
Management  
Service

6

IDB

Internal  
Database  
(PostgreSQL)

3

JBoss AS

JBoss  
Application  
Server

7

Configuration  
Files

## Cell Manager

2

Disk Agent

1

Media Agent

3

Application  
Integrations  
Oracle, SAP,  
Exchange...

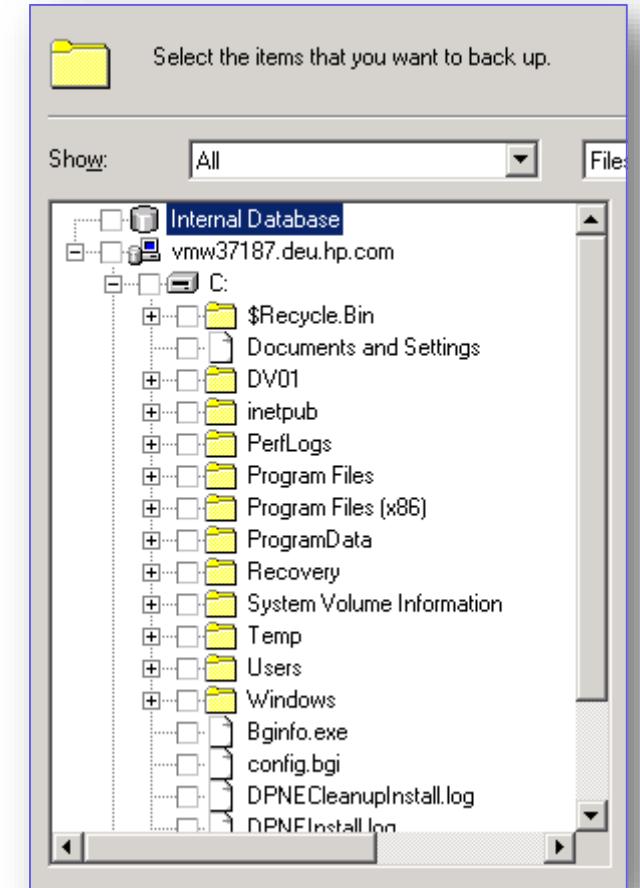
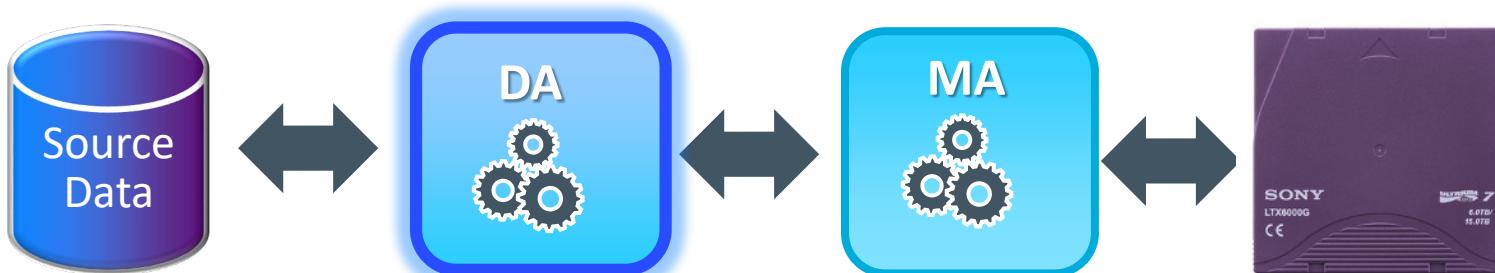
4

ZDB/IR

Hardware  
snapshots for Zero  
Downtime Backup,  
Instant Recovery

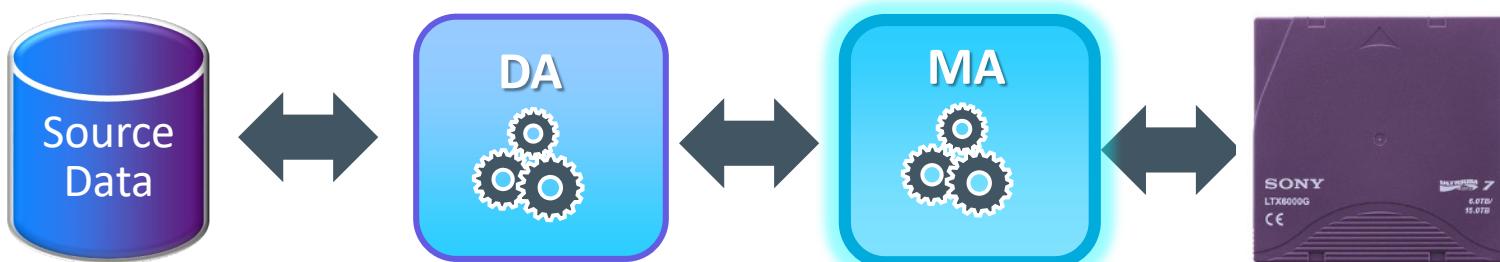
# Disk Agent (DA)

- Provides disk access (read/write)
- Exchanges data with Media Agents (MA)
- Invoked by session manager
- Remote Installation via Installation Server or local client installation
- Installed once per client
- Multi-vendor support



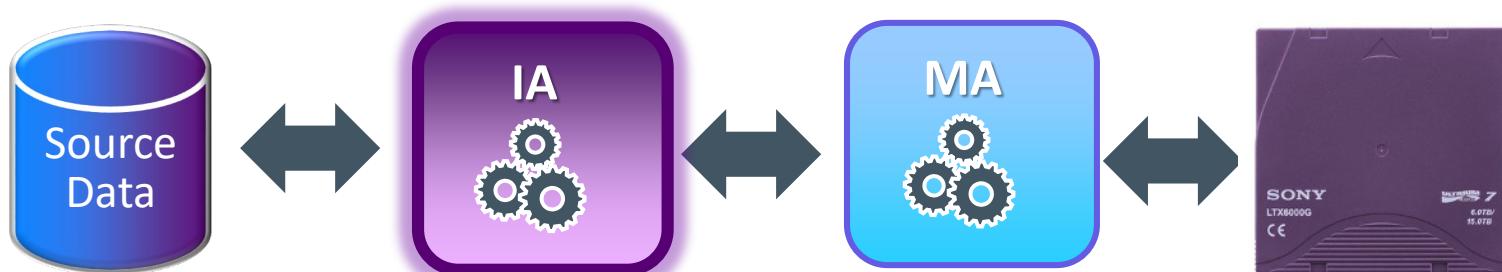
# Media Agent (MA)

- Provides backup media access (read/write) located in backup devices such as: standalone tape drive, physical or virtual tape library, file library
- Exchanges data with Disk Agents (DA)
- Invoked by session manager
- Remote installation via Installation Server or local client
- Installed once per client
- Multi-vendor support



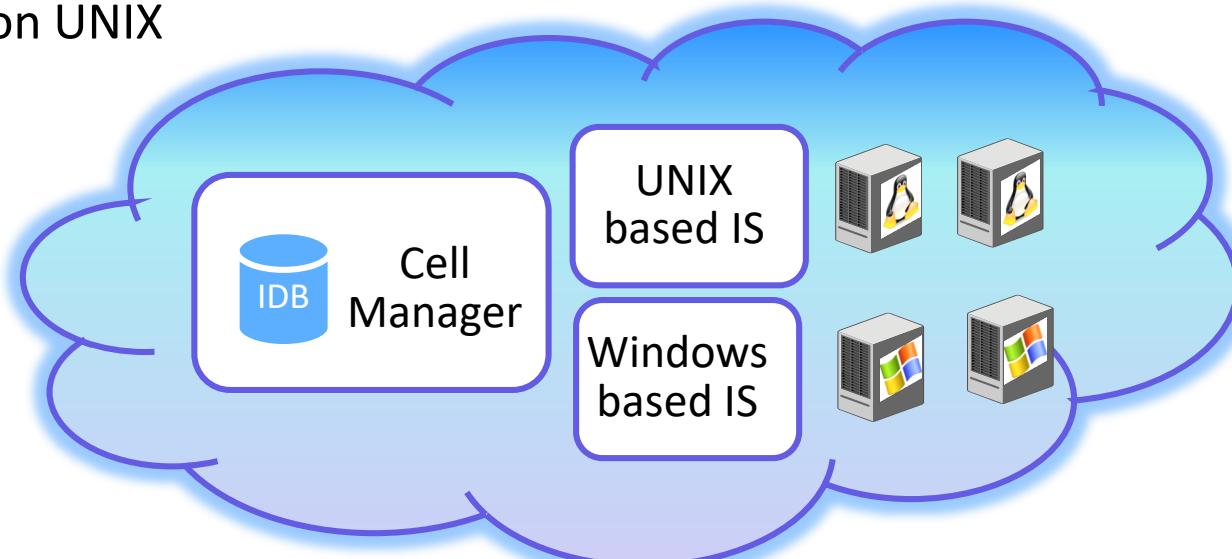
# Integration Agent (IA)

- Enables true online backup of databases and applications
- Integrates with vendor's API or backup and restore tools
- Exchanges data with Media Agents (MA)
- Installed via Installation Server or local client installation
- Multi-vendor support



# Installation Server (IS)

- Repository for all Data Protector Agents for push installation to remote clients
- Supported on all Cell Manager platforms
- Always requires a local installation
- A dedicated Installation Server for push installations (one for Windows and one for UNIX/Linux for push installations)
- Can share IS with multiple cells
- Must be registered/imported on the CM
- Supports SSH on UNIX



General	
Installation Server	
Name:	dp_serv_03.corp.net
Platform:	microsoft amd64 wNT-6.1-W
Components available for installation:	
Component	Version
Disk Agent	A.08.10
General Media Agent	A.08.10
NDMP Media Agent	A.08.10
User Interface	A.08.10
Manager-of-Managers User Interface	A.08.10
HP 3PAR VSS Agent	A.08.10
HP P4000 VSS Agent	A.08.10
HP P6000 / HP 3PAR SMI-S Agent	A.08.10
HP StorageWorks disk array XP Agent	A.08.10
MS Exchange Integration	A.08.10
MS Exchange Server 2010+ Integration	A.08.10
MS SharePoint Server 2007/2010/2013 Integration	A.08.10
MS SQL Integration	A.08.10
MS Volume Shadow Copy Integration	A.08.10
DB2 Integration	A.08.10
EMC Symmetrix Agent	A.08.10
Informix Integration	A.08.10
Lotus Integration	A.08.10
Oracle Integration	A.08.10
SAP MaxDB Integration	A.08.10
SAP R/3 Integration	A.08.10

# Installation

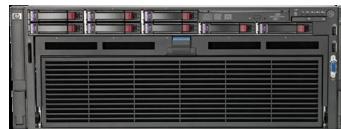
- Supported Platforms
- Server Installation Process
- Client Import and Export

# Installation Overview

**Data Protector installation is a 2-Step process:**

1. Data Protector Cell Manager and Installation Server Installation
2. Data Protector Clients Installation

## Step 1: Install Cell Manager & Server



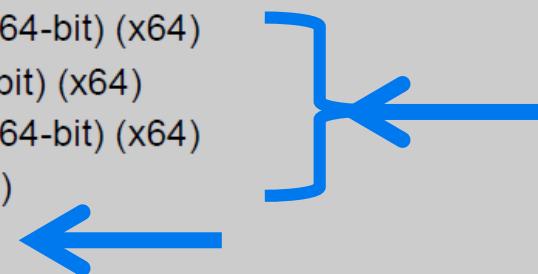
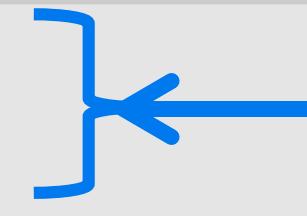
- Always a local Installation
- Cell Manager and Installation Server can be on the same or on separate systems

## Step 2: Install Clients



- Push Installation
- Local Installation

# Platform Support for Cell Manager & Installation Server

Supported Operating Systems	
Data Protector component	Supported operating systems
Cell Manager	<ul style="list-style-type: none"><li>Windows Server 2008 R2 (64-bit) (x64)</li><li>Windows Server 2012 (64-bit) (x64)</li><li>Windows Server 2012 R2 (64-bit) (x64)</li><li>Windows Server 2016 (x64)</li><li>HP-UX (Itanium) 11.31<sup>1,2</sup></li><li>RHEL<sup>3</sup> 5.x , 6.x, 7.x (x64)</li><li>CentOS 6.x, 7.x (x64)</li><li>Oracle Linux (OL) 6.x, 7.x (x64)</li><li>SLES 11, 12 (x64)</li></ul> 
Installation Server	<ul style="list-style-type: none"><li>Windows Server 2008 R2 (64-bit) (x64)</li><li>Windows Server 2012 (64-bit) (x64)</li><li>Windows Server 2012 R2 (64-bit) (x64)</li><li>Windows Server 2016 (x64)</li><li>HP-UX (Itanium) 11.31<sup>1,2</sup></li><li>RHEL<sup>3</sup> 5.x, 6.x, and 7.x (x64)</li></ul> 

# Platform Support for MoM

## Supported Operating Systems

Data Protector component	Supported operating systems
	<ul style="list-style-type: none"><li>• CentOS 6.x, 7.x (x64)</li><li>• Oracle Linux (OL) 6.x, 7.x (x64)</li><li>• SLES 11, 12 (x64)</li></ul>
Manager-of-Managers (MoM)	<ul style="list-style-type: none"><li>• Windows Server 2008 (64-bit) (x64)</li><li>• Windows Server 2008 R2 (64-bit) (x64)</li><li>• Windows Server 2012 (64-bit) (x64)</li><li>• Windows Server 2012 R2 (64-bit) (x64)</li><li>• Windows Server 2016 (x64)</li><li>• CentOS 6.x, 7.x (x64)</li><li>• Oracle Linux (OL) 6.x, 7.x (x64)</li><li>• HP-UX (Itanium) 11.31<sup>1,2</sup></li><li>• RHEL<sup>4</sup> 5.x , 6.x, and 7.x (x64)</li><li>• SLES 11, 12 (x64)</li></ul>

# Platform Support for Media Agent

## Supported Operating Systems

Backup device server (Media Agent),  
including robotic control

- Windows Server 2008 (64-bit) (x64)
- Windows Server 2008 R2 (64-bit) (x64)
- Windows Server 2008 Core (32 bit, 64-bit) (x64)
- Windows Server 2008 R2 Core (64-bit) (x64)
- Windows Server 2012 (64-bit) (x64)
- Windows Server 2012 R2 (64-bit) (x64)
- Windows Server 2012 Core (x64)
- Windows Server 2012 R2 Core (x64)
- Windows Server 2016 (x64)
- Novell Open Enterprise Server 11.x for Linux (64-bit)
- Novell Open Enterprise Server 2015 for Linux (64-bit)
- HP-UX (PA-RISC) 11.11<sup>1,2</sup>, 11.23<sup>1,2</sup>, 11.31<sup>1,2</sup>
- HP-UX (Itanium) 11.23<sup>1,2</sup>, 11.31<sup>1,2</sup>
- Sun Solaris (SPARC) 10, 11
- Sun Solaris 10, 11 (x86 and x64)
- Linux (32-bit): RHEL<sup>3</sup> 5.x and 6.x
  - SLES 11
  - Oracle Linux, 5.x and 6.x
  - CentOS 5.x and 6.x
- Linux (64-bit): RHEL<sup>3</sup> 5.x (Itanium, x64), 6.x, 7.x (x64)
  - SLES 11 (Itanium, x64)
  - SLES 12 (x64)
  - Oracle Linux (OL) 5.x, 6.x, and 7.x (x64)
  - CentOS 5.x, 6.x, and 7.x (x64)
  - Scientific Linux 6.x (x64)

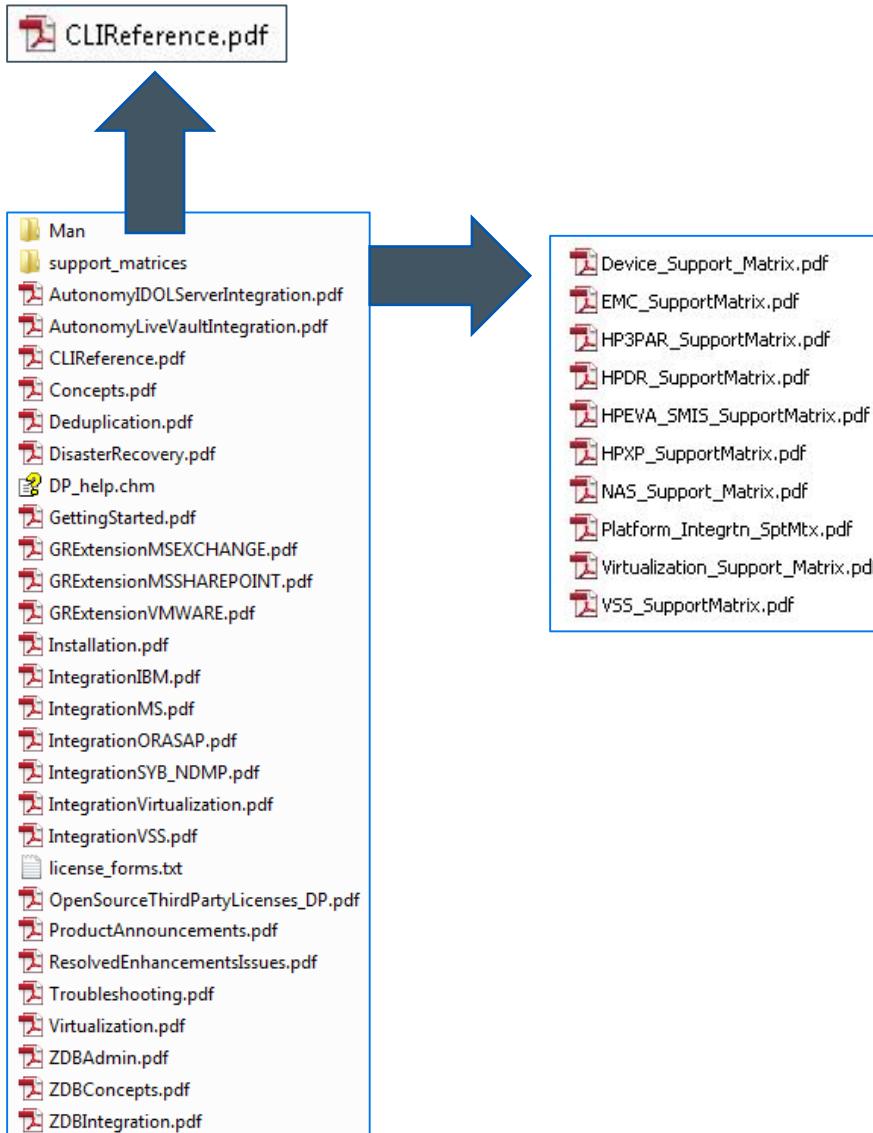
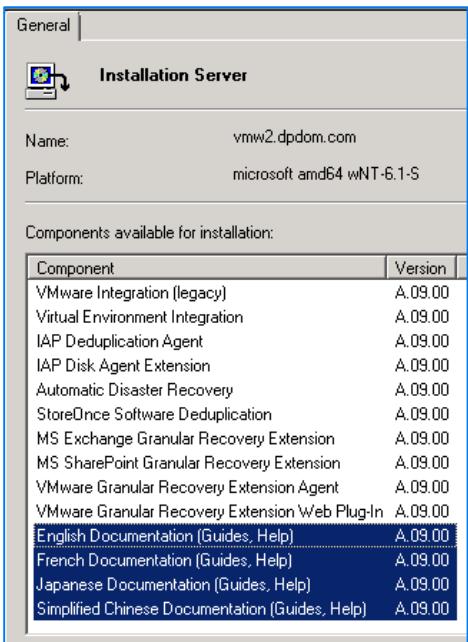
# Platform Support for Clients

## Supported Operating Systems

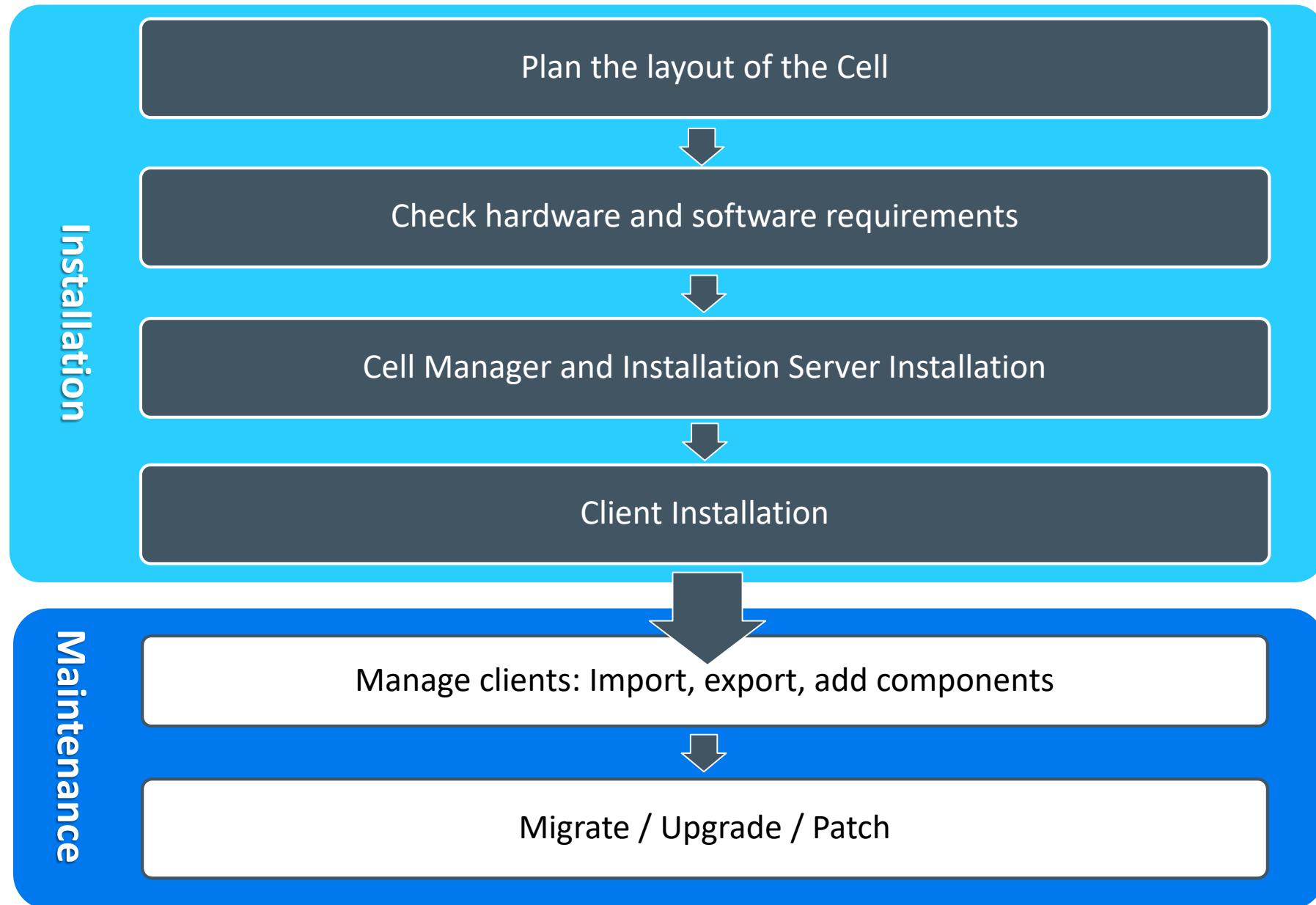
Data Protector component	Supported operating systems
	<ul style="list-style-type: none"><li>Windows Server 2012 R2 Core (x64)</li><li>Windows Server 2016 (x64)</li><li>Novell Open Enterprise Server 11.x for Linux (64-bit)</li><li>Novell Open Enterprise Server 2015 for Linux (64-bit)</li><li>HP-UX (PA-RISC) 11.11<sup>1,2</sup>, 11.23<sup>1,2</sup>, 11.31<sup>1,2</sup></li><li>HP-UX (Itanium) 11.23<sup>1,2</sup>, 11.31<sup>1,2</sup></li><li>Sun Solaris (SPARC) 10, 11<sup>6</sup></li><li>Sun Solaris (x86, x64) 10, 11<sup>6</sup></li><li>IBM AIX 6.x, 7.1<sup>7</sup>, 7.2</li><li>SCO OpenServer 6.0.0</li><li>OpenVMS 8.3<sup>4</sup>, 8.4<sup>4</sup> (Alpha)</li><li>OpenVMS 8.3<sup>4</sup>, 8.3-1H1<sup>4</sup>, 8.4<sup>4</sup> (Itanium)</li><li>Mac OS X Server 10.6.x, 10.11.x (64-bit) (x64)</li><li>Linux (32-bit): RHEL<sup>3</sup> 5.x and 6.x<ul style="list-style-type: none"><li>SLES 11</li><li>Oracle Linux (OL) 5.x and 6.x</li><li>CentOS 5.x and 6.x</li></ul></li><li>Linux (64-bit): RHEL<sup>3</sup> 5.x (Itanium, x64), 6.x, and 7.x (x64)<ul style="list-style-type: none"><li>SLES 11<sup>8</sup> (Itanium, x64)</li><li>SLES 12 (x64)</li><li>SLES 11, 12 for SAP Applications (x64)</li><li>Oracle Linux (OL) 5.x , 6.x, and 7.x (x64)</li><li>Debian Linux 7.0 (x64)</li><li>CentOS 5.x (x64), 6.x, and 7.x (x64)</li><li>Ubuntu 14.04 and 16.04 LTS versions</li><li>Scientific Linux 6.x (x64)</li></ul></li><li>additional UNIX platforms via NFS (on UNIX systems)</li><li>additional platforms via shared disks (CIFS /SMB 1, 2, or 3 on Windows systems)</li></ul>

# Product Documentation

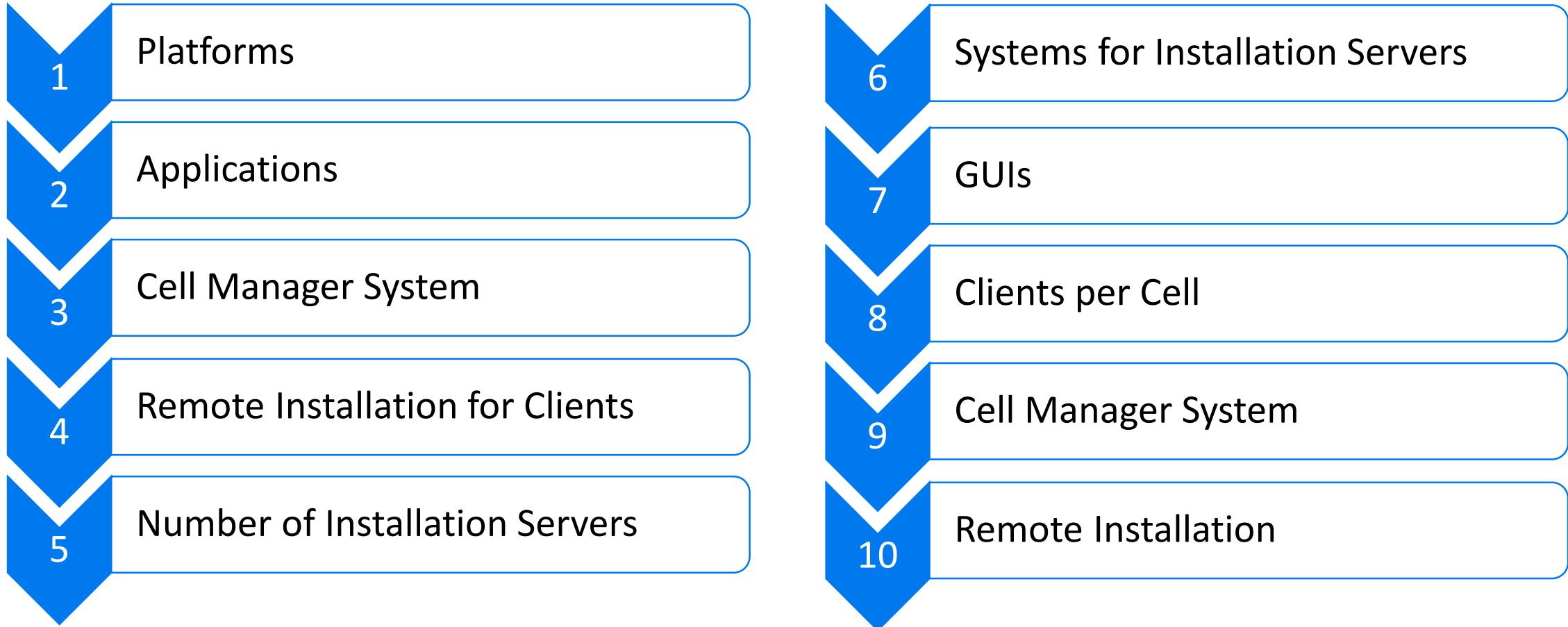
Documentation is bundled  
with the Data Protector Cell  
Manager installation



# Overall process



# Plan the layout of the cell



# Hardware Requirements

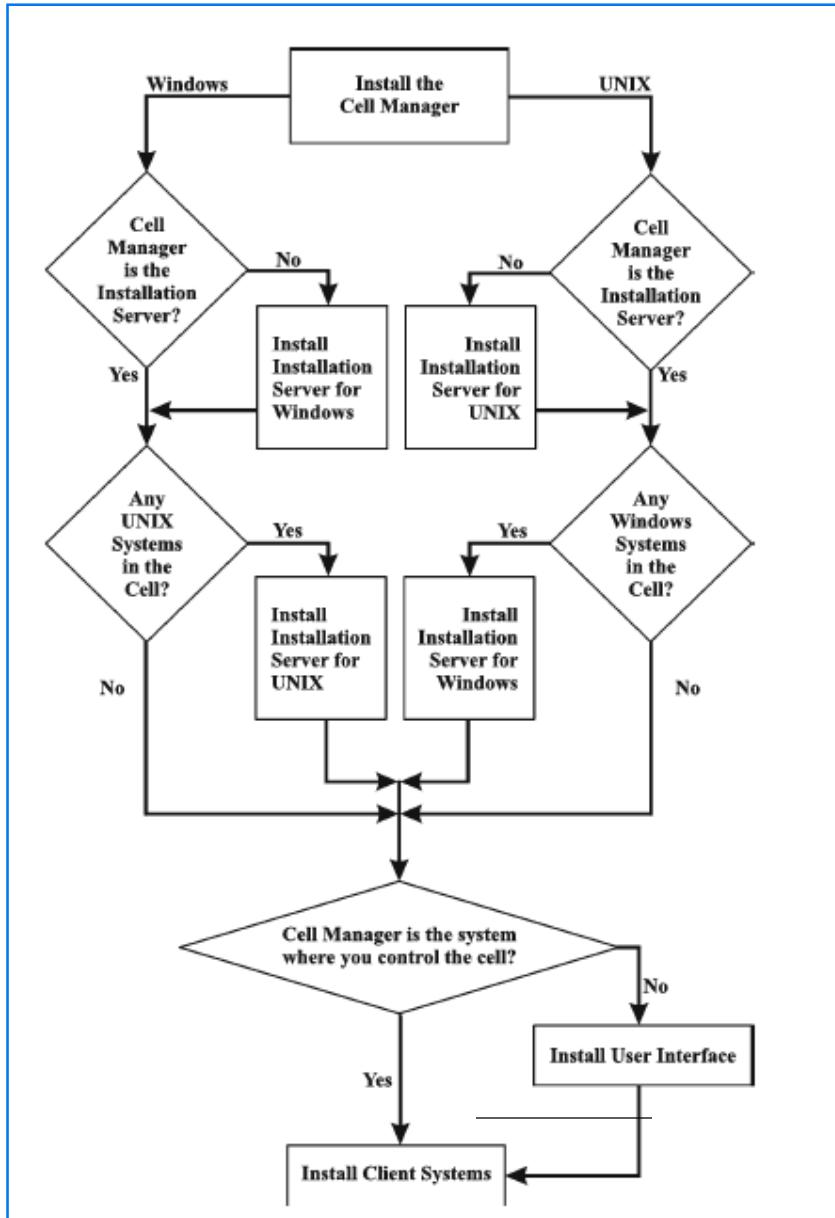
Windows – Linux – HP-UX – Cluster (64bit)

Module	RAM/Cores	Disk space
Cell Manager	16 GB (Windows & Linux) 4 Cores 16 GB (HP-UX) 4 Cores	1.5 GB + IDB
Installation Server	512 MB	2 GB (Windows)
Disk Agent	128 MB*	20 MB
Media Agent	128 MB*	20 MB
Integration modules	128 MB*	20 MB

\* = Amount of space required for each Data Protector agent

**NOTE:** Detailed requirements are listed in the Installation Guide

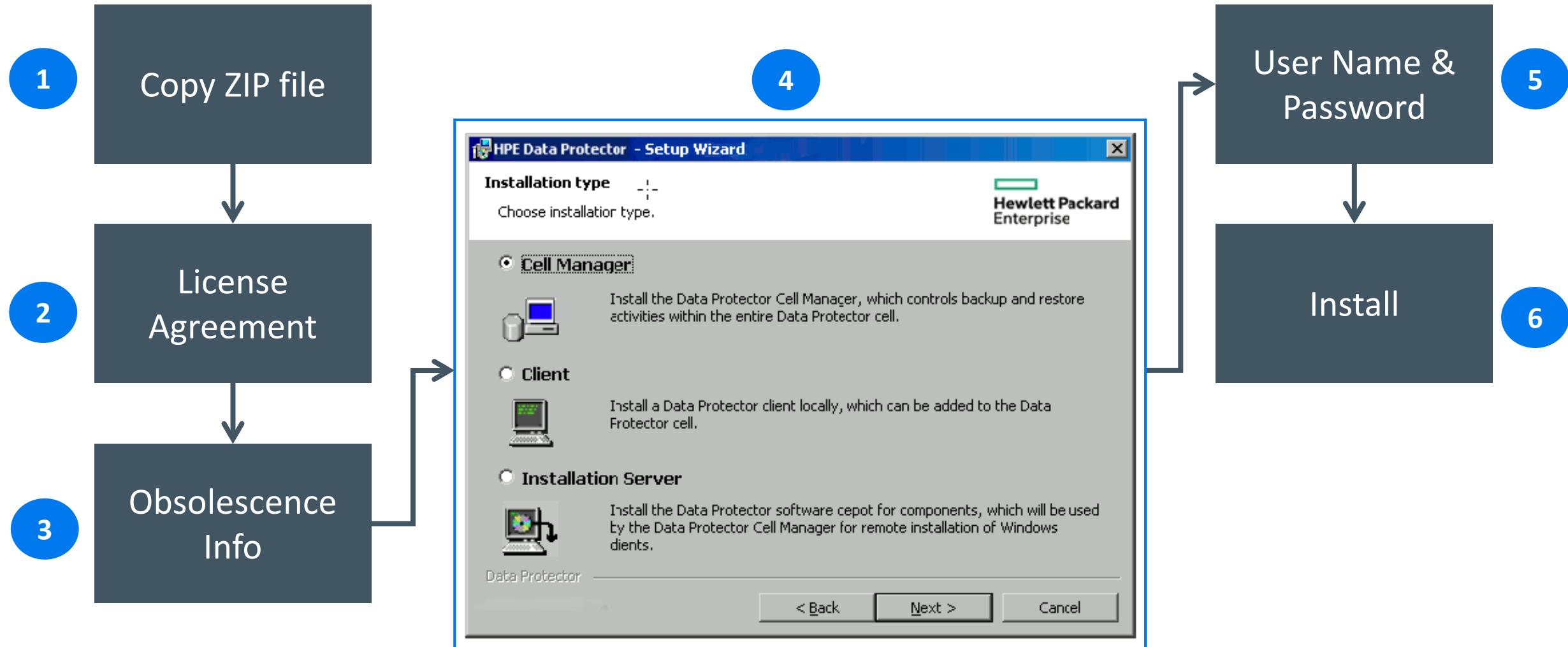
# Installation Procedure



# Preparation on Windows

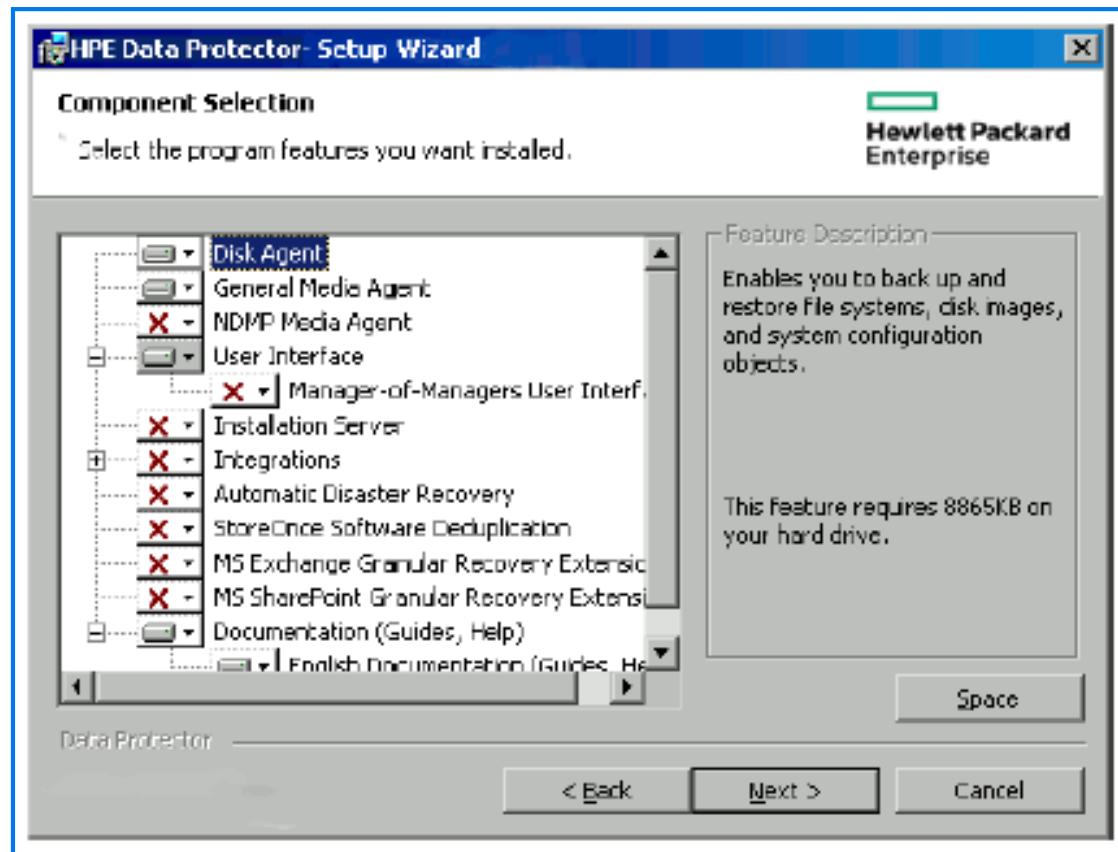
- 
- 1 Logon as (Domain) Administrator
  - 2 Verify that system has at least 16GB RAM and 4 CPU Cores
  - 3 Verify that host name resolution is enabled (DNS)
  - 4 Make sure the Cell Manager and IS have static IP addresses
  - 5 Verify that port number 5565 is free on all systems in the cell
  - 6 Verify that ports 7112, 7113 and 7116 are free on the Cell Manager
  - 7 Verify that port 9999 are free on the Cell manager
  - 8 Java JRE 64bit must be installed – if not, it will automatically be installed
  - 9 On DP installation partition get prepared for future IDB grow (DCBF)

# Installation Procedure: Steps 1 to 6

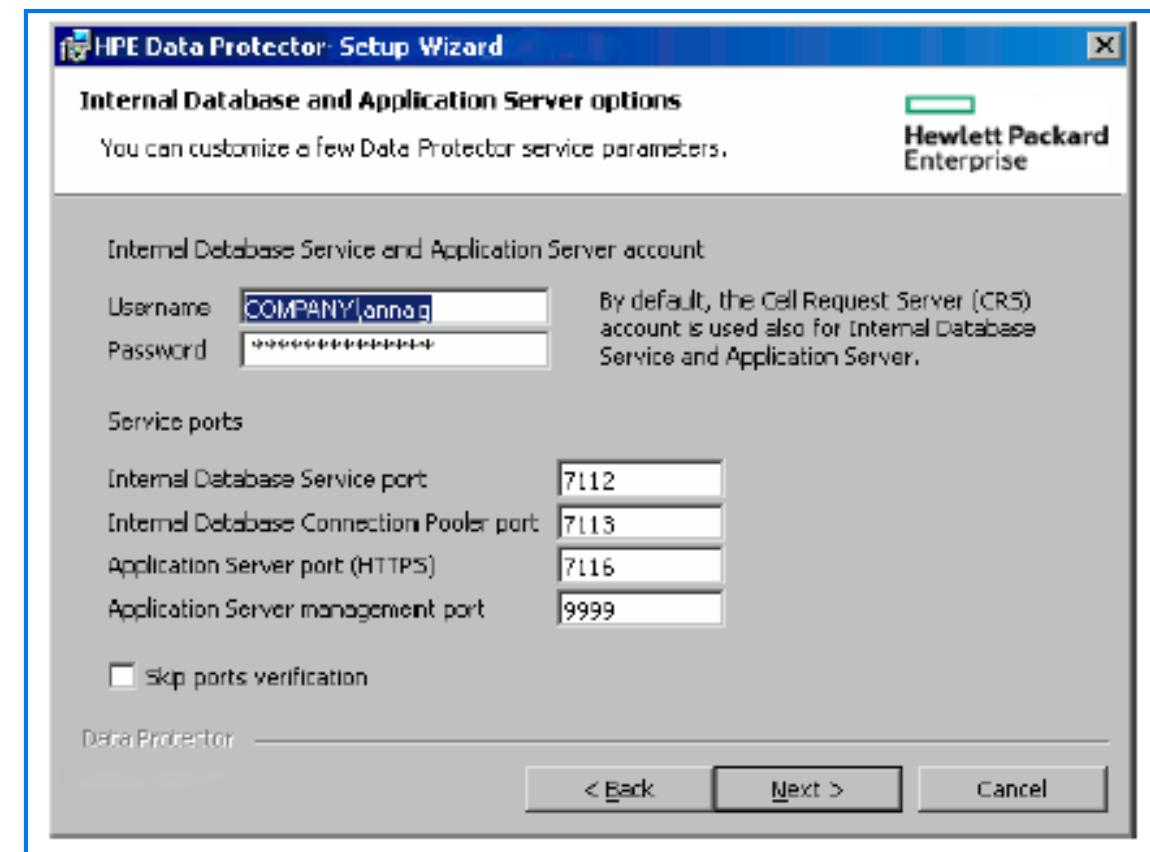


# Installation Procedure: Steps 7 to 8

7

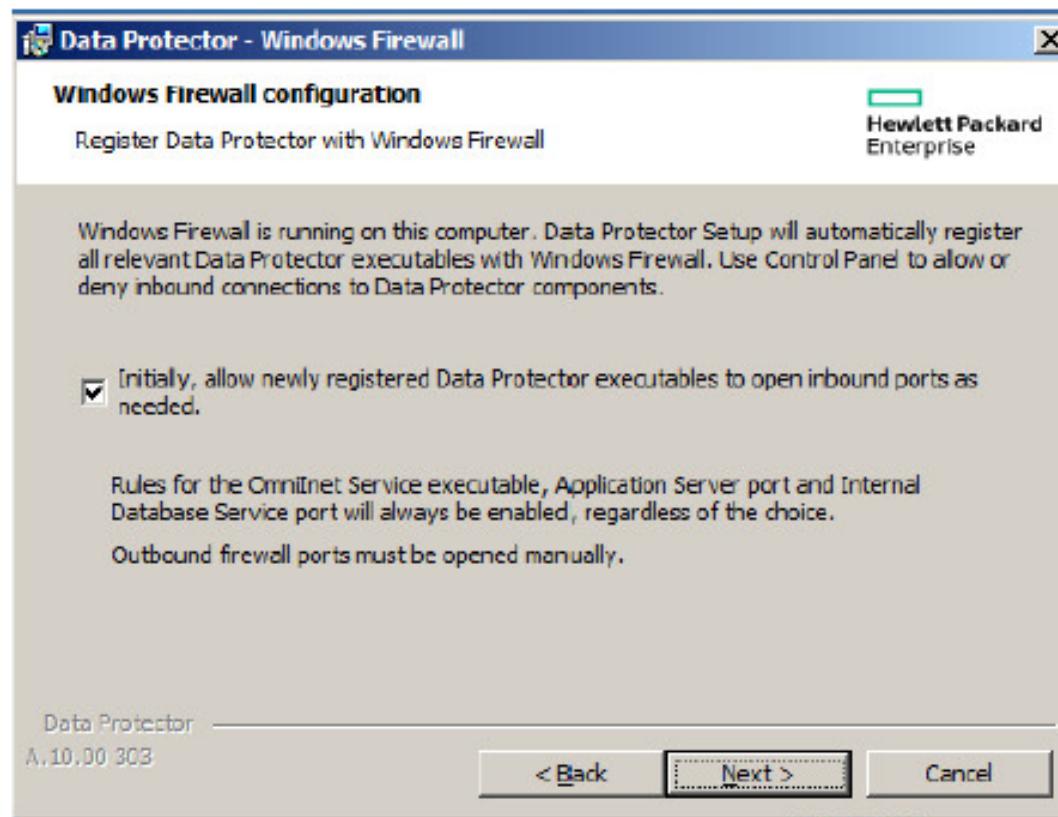


8



# Installation Procedure: Step 9

9



# Client Installation: Overview

Data Protector Clients  
can be install via:

- Local installation
- Remote installation using an Installation Server

1

Support:

- Local installation available for: All supported client platforms
- Remote installation available for: All supported client platforms *besides OpenVMS and Netware*

2

Remote installation:

To UNIX System

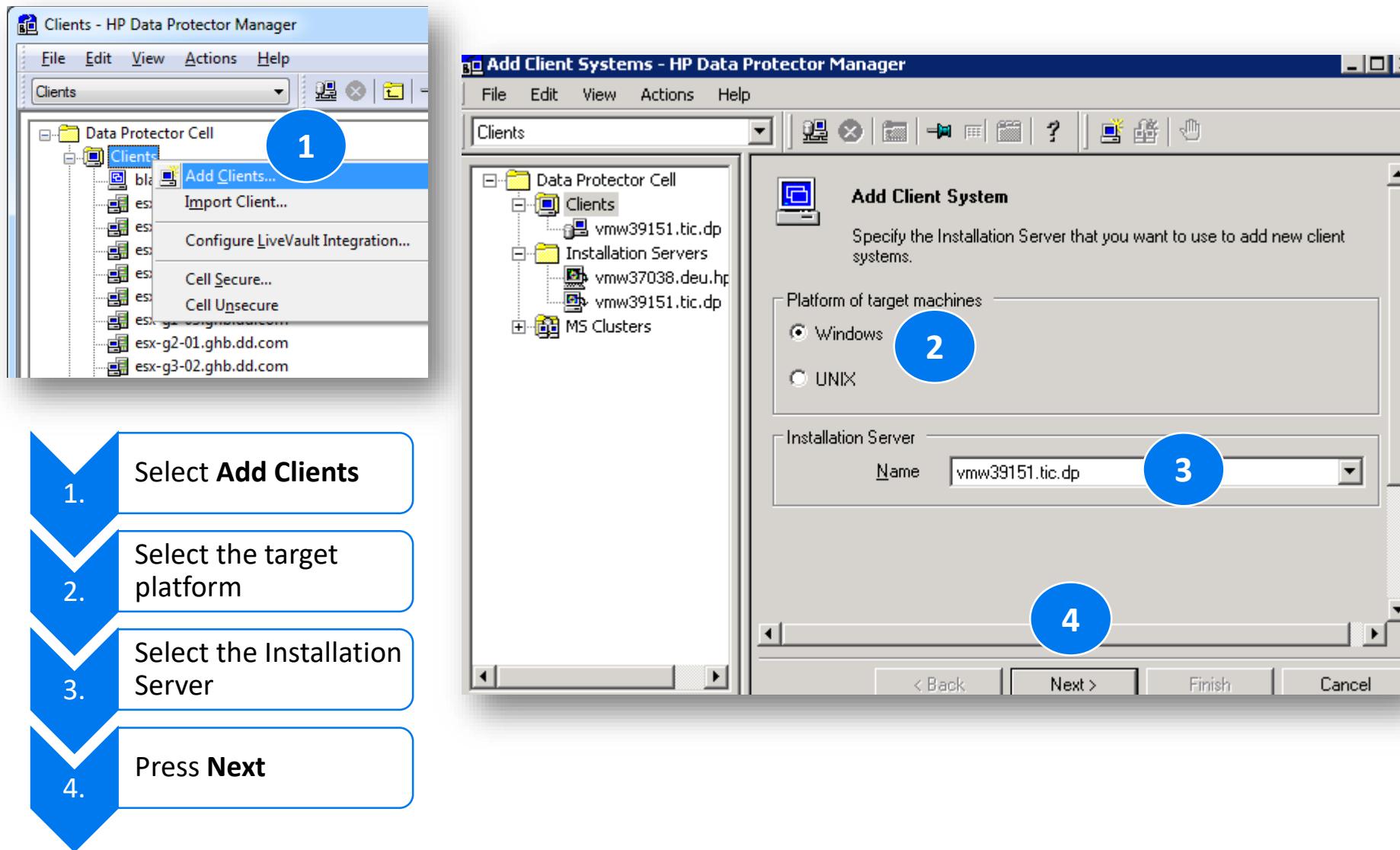
- Requires at least one Installation Server on either HP-UX or Linux
- Methods: secure shell (recommended), *rsh*, and *rexec*

To Windows System

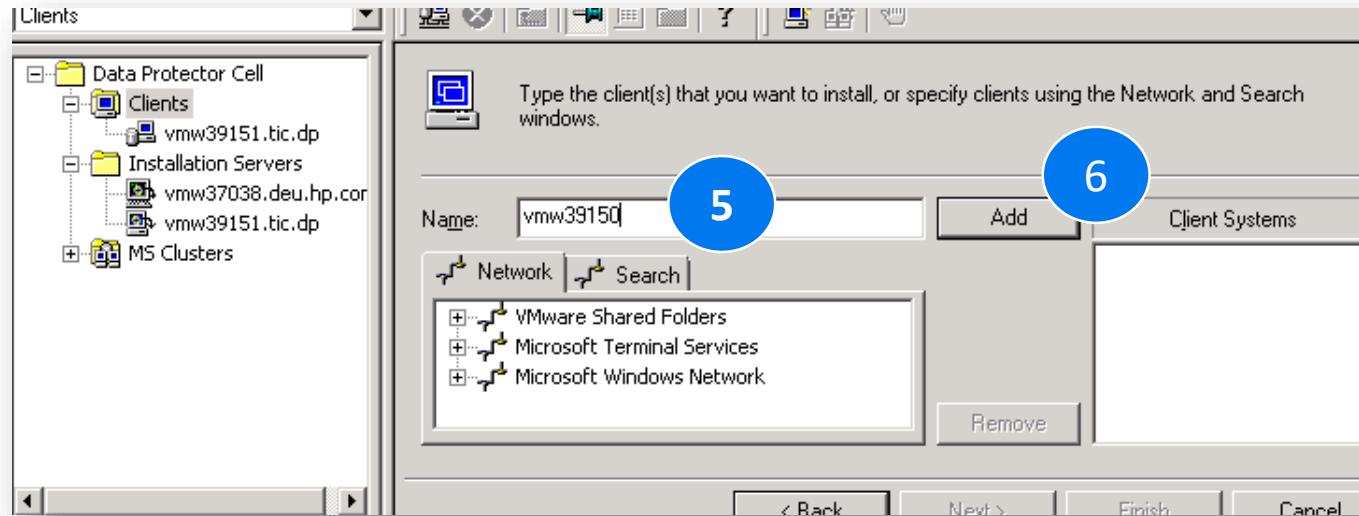
- Requires at least one Installation Server on Windows

3

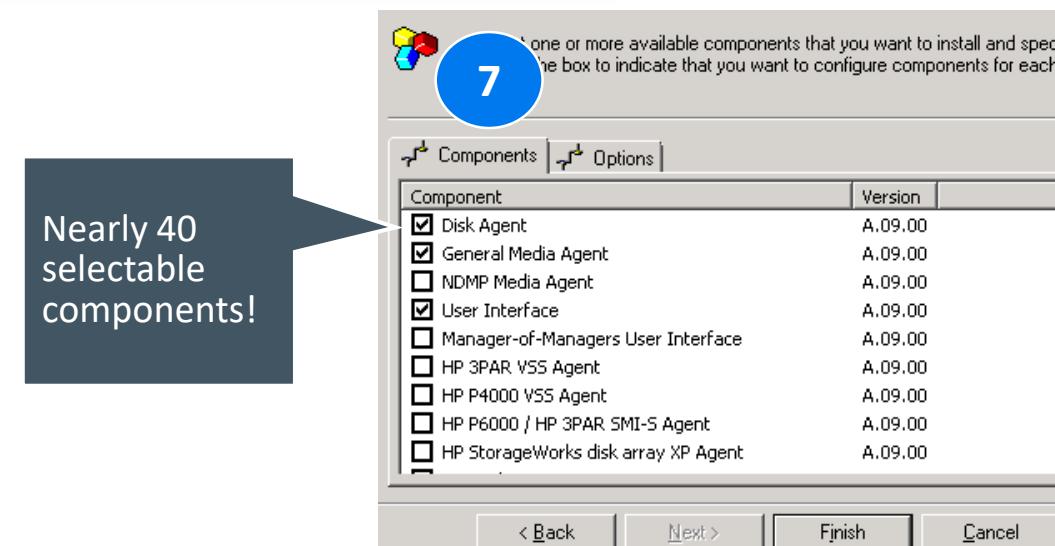
# Remote Push Installation: Steps 1 to 4



# Remote Push Installation: Steps 5 to 8



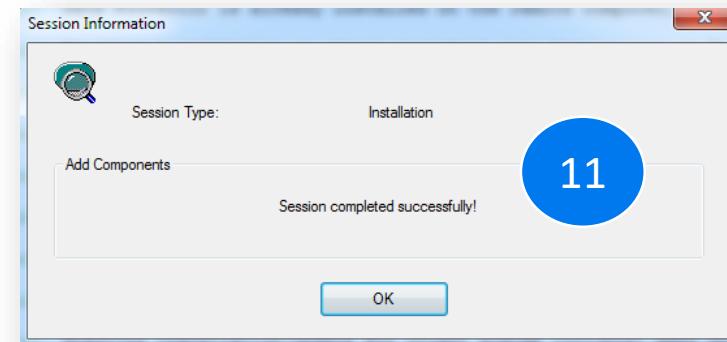
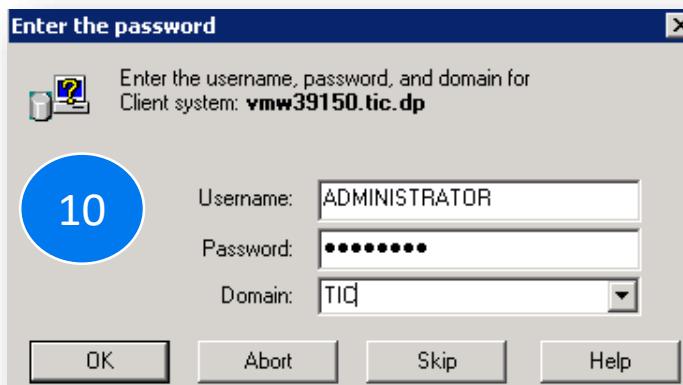
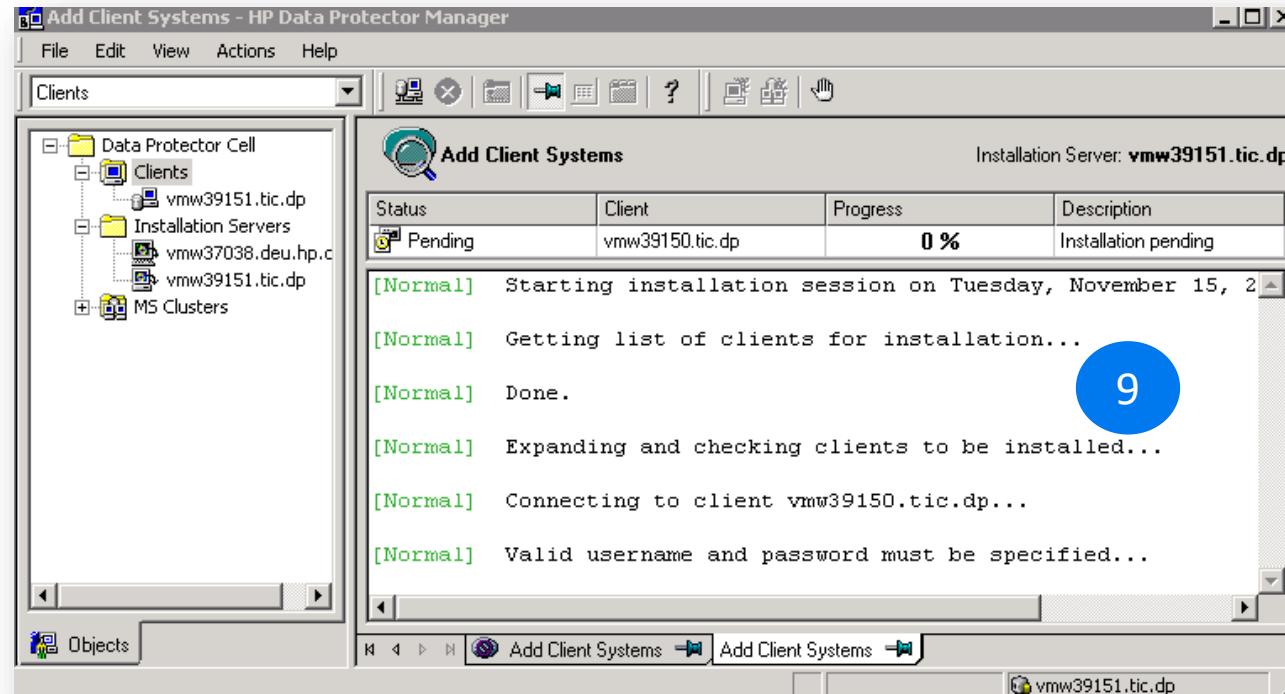
5. Specify system name
6. Press Add
7. Select all required components
8. Press Finish



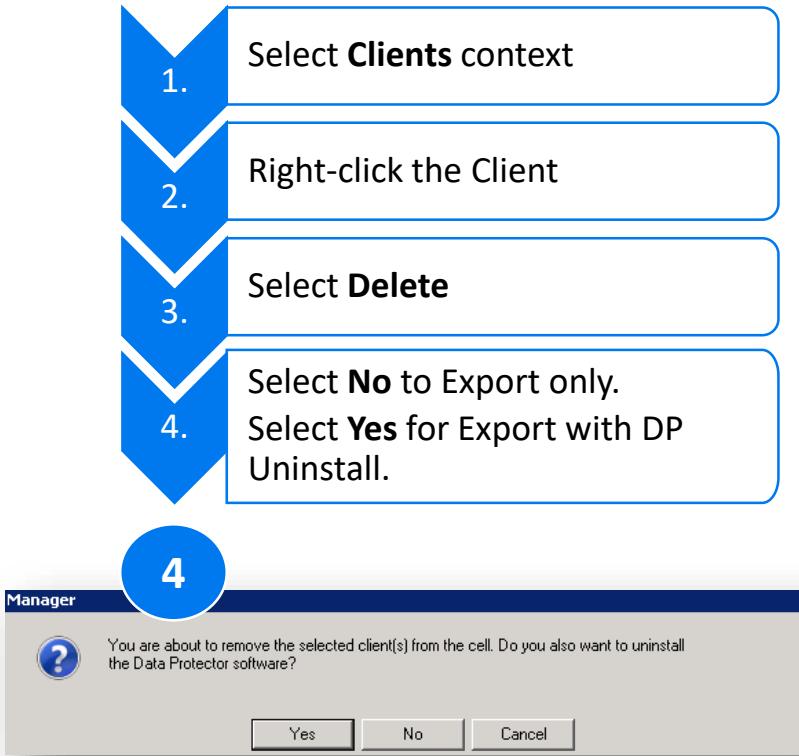
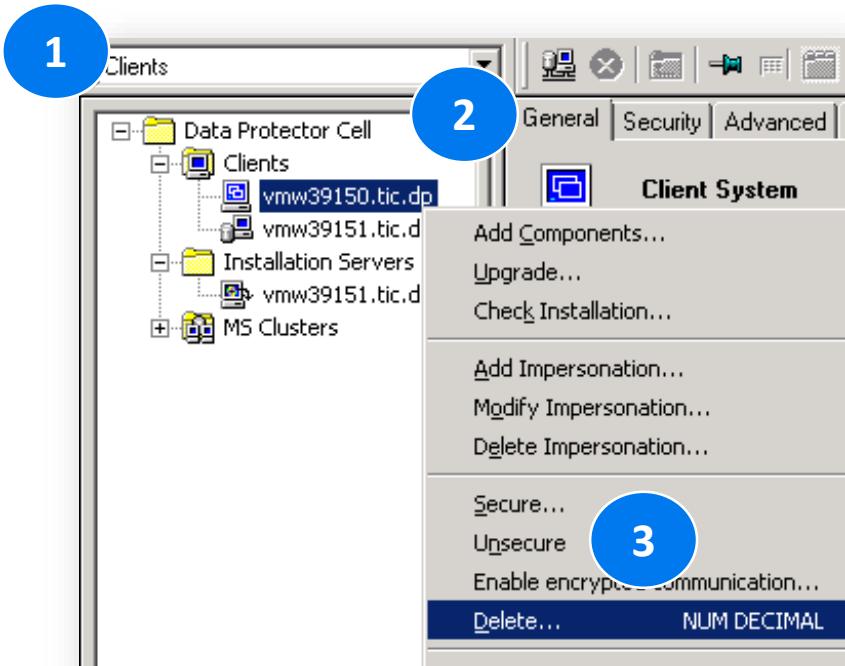
8

# Remote Push Installation: Steps 9 to 11

9. Installation session starts
10. If required, DP asks for user credentials
11. Installation finishes



# Export of Clients



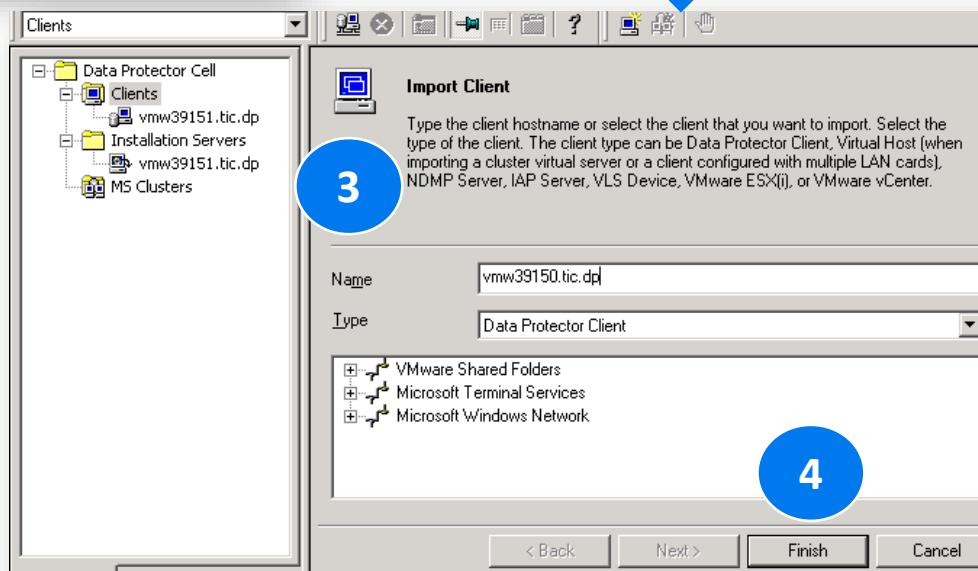
## RULES

- A DP client always belongs to one DP Cell only.
- A DP client can be exported from its Cell and then imported into another Cell.
- Optional: Export can be performed together with client software uninstall.
- After Client Export, all backed up data of that client stays protected until protection expires.

# Import Clients

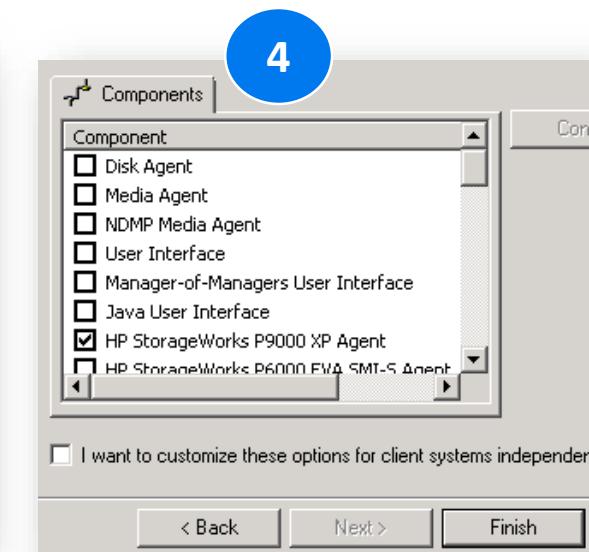
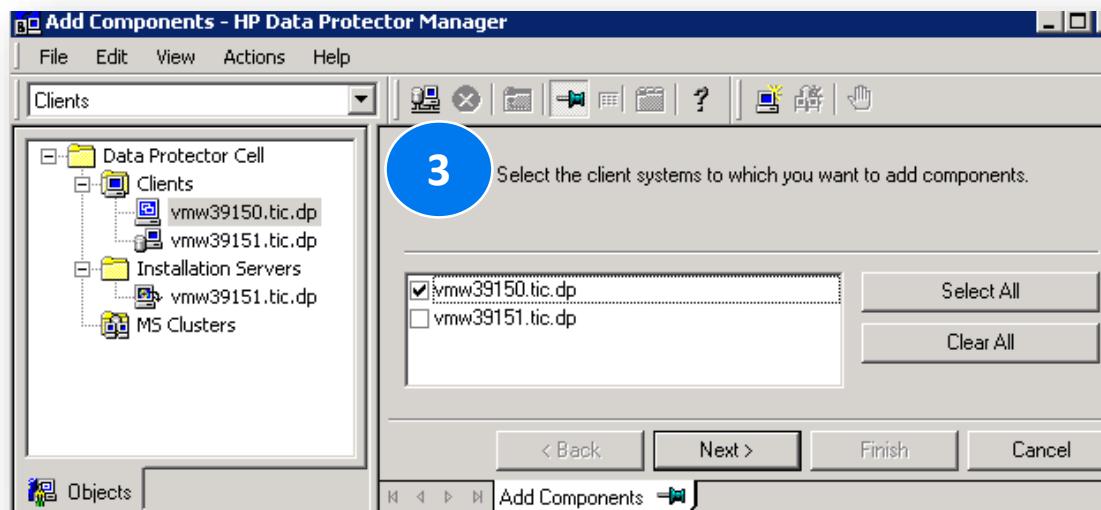
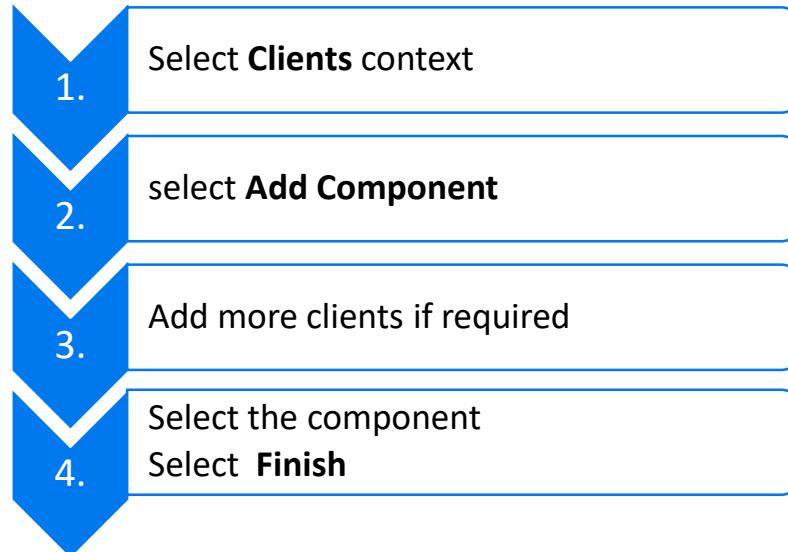
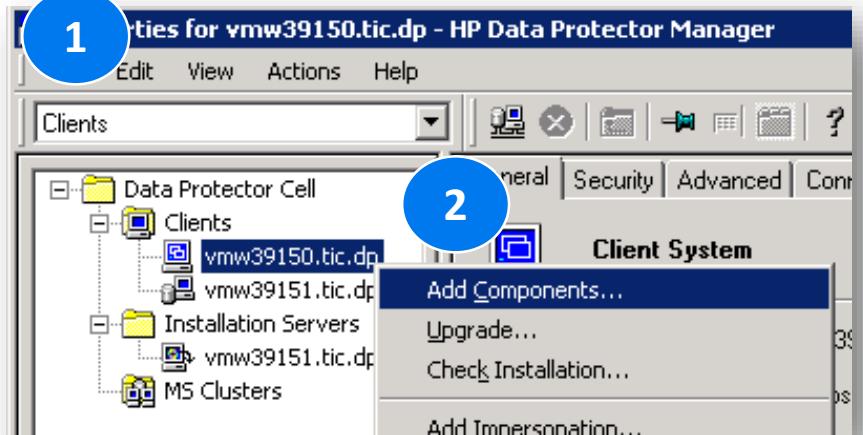


1. Select Clients context
2. Right-click Clients  
Select Import Clients
3. Specify system name and select  
Type Data Protector Client
4. Select Finish



**NOTE:** Data Protector Client always belongs to one Data Protector Cell only, so Import fails if the Client still belongs to another cell.

# Adding Components to Clients





# Wrap-Up

- Summary
- Module Quiz

# Quick Summary



Here's what you learned ...



- Cell: logical backup unit
- Cell Manager: physical server
- Client Agents: DA, MA, or IA
- Documentation: bundled with Cell Manager
- Cell Manager: install on Windows or UNIX system
- Clients: install on local or remote (push installation) Windows or UNIX system
- Import/Export: move clients from one Cell to another



## Module 2 Quiz

Pause now to take a short interactive quiz to gauge your understanding of what you learned in this module.

# Congratulations!

You completed Module 3.

Stay tuned for Module 3: User Interface

## What's next?

[Move on to the next module.](#)





# Data Protector 10.10

## Module 3: User Interface

### Level 310 Technical Deep-Dive

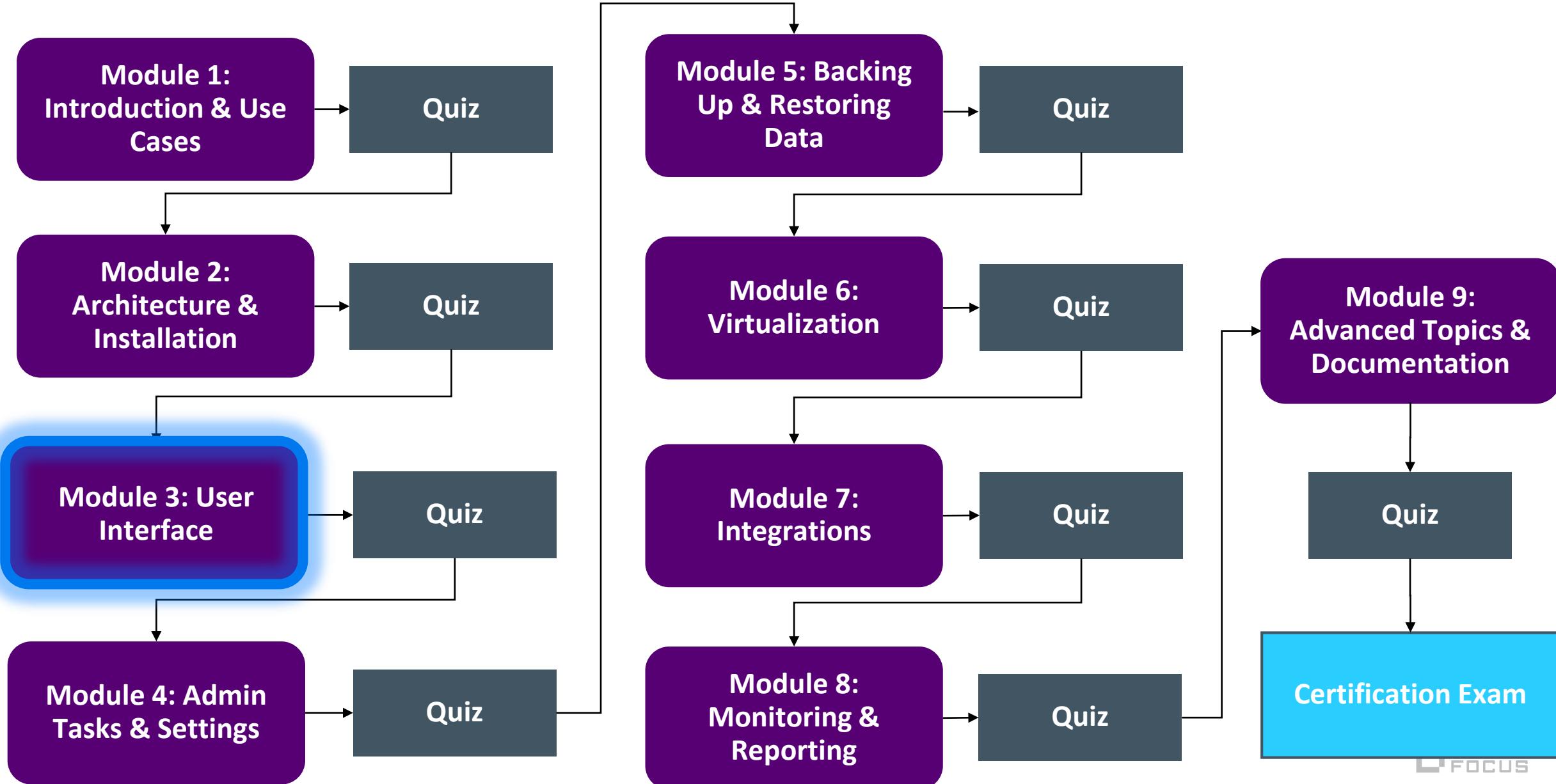
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Technical Enablement

October 2018

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# Level 310 Multi-Module Course



# About Module 3: User Interface

## NextGen GUI

- Intro to Web-based GUI
- NextGen Dashboard
- Telemetry preferences
- NextGen Scheduler

## Legacy GUI

- Classic “legacy” GUI

## Module Quiz

- Take a quick interactive quiz

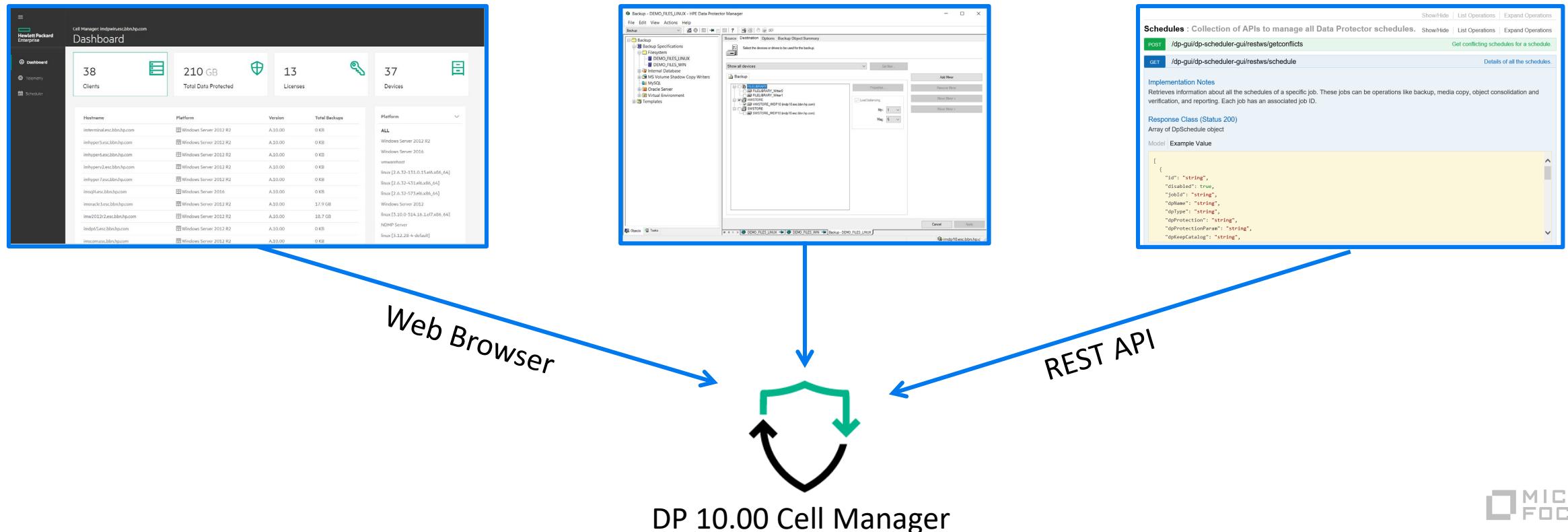
# NextGen GUI

- Intro to Web-based GUI
- NextGen Dashboard
- NextGen Scheduler
- Classic “legacy” GUI

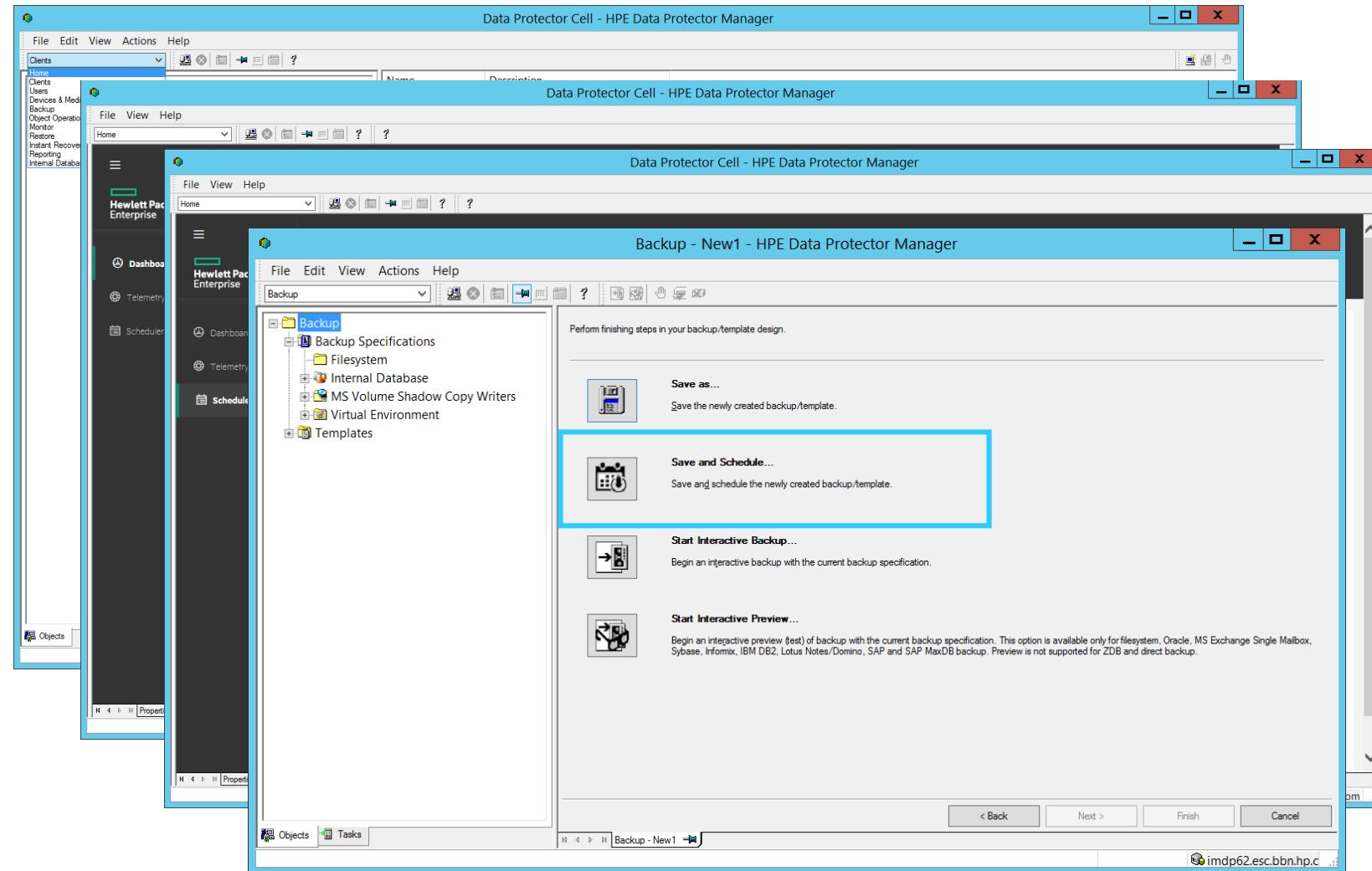
# Data Protector 10.00: NextGen GUI

## Positioning

- The next generation GUI will take over from the previous GUI in a number of phases.
- New GUI offers a Dashboard, telemetry setup and info as well as a new consolidated scheduler
- Classic GUI still required for: backup/copy specs, media/device management, deployment/updates



# Data Protector: NextGen GUI (legacy GUI plug-in)



New GUI items are also available inside the Classic GUI as a plug-in.

Select **Home** from the general drop-down.

Select **Save and Schedule** at the end of a backup spec creation to be redirected to the Scheduler plug-in

# Data Protector – NextGen GUI

NexGen GUI makes things possible!

Other platforms can now access Dashboard, Telemetry, and Schedule information

Information about multiple Cell Managers can appear in the same browser

Plug URLs into existing service portals

Beef up Web GUI functionality with REST-based GUI calls

**These items become more important as more features are added to the Web GUI**

# Data Protector: NextGen GUI

## Dashboard - Clients

The screenshot shows the Data Protector NextGen GUI Dashboard - Clients. On the left is a navigation sidebar with 'Hewlett Packard Enterprise' branding and links for 'Dashboard', 'Telemetry', and 'Scheduler'. The main dashboard area has a dark header with 'Cell Manager: imdpwin.esc.bbn.hp.com' and a 'Dashboard' title. It displays two key metrics: '38 Clients' with a server icon and '210 GB Total Data Protected'. Below these are two tables: 'Installed Components' and 'Data Protected'. A callout box highlights the 'Clients' metric with a blue border and the number '1'. Another callout box highlights the 'Installed Components' table with a blue border and the number '2'. A third callout box highlights the 'Data Protected' table with a blue border and the number '3'. The 'Installed Components' table lists various software components installed on the selected client, and the 'Data Protected' table lists the individual license and capacity consumption for protected volumes.

1 Dashboard starts with Client count

2 Filters are applied on the right side

3 Individual license and capacity consumption

Hostname	Platform
imterminal.esc.bbn.hp.com	Windows Server 2012 R2
imhyper5.esc.bbn.hp.com	Windows Server 2012 R2
imhyper6.esc.bbn.hp.com	Windows Server 2012 R2
imhyperv2.esc.bbn.hp.com	Windows Server 2012 R2
imhyper7.esc.bbn.hp.com	Windows Server 2012 R2
imsql4.esc.bbn.hp.com	Windows Server 2016
imoracle3.esc.bbn.hp.com	Windows Server 2012 R2
imw2012r2.esc.bbn.hp.com	Windows Server 2012 R2
imdp65.esc.bbn.hp.com	Windows Server 2012 R2
imscom.esc.bbn.hp.com	Windows Server 2012 R2

Application	Size
C:	5.2 GB
MSVSSW	25.2 GB
IDB	65.2 MB

# Data Protector: NextGen GUI

## Dashboard - Capacity

Cell Manager: imdpwin.esc.bbn.hp.com

Capacity consumption

The screenshot shows the Data Protector NextGen GUI Dashboard. On the left is a navigation sidebar with 'Hewlett Packard Enterprise' branding and links to 'Dashboard', 'Telemetry', and 'Scheduler'. The main dashboard area has a dark header with the cell manager information and a title 'Capacity consumption'. Below the header are four summary cards: 'Clients' (39), 'Total Data Protected' (215.2 GB, highlighted with a blue border), 'Licenses' (0), and 'Devices' (37). A large horizontal bar chart below these cards displays capacity consumption by application type. The chart has categories: WINFS, MSVSSW-APP, FILESYSTEM, Hana, Oracle8, and MSSQL. The x-axis represents capacity in GB from 0KB to 111.8GB. The chart shows that VEAgen consumes the most capacity at 111.8GB, followed by Oracle8 at 74.5GB, and FILESYSTEM at 55.9GB.

Application Type	Capacity Consumed (GB)
WINFS	~18.6GB
MSVSSW-APP	~18.6GB
FILESYSTEM	~37.3GB
Hana	~18.6GB
Oracle8	74.5GB
MSSQL	~18.6GB
VEAgen	111.8GB

# Data Protector: NextGen GUI

## Dashboard - Licenses

Cell Manager : imdp10 esc.bbn.hp.com

Dashboard

4 Clients

42.9 GB Total Data Protected

13 Licenses

5 Devices

Online Licenses

- > HPE DP Granular Recovery Extension: 999
- > HPE Data Protector Extended On-line Backup for Win/Linux Software: 999
- > Manager-of-Managers Extension for UNIX: 999
- > Manager-of-Managers Extension for Windows / Linux: 999
- > On-line Extension for ONE UNIX system: 999
- > On-line Extension for ONE Windows / Linux system: 999

Hostname	Component	Licenses Used
imdp10.escape.bbn.com	MS Volume Shadow Copy Integration	1
imdp10.escape.bbn.com	Virtual Environment Integration	1
imoracle3.escape.bbn.com	MS Volume Shadow Copy Integration	1
imredhat10.escape.bbn.com	Virtual Environment Integration	1

> Single Drive for UNIX / NAS / SAN: 999

Quick and easy licensing overview

License consumption

# Data Protector – NextGen GUI

## Dashboard - Devices

Cell Manager: imdpwin.esc.bbn.hp.com

Dashboard

39 Clients 215.2 GB Total Data Protected 13 Licenses 37 Devices

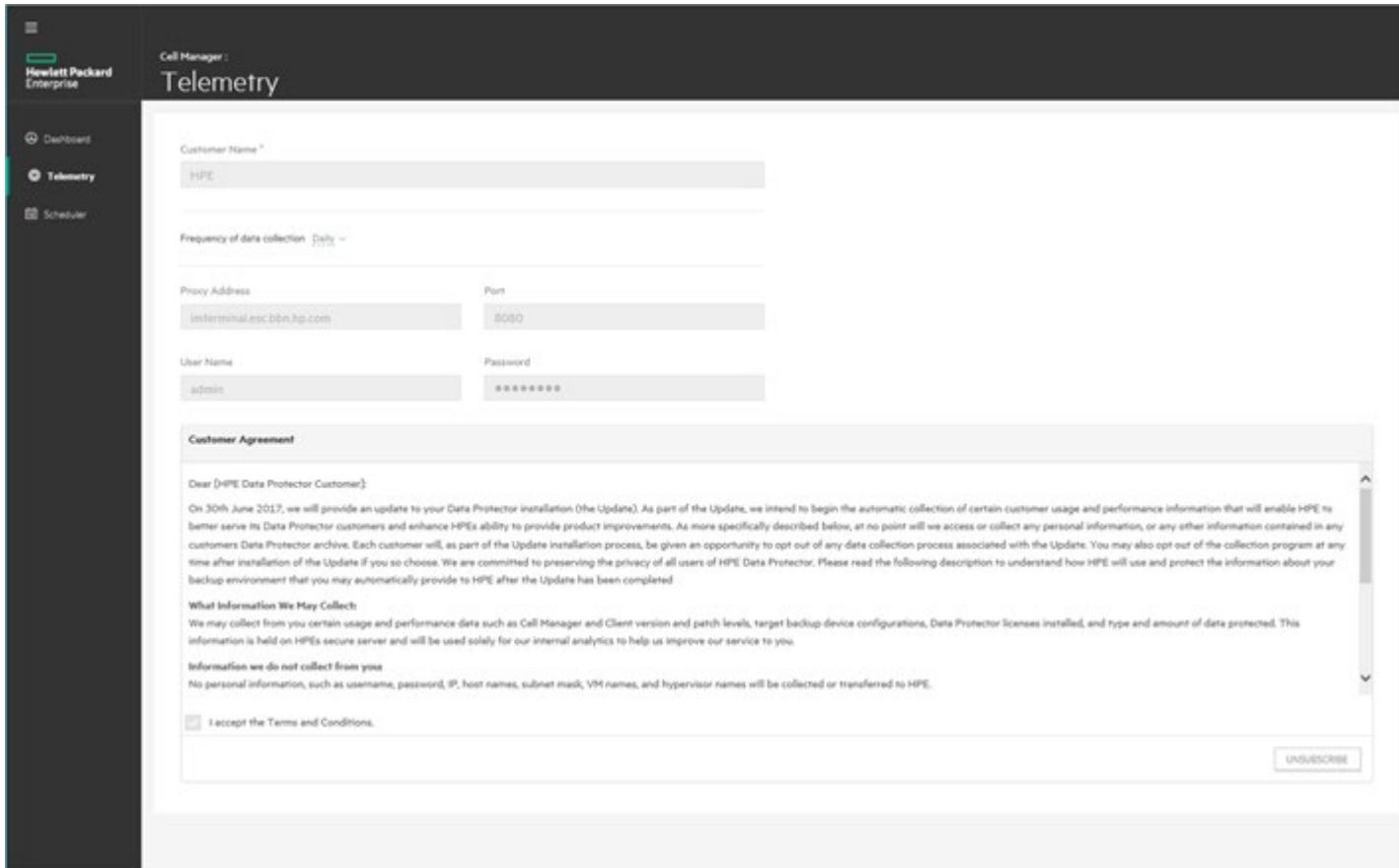
Host Name	Device	Type	Subtype	Pool Name
imhyper3.esc.bbn.hp.com	DEMO_SO4500_DATABASES	B2D	Object Store	DEMO_SO4500_DATABASES_MediaPool
imdpwin.esc.bbn.hp.com	DEMO_REPLICATION_REMOTE_STORE	B2D	Object Store	DEMO_REPLICATION_REMOTE_MediaPool
imkvm2.esc.bbn.hp.com	DEMO_SO4500_DATABASES	B2D	Object Store	DEMO_SO4500_DATABASES_MediaPool
imdpwin.esc.bbn.hp.com	DEMO_REPLICATION_LOCAL_STORE	B2D	Object Store	DEMO_REPLICATION_LOCAL_MediaPool
imhyper3.esc.bbn.hp.com	DEMO_SMARTCACHE	B2D	Smart Cache	DEMO_SMARTCACHE_MediaPool
imdpwin.esc.bbn.hp.com	DEMO_SO4500_FILES	B2D	Object Store	DEMO_SO4500_FILES_MediaPool
imdpwin.esc.bbn.hp.com	DEMO_SO4500_DATABASES	B2D	Object Store	DEMO_SO4500_DATABASES_MediaPool
imkvm2.esc.bbn.hp.com	DEMO_SO4500_FILES	B2D	Object Store	DEMO_SO4500_FILES_MediaPool
imhyper5.esc.bbn.hp.com	PROD_SO4500_PRODUCTIVE	B2D	Object Store	PROD_SO4500_PRODUCTIVE_MediaPool
imhyper3.esc.bbn.hp.com	DEMO_SO4500_FILES	B2D	Object Store	DEMO_SO4500_FILES_MediaPool
imdpwin.esc.bbn.hp.com	DEMO_AZURE_NATIVE	B2D	Microsoft Azure	DEMO_AZURE_NATIVE_MediaPool

Quick overview of devices

Filter by type

# Data Protector – NextGen GUI

Telemetry Preference Settings is “opt-in” model



**NOTE:** The Upgrade installation asks you up front if you want to opt-in for Telemetry, but you can always change your mind later.

## Telemetry uploads:

- Capacity info
- Licensing info
- Cell/Agent usage info
- Daily, Weekly, Monthly, Quarterly

## Customer benefits planned:

- easier call handling since data exists
- pro-active early warning scenarios
- tailored recommendations

# Data Protector – NextGen GUI

## Scheduler for DP 10.0

### IMPORTANT:

- ✓ Basic scheduler and advanced scheduler: OBSOLETED and REPLACED by new Web-based consolidated scheduler. (existing schedules migrated automatically)
- ✓ New Web-based scheduler with re-designed user interface, simplified and easy-to-use web controls, with easier schedule management: schedule priority, data protection, recurrence, conflicts
- ✓ New Web-based scheduler automates various operations: backup, media copy, object consolidation, and copying

# Data Protector: NextGen GUI

## Scheduler – Day View

Cell Manager : imdn10.scs.bbn.hp.com

Hewlett Packard Enterprise

Cell Manager:  
Scheduler

Monday, April 24th 2017

04:24 PM DAILY\_FILES Edit Disable Instance Disable Series Delete

Specification: DEMO\_FILES | Backup Type: full | Type: datalist

06:29 PM DAILY\_VMWARE\_INCR Edit Disable Instance Disable Series Delete

Specification: DEMO\_VMWARE | Backup Type: incr | Type: veagent

Icons for changes:

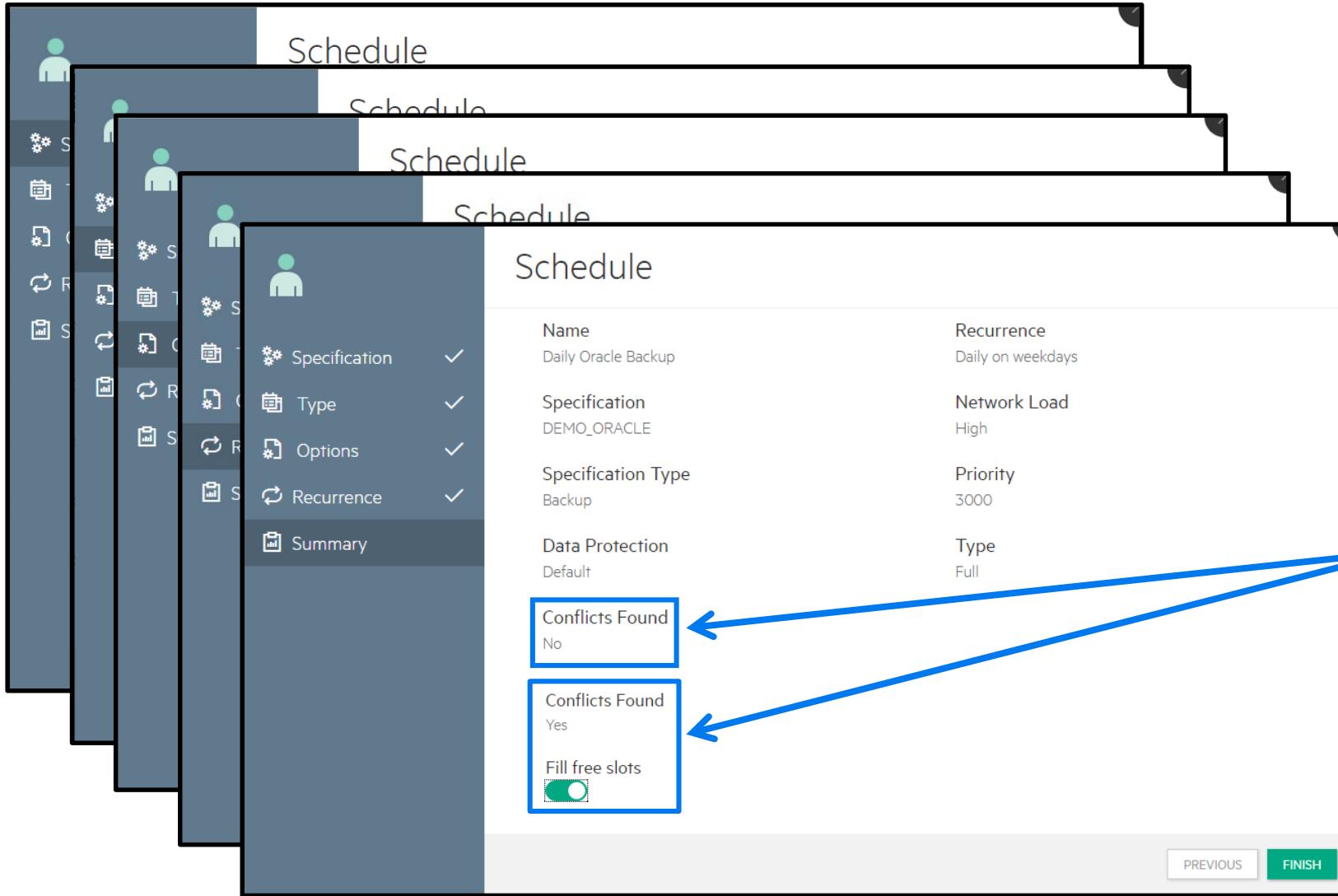
- Edit
- Disable Instance
- Disable Series
- Delete

Color Coding:

- Red = Datalist
- Blue = Media Operation
- Orange = Report
- Yellow = Copy operation
- Gray = Disabled Schedule

# Data Protector – NextGen GUI

## Scheduler – Create/Edit Schedule (step-by-step)



A new feature is  
Conflict Checking.

# Schedule Migration During Upgrades ...

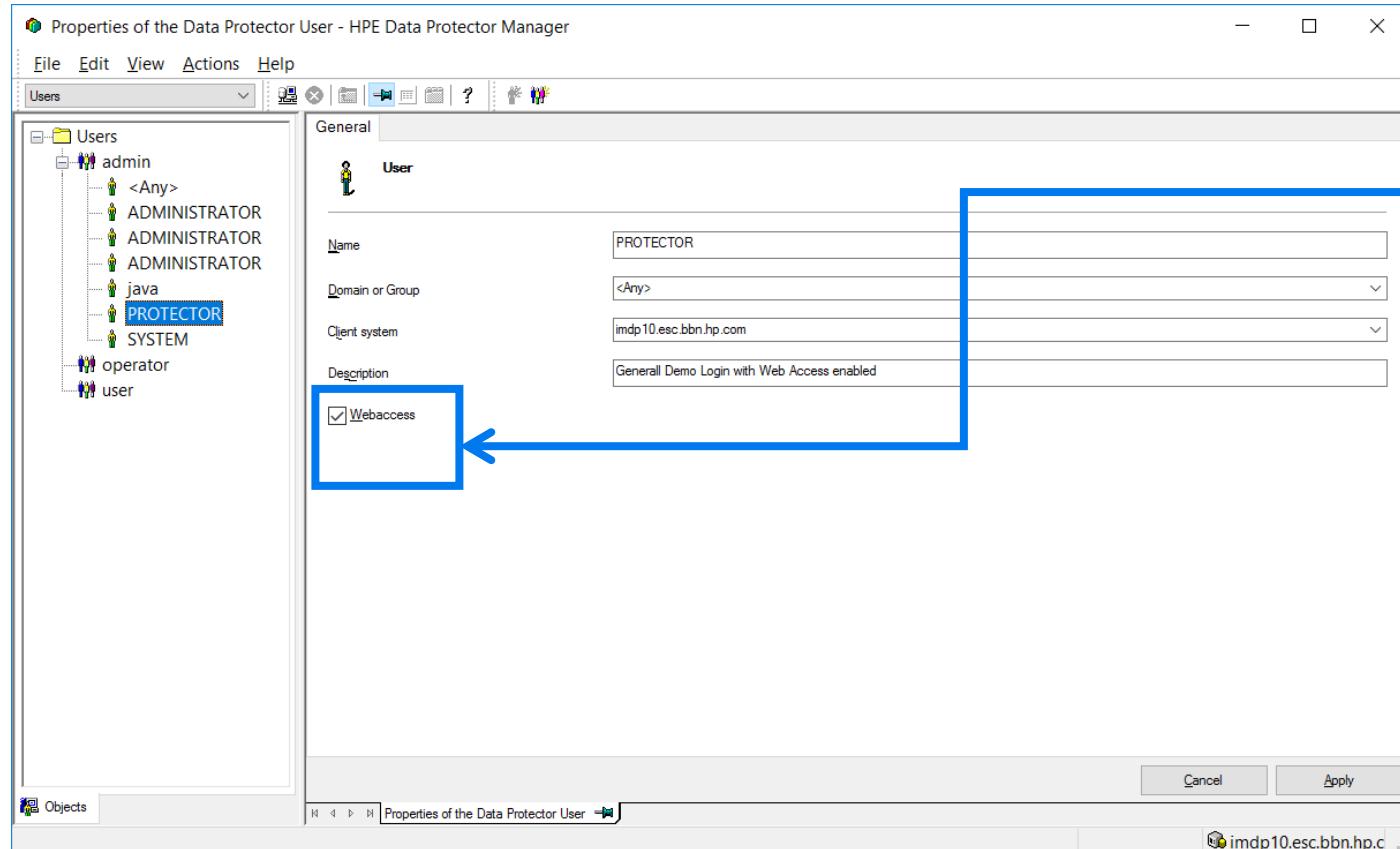
- ✓ Traditional and advanced schedules from previous versions are migrated automatically during the upgrade process.
- ✓ The Calendar view shows the appropriate schedules on the day viewed.
- ✓ You can manually trigger migration with the this command: **omnidbutil –migrate\_schedules**
- ✓ Minute/hourly/yearly schedules configured in earlier versions are not migrated.
- ✓ If a scheduled backup is running, and the same backup is triggered again, the second backup specification is ignored, and is NOT queued to be run later.

# Scheduler Comparison

RED = NEW in 10.01

Feature	Basic Scheduler	Advanced Scheduler	Consolidated Scheduler
Daily/Weekly/Monthly	X	X	X
Every Hour/Minute	manual edit	X	REST API
Priorities		X	X
Timezones		X	X
Monthly overview	X	X	X
Duration		X	X
Conflict handling		X	X
x-Day of Week/ Month/ Year		X	X
Editable schedules	manual edit	X	X (+REST)
Filtering		X	X
Searching		X	X

# Data Protector: NextGen GUI Secure Access



Check the "Web Access" box and set a password.

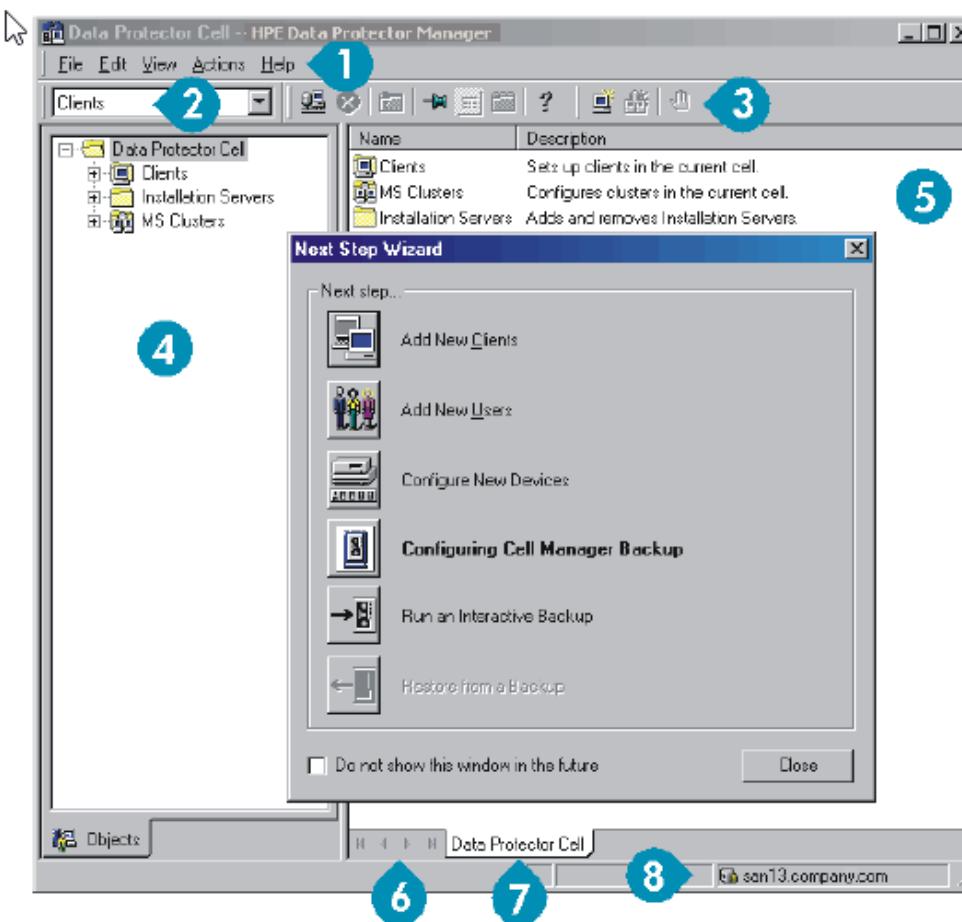
This login is also used for Vmware GRE and Backup Navigator.

**NOTE:** This command is necessary to give VMWare GRE and Backup Navigator access:  
**omnicc -secure\_comm -configure\_for\_gui**

# Classic or "Legacy" GUI

- Tasks performed by legacy GUI

# Anatomy of the "Classic" or "Legacy" GUI



- |                |                   |                |                |
|----------------|-------------------|----------------|----------------|
| 1 Menu bar     | 2 Context list    | 3 Tool bar     | 4 Scoping pane |
| 5 Results area | 6 Navigation tabs | 7 Results tabs | 8 Status bar   |

**Runs only on Windows to:**

- Create backup and copy specs
- Do media and device management
- Perform deployment and update tasks

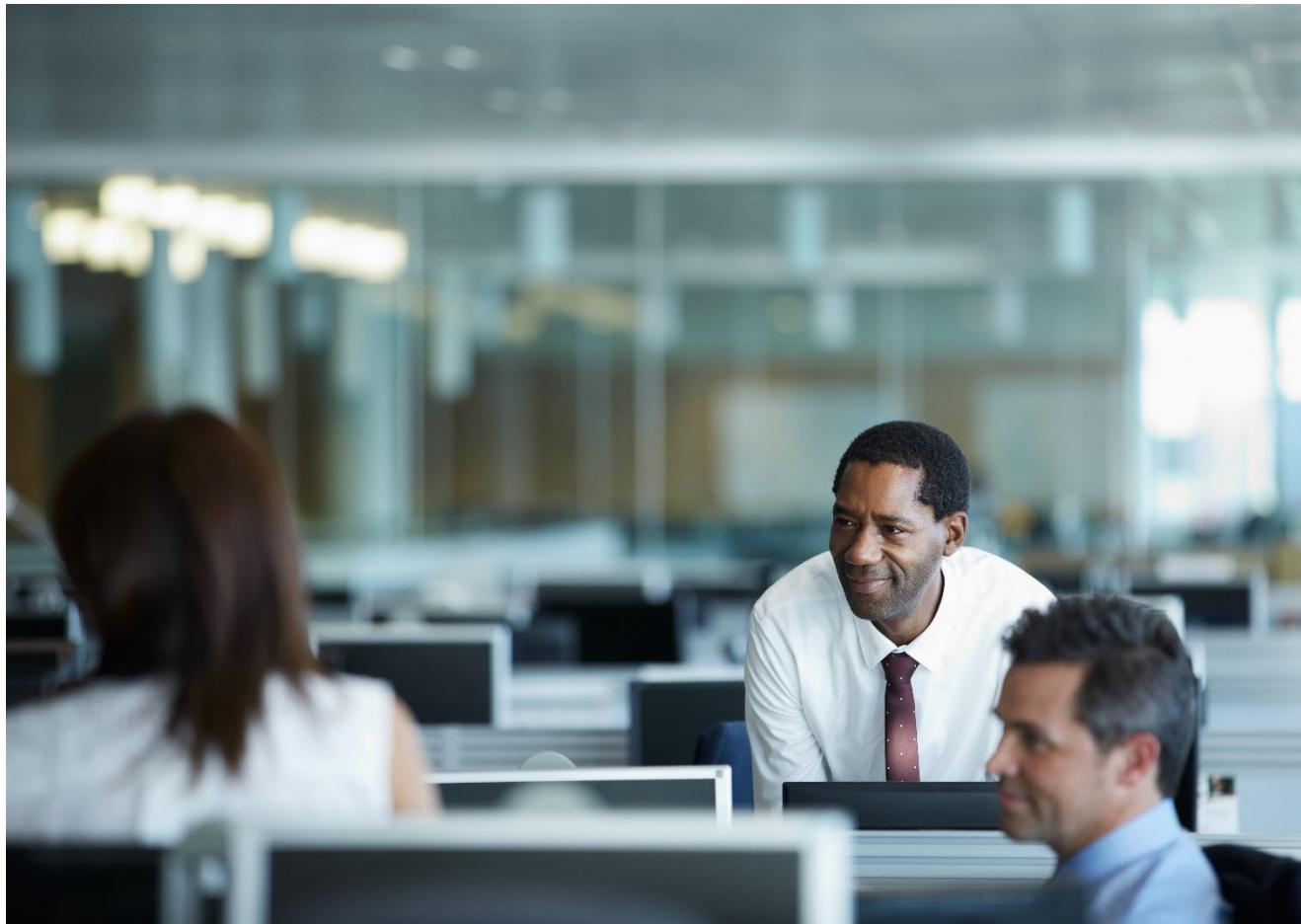


# Wrap-Up

- Summary
- Module Quiz

# Quick Summary

Here's what you learned ...



- **Web GUI has new features:** Dashboard, Telemetry, Scheduler
- **Web GUI is plug-in** for legacy GUI
- **Dashboard:** license and capacity consumption, device usage
- **Telemetry:** info available for capacity, licensing, cell/agent usage
- **Consolidated Scheduler:** schedule type, time zones, priorities, recurrence, conflict resolution
- **Legacy GUI:** backup/copy specs, media/device management, deployment/update tasks



## Module 3 Quiz

Pause now to take a short interactive quiz to gauge your understanding of what you learned in this module.

# Congratulations!

You completed Module 3.

Stay tuned for Module 4: User Interface

## What's next?

[Move on to the next module.](#)





# Data Protector 10.10

## Module 4: Administrative Tasks & Settings

### Level 310 Technical Deep-Dive

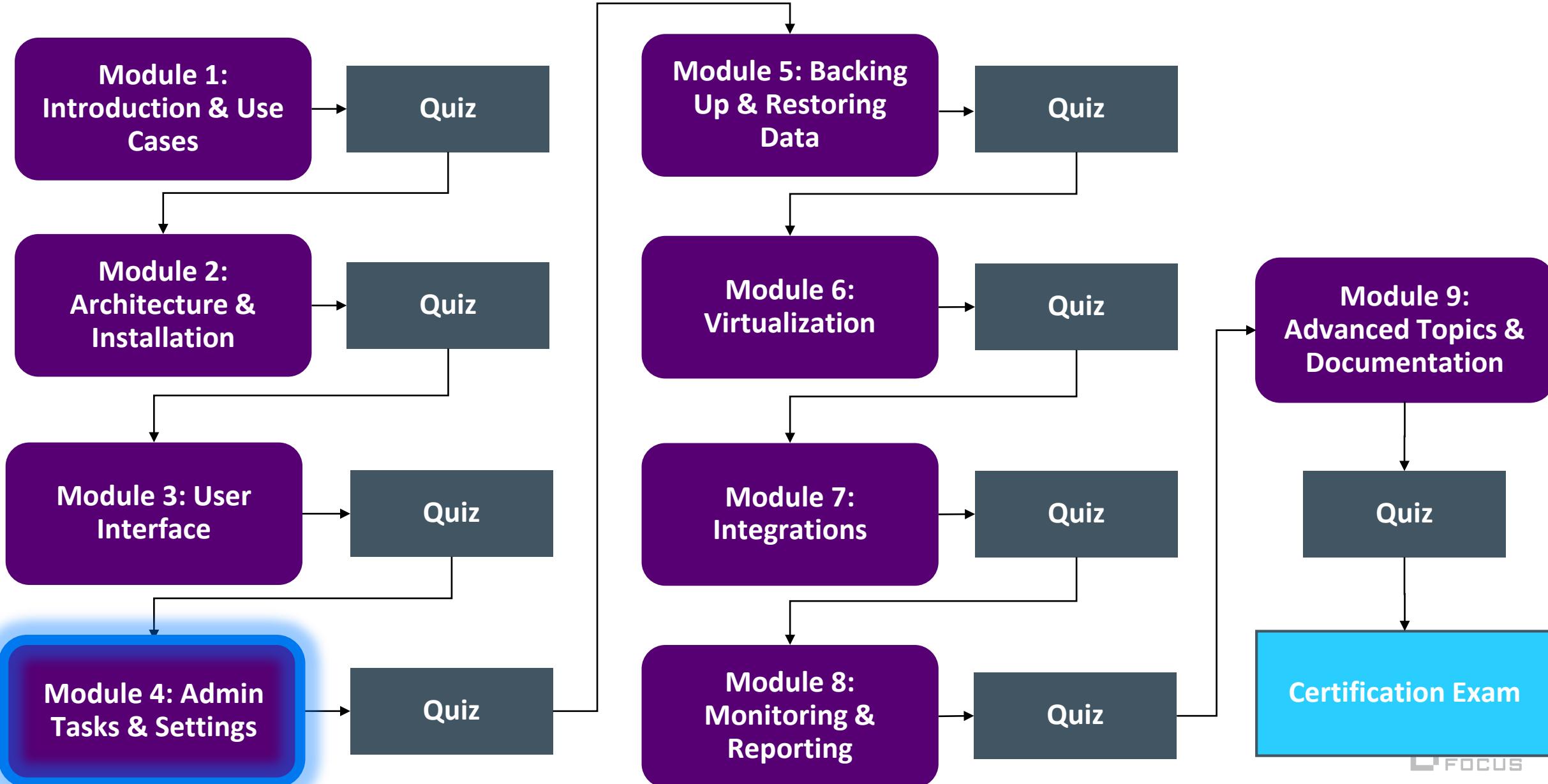
Keith Walls  
Technical Enablement

November 2018

You can:

- Download the presentation.
- Download PowerPoint slides & speaker notes.

# Level 310 Multi-Module Course



# About this Course

## Internal Database (IDB)

- What is IDB?
- What is it used for?
- Architecture
- Limits
- Admin Tasks

## Security

- What is security?
- Security features
- Encryption

## Security Changes in DP 10.00

- Secure peering
- Secure push installation for clients
- Centralized Command Execution
- REST API Security
- Network Port consolidation

## Backup Devices & Command Line

- Smart Cache
- Tape
- Disk-Based
- Cloud Backup
- Command Line

## Module Quiz

- Take the interactive Module Quiz

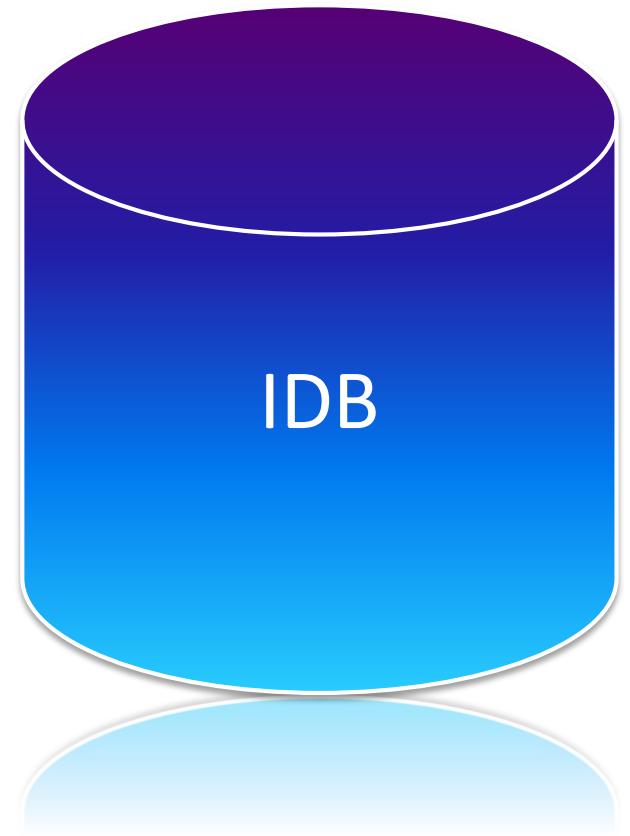
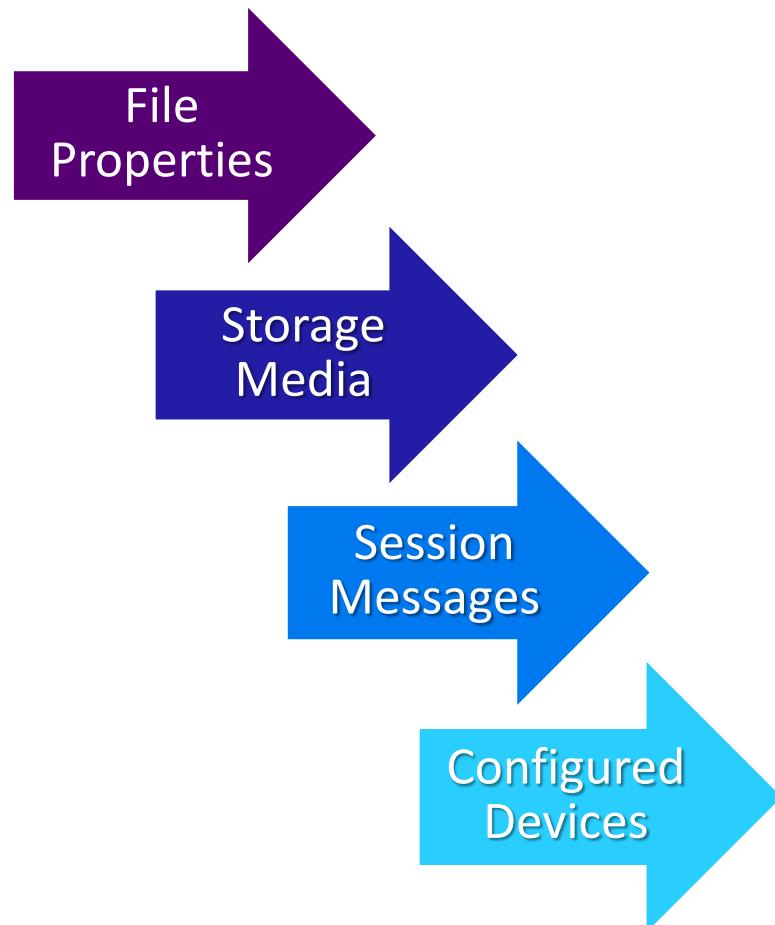
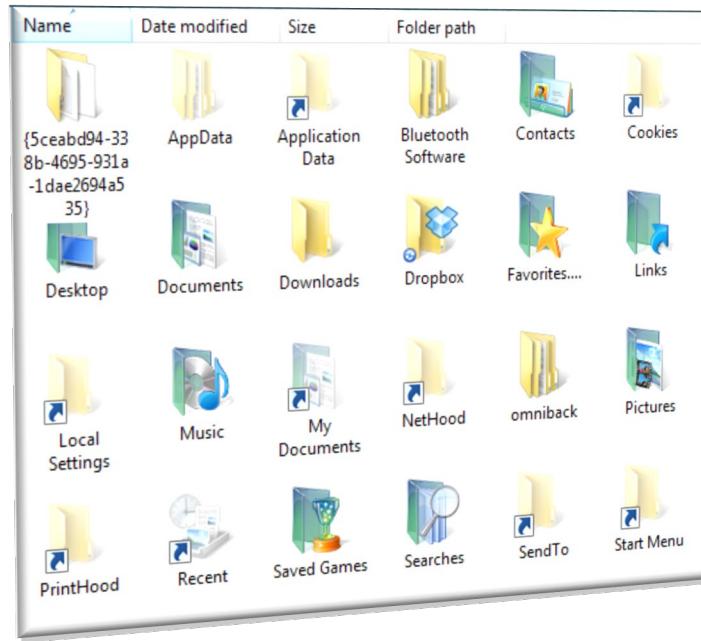
Interactive quizzes!

# Internal Database

- What is IDB?
- What problems does it solve?
- IDB Architecture
- IDB Limits
- IDB Admin Tasks

# What is the IDB?

Embedded Database in the DP Cell Manager, implemented with PostgreSQL



# What is the IDB Used For?

---



---

## **Fast and convenient restore:**

Quickly browse and select the files and directories for backup

---

## **Backup management:**

Verify backup session results

---

## **Media management:**

Store information about all media used for backup, track operations, and track location of backed up data for fast restore

---

## **Reporting and auditing:**

Get reports and audit configuration changes.

---

## **Encryption/decryption management:**

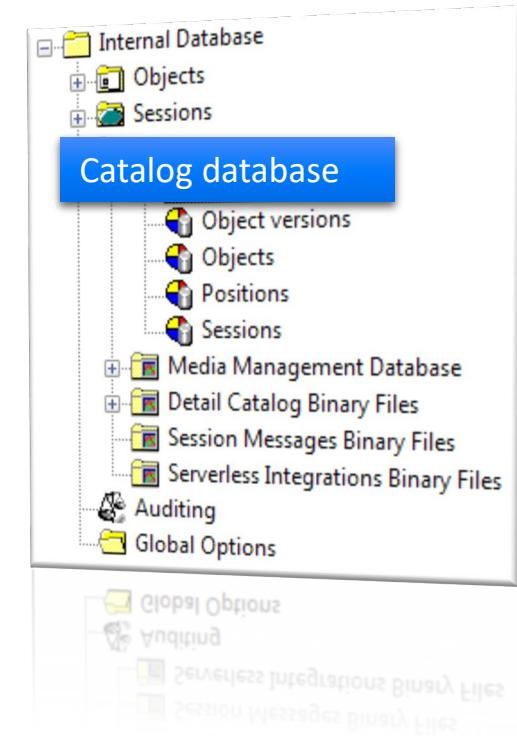
Store encryption keys during encrypted backups and retrieve decryption keys to restore encrypted backup objects.

---

# IDB Architecture: Catalog database (CDB)

The Catalog database keeps information about:

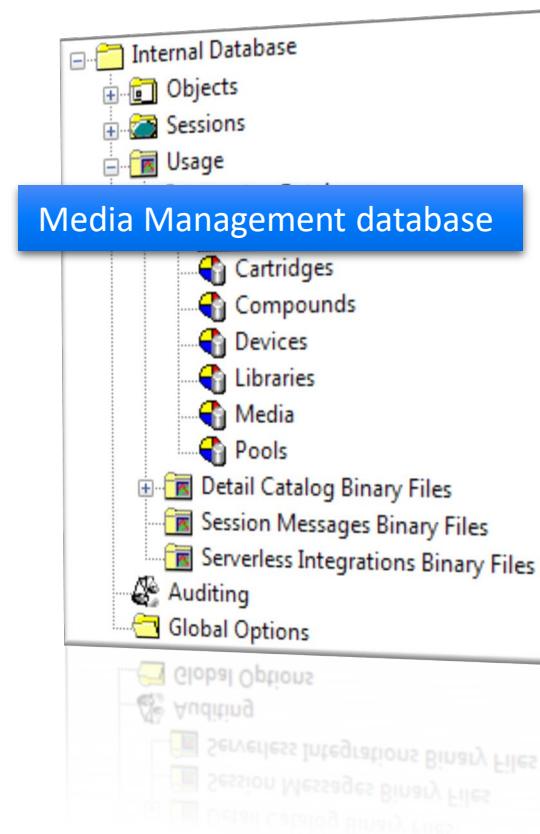
- Backed up client systems with their object names, versions, copies, mirrors, replicas and key identifiers (if encryption was used).
- Database and Application Integration object names, versions, copies, mirrors, replicas and key identifiers (if encryption was used).
- Positions of backed up objects on media. The same is done for object copies and mirrors.
- IDs of all started Data Protector sessions.



# IDB Architecture: Media Management database (MMDB)

The Media Management database keeps information about:

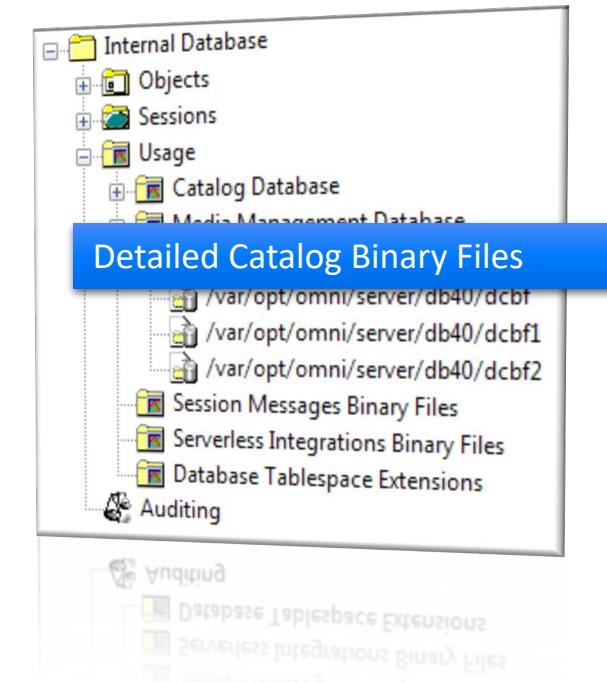
- All available and used Data Protector media of different types
- Configured logical devices, libraries and slots
- Configured media pools and magazines



# IDB Architecture: Detail Catalog Binary Files (DCBF)

## The Detail Catalog Binary Files:

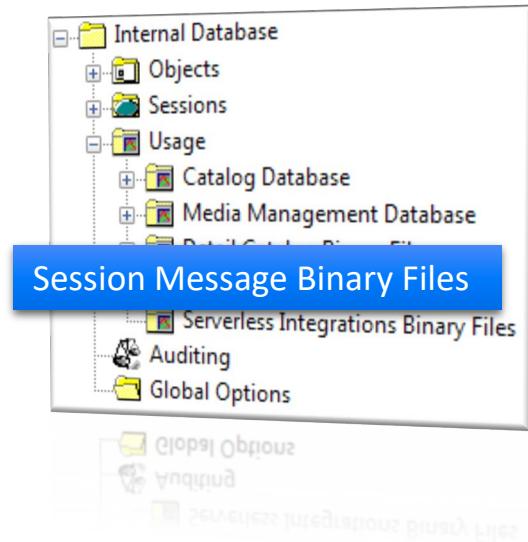
- Form the biggest part of the IDB
- Are grouped into configurable DCBF directories, which are either filled with DCB files sequentially or in parallel (global parameter)
- Contain all metadata about backed up files, such as file name, size, modification time, attributes, and protection.
- Are created for each medium, will be deleted after the medium is exported, and will be re-created if the medium is overwritten



# IDB Architecture: Session Messages Binary Files (SMBF)

## The Session Messages Binary Files:

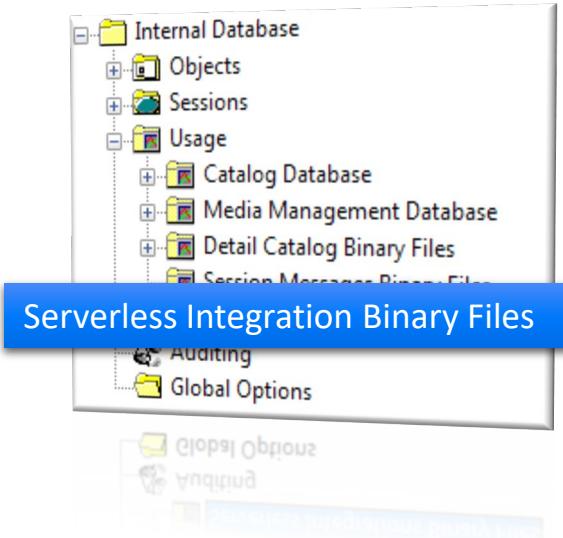
- Store session messages in a binary format generated during any Data Protector session
- Are read by DBSM process and shown in the DP GUI (in Monitor window or in Internal Database-Session section)
- Are created as file for each single Data Protector session (Session ID is used as filename)
- Are grouped by year and month in the file system



# IDB Architecture: Serverless Integration Binary Files (SIBF)

## The Serverless Integration Binary Files :

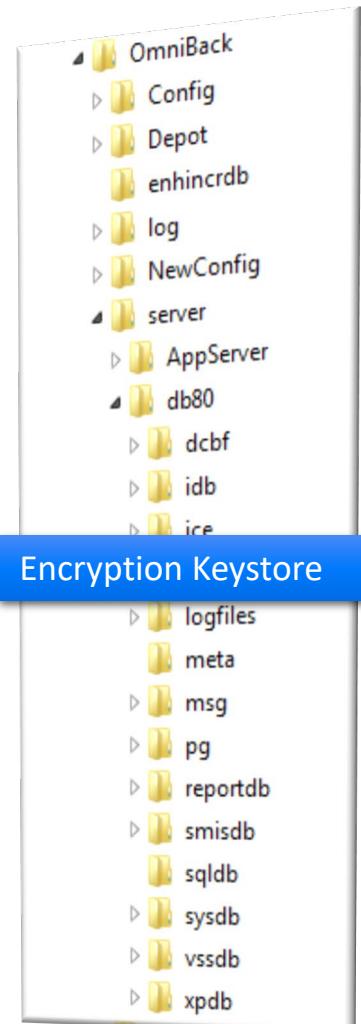
- Store metadata about each NDMP backup sessions
- Are required to restore NDMP objects



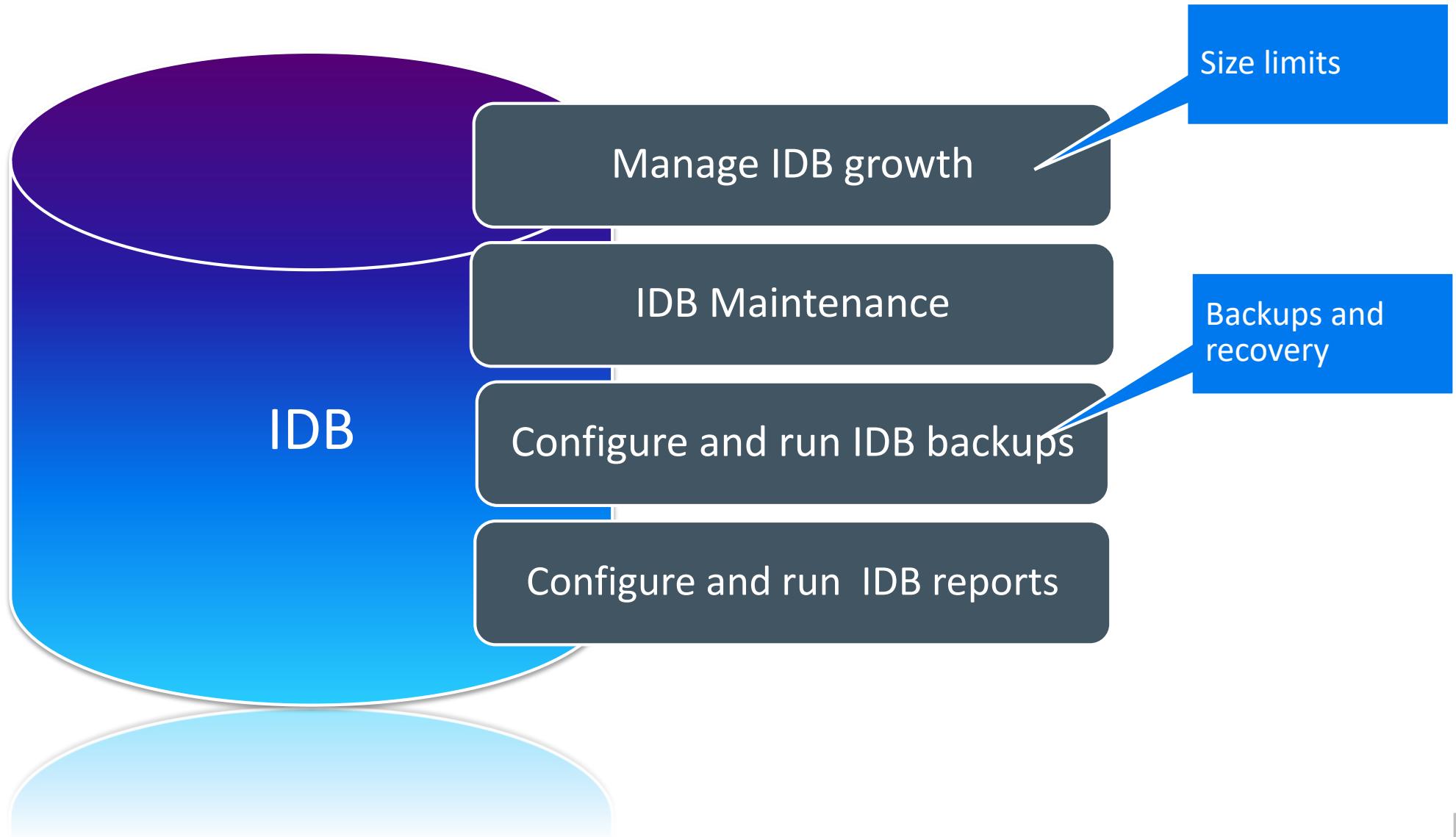
# IDB Architecture: Encryption Keystore

## The Encryption Keystore:

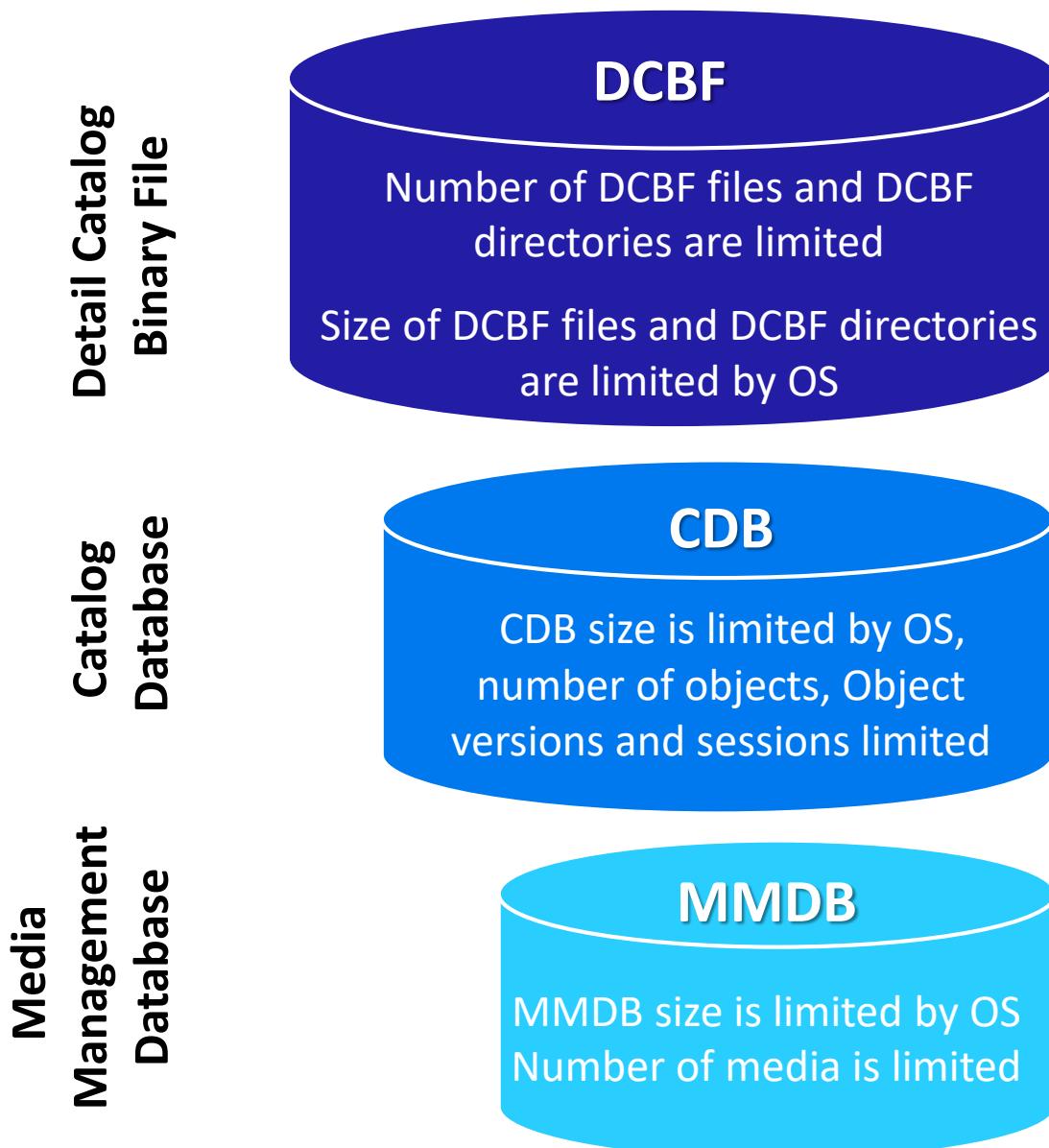
- Is the central store for all created encryption keys (manually or automatically generated)
- Manages key identifiers for Data Protector; performs hardware and software encryption of backed up objects
- Contains a database that tracks the mapping between encrypted object version and key identifier; for hardware encryption, it contains the mapping between Object Version and Medium-ID
- DP CLI-based administration only



# IDB Administrative Tasks

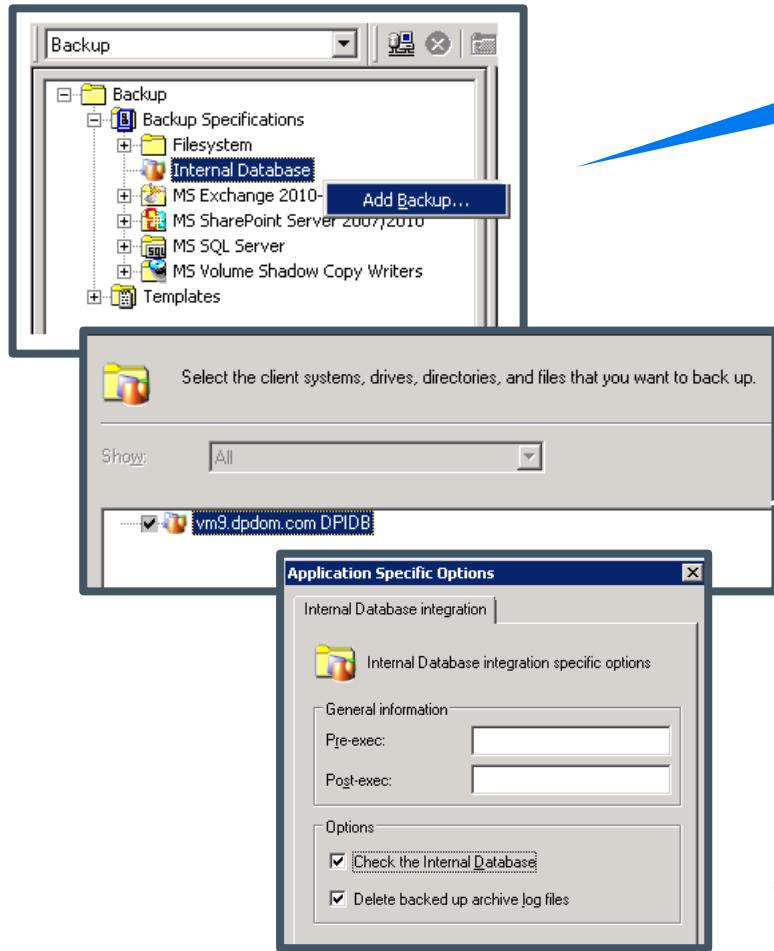


# Internal Database Size Limits



- Stores up to 1 Trillion ( $10^{12}$ ) file names with metadata
  - Default of 5 DCBF directories (max. 100 DCBF directories)
  - Default 200 GB size limit per directory (maximum size limited by FS limitations)
  - Default 100,000 files per directory (max 500 000)
- 
- Stores up to 100 Million ( $10^8$ ) sessions
  - Allows a maximum of 99,999 sessions a day
  - Default limitation of 100 concurrent running backup sessions (max 1000 possible)
  - Stores 1 Million Backup Objects
  - 50 Million Backup Object versions
  - Keeps up to 1 Billion ( $10^9$ ) media positions
- 
- 50 Million backup media allowed
  - 200,000 backup media within one media pool

# IDB Full Backup



## GUI

- Switch to Backup context
- Right-click **Internal Database** and select **Add backup**.

- Select the **Blank IDB Backup** template and click **Next** on the Application Configuration window.
- Then select the **DPIDB** object in the Source Windows

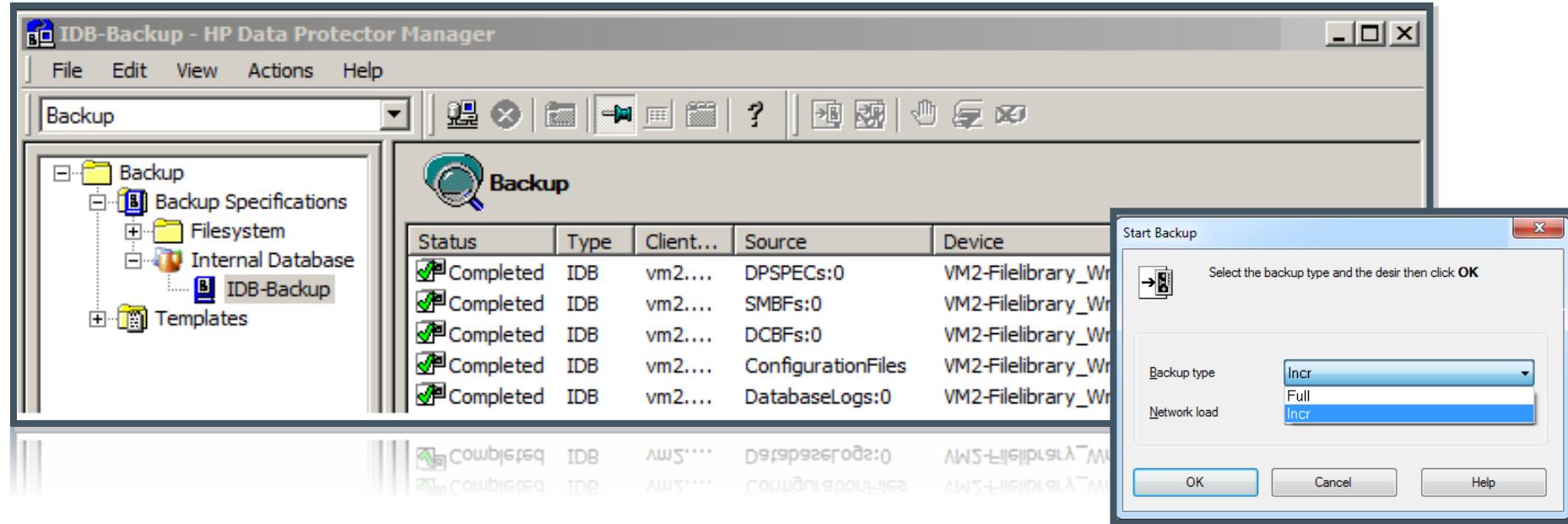
### Special IDB Backup Options:

- Check the Internal Database (default: **On**)
- Delete backed up archive logs file (default: **On**)

## Command Line

```
omnib -idb_list <name> -barmode <full/incr
```

# IDB Incremental Backup



**Configuration Files:**

full backup performed

**DatabaseLogs:**

new PostgreSQL Archive logs backed up  
excluded from backup

**DatabaseFiles:**

incremental backup performed

**SMBFs:**

incremental backup performed

**DCBFs:**

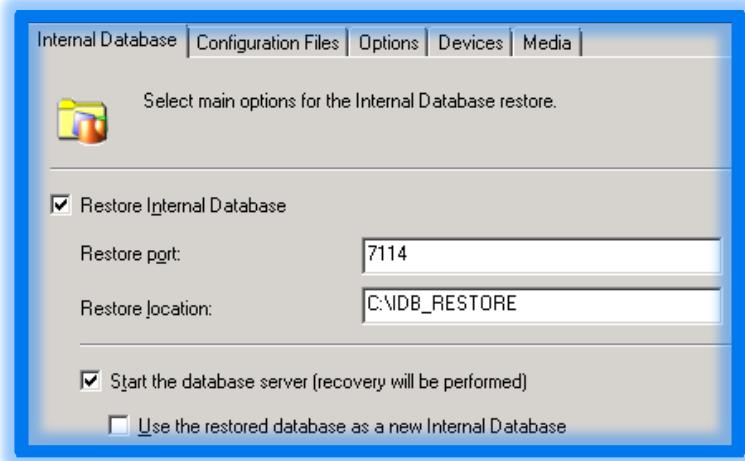
full backup performed

**DPSPECs:**

- Schedule once a day
- Choose device
- Do NOT use file library
- Set protection

# IDB Restore: Overview

## GUI



## Command Line

```
omniofflr -idb -autorecover -session 2014/03/34 -force  
[Normal] From: OMNIOFFLR@vm1 "Offline Restore" Time: 3/3/2014 4:41:19  
PM  
Opening obrindex.dat:  
C:\ProgramData\OmniBack\server\db80\logfiles\rlog\obrindex.dat -> FAILED  
C:\Data\obrindex.dat -> SUCCEEDED  
...  
[Normal] From: OMNIOFFLR@vm1 "Offline Restore" Time: 3/3/2014 4:46:54  
PM  
Starting Data Protector services.  
HP Data Protector services successfully started.
```

## Cell Manager Disaster Recovery

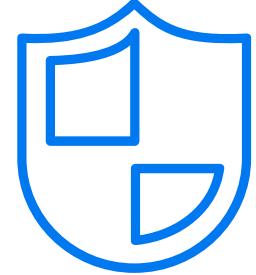
```
DRM  
To start recovery of the machine VMW35163 press F12 in 10 seconds...  
Booting from disk.  
-
```

**NOTE:** for details on backing up and restoring,  
see *Administrator Guide, Chapter 4*.

# Internal Database

- What is security?
- Security features
- Encryption

# What is Data Protector Security



Data Protector provides security solutions at all levels of backup security:

- Who can administer or operate a backup application (Data Protector)?
- Who can physically access client systems and backup media?
- Who can restore data?
- Who can view information about backed up data?

## Before DP 10.00

- Encrypted Control Communication
- CRS request signed by CA, hosted on Cell Manager

## DP 10.00

- Self-signed certificate and certificate pinning
- Commands and scripts routed through Cell Manager (secured by default)

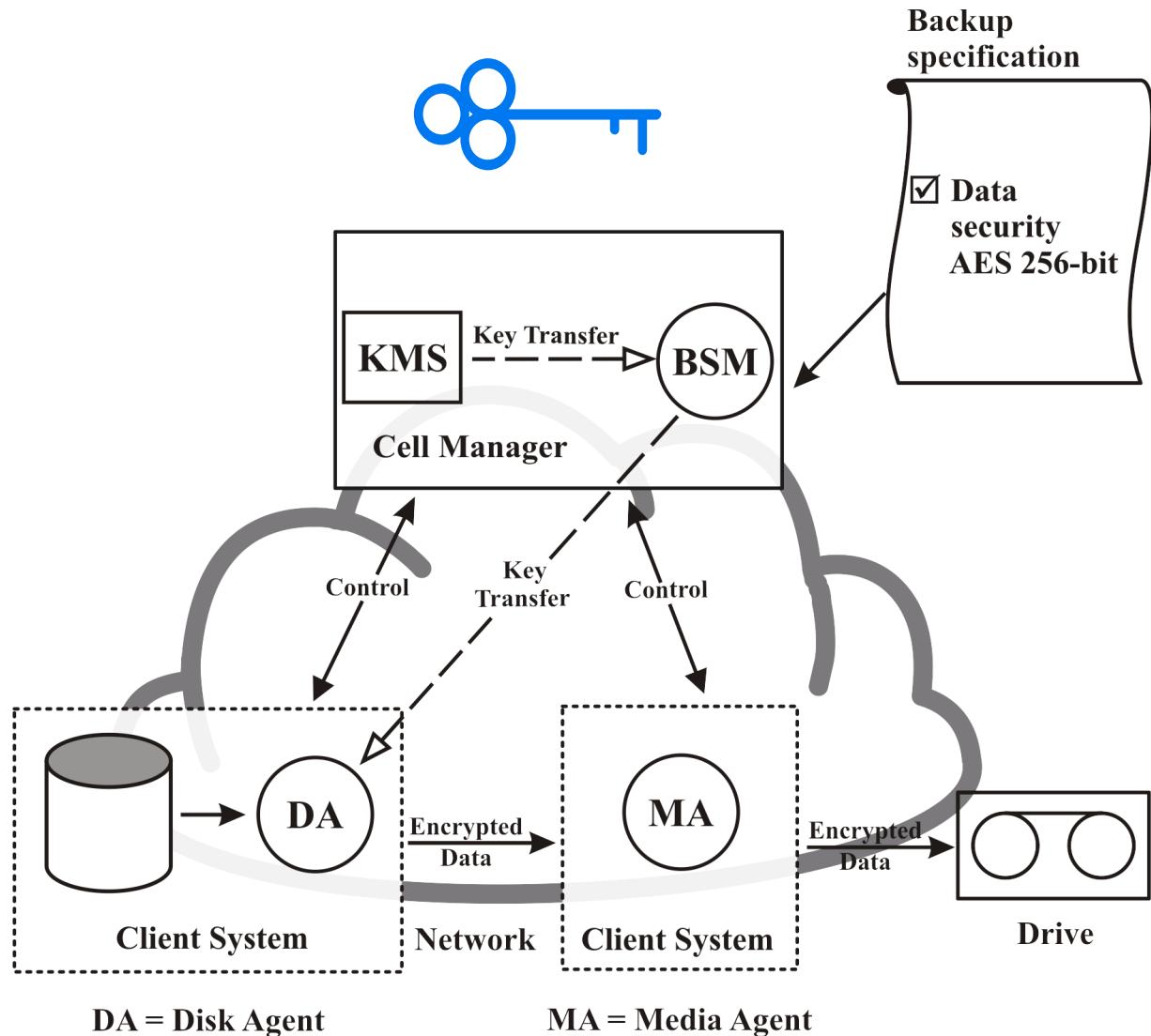
# Data Protector Security Features

The following features allow and restrict access to Data Protector and the backed up data:

- Cells
- Data Protector user accounts
- Data Protector user groups
- Data Protector user rights
- Visibility and access to backed up data
- **Data encryption**

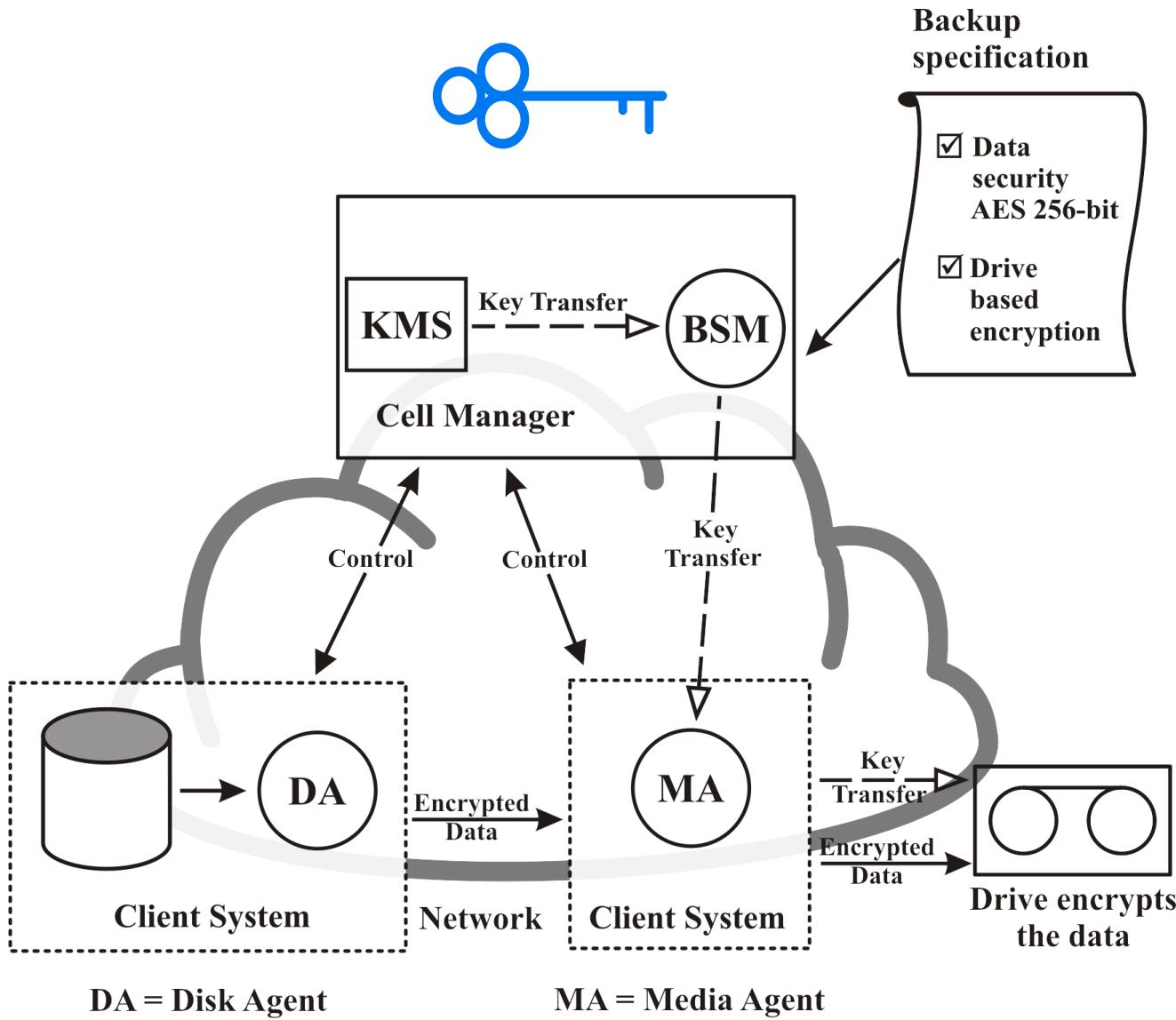
Software and hardware  
encryption supported!

# Encryption: Software



- AES 256-bit encryption
- Same key for encryption and decryption
- Data is encrypted before it is backed up to media

# Encryption: Hardware



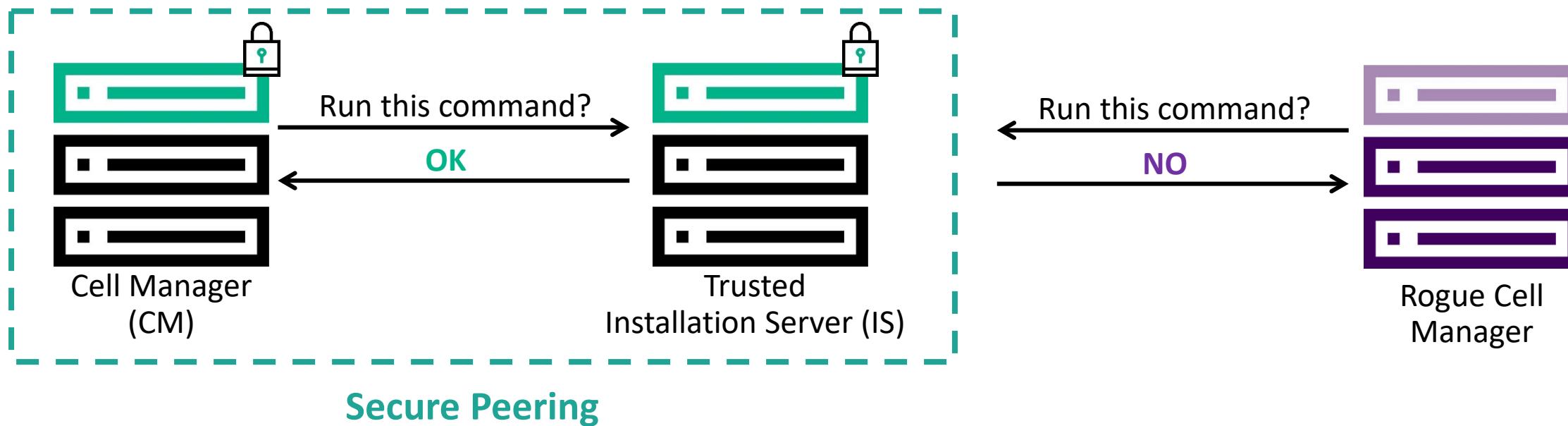
- Drive-based encryption option
- Requests encryption key from KMS
- Key is transferred to MA – configures drive for encryption and sets encryption key in the drive

# Security Changes in DP 10.00

- IS and CM “Secure Peering”
- DP Push Installation: Windows clients
- DP Push Installation: Linux/Unix clients
- CM and Client “Secure Peering”
- Centralized Command Execution (CCE)
- REST API Security
- Network Port Consolidation (added in DP 9.09)

# 1. Secure Peering between IS and CM

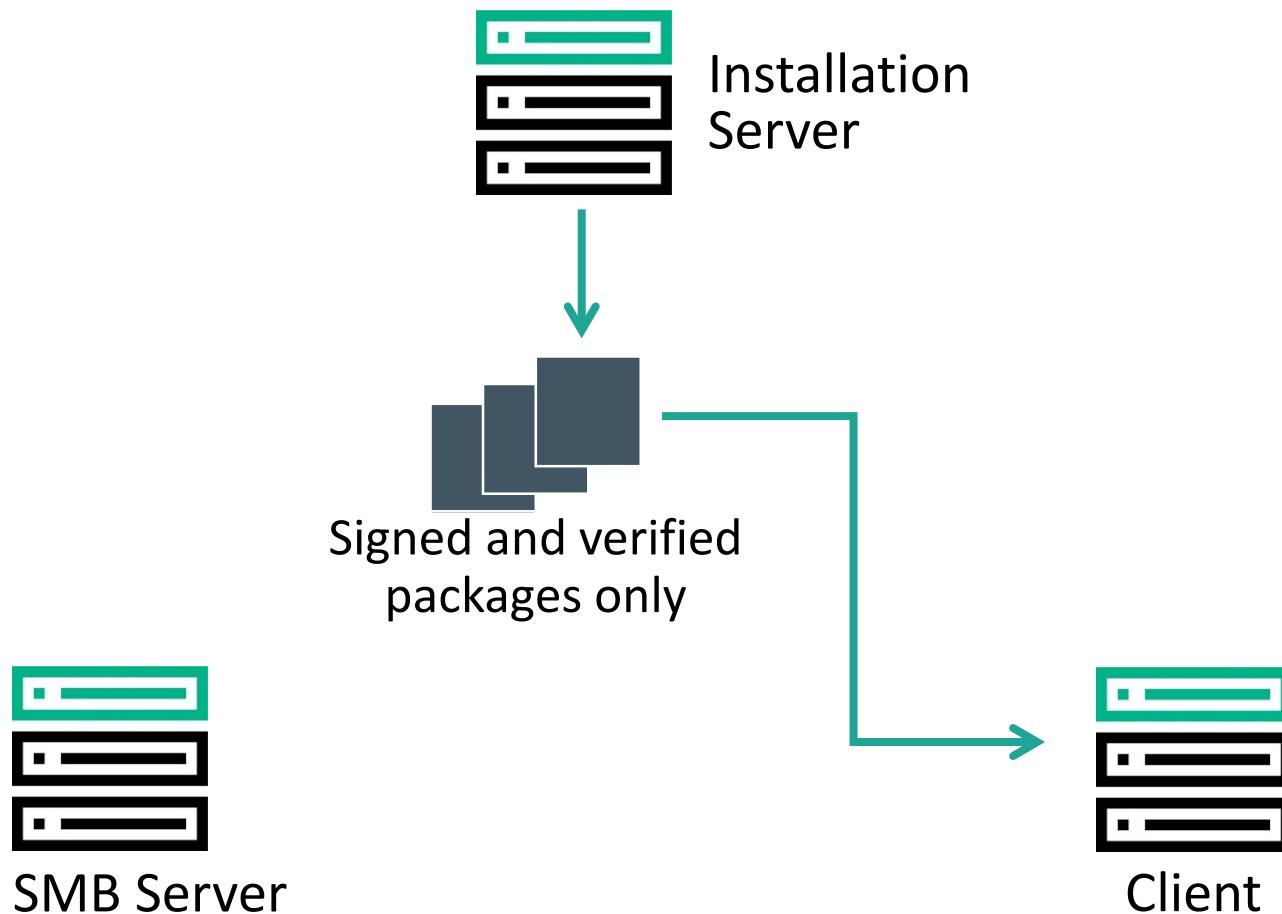
More secure communication between IS and CM



- Communication between IS and CM is via a **secure TLS 1.2 channel**; the CM/IS relationship is securely verified.
- Trust verification did NOT occur DP 9.x or earlier; the CM/IS relationships was not verified. Cell Manager and the DP environment were at a greater risk of MITM attacks and command interception. For example, a rogue “Installation Server” could tell any Cell Manager what to do in DP 9.x and push rogue packets to it.

## 2. DP Client “Push” Installation: Windows

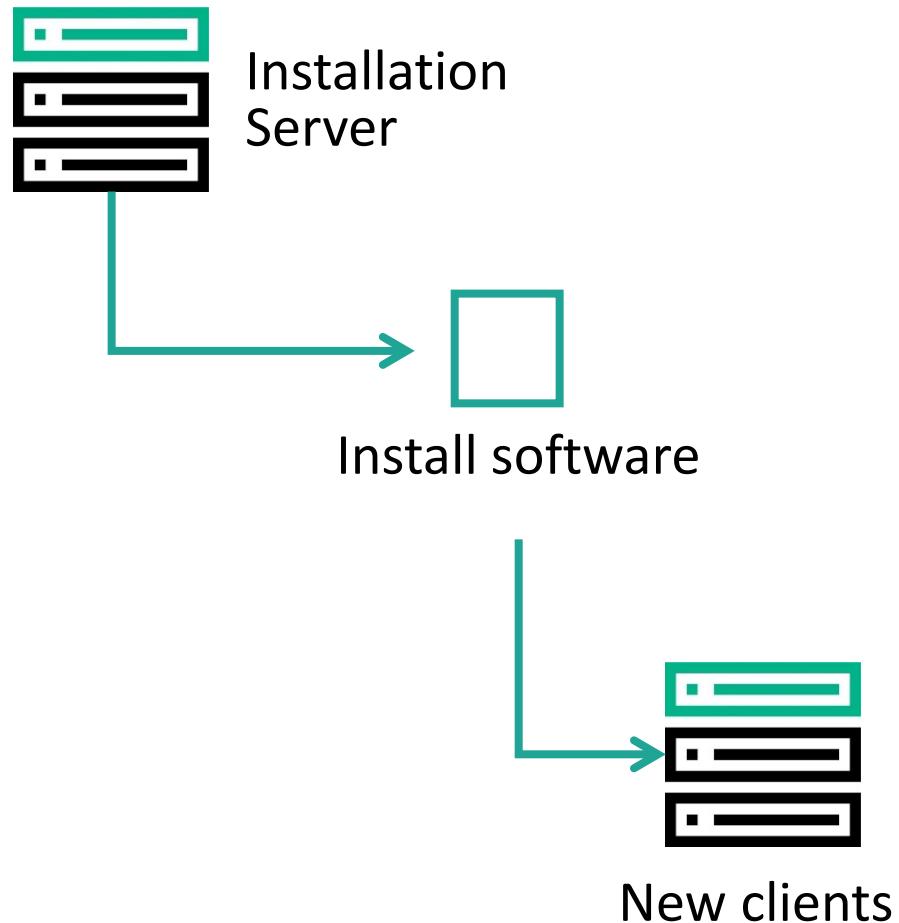
Install packages are signed and verified



- SMB server and Client both request **SMB signing**.
- Files copied from **\IS\OmniBack** shares are copied to clients from the installation server with **signed and verified** packages.

### 3. DP Client “Push” Installation – Linux/UNIX

SSH is a more secure protocol for sending & receiving data and exchanging certificates



- DP 10.0 uses **ssh** to send and install software on new clients.
- If ssh keys are not pre-configured between IS and clients, a password is requested for each client.
- Ssh is more secure than rsh and rexec because it sends encrypted data.

# 4. Secure Peering between CM and Clients

More secure communication between CM and Clients

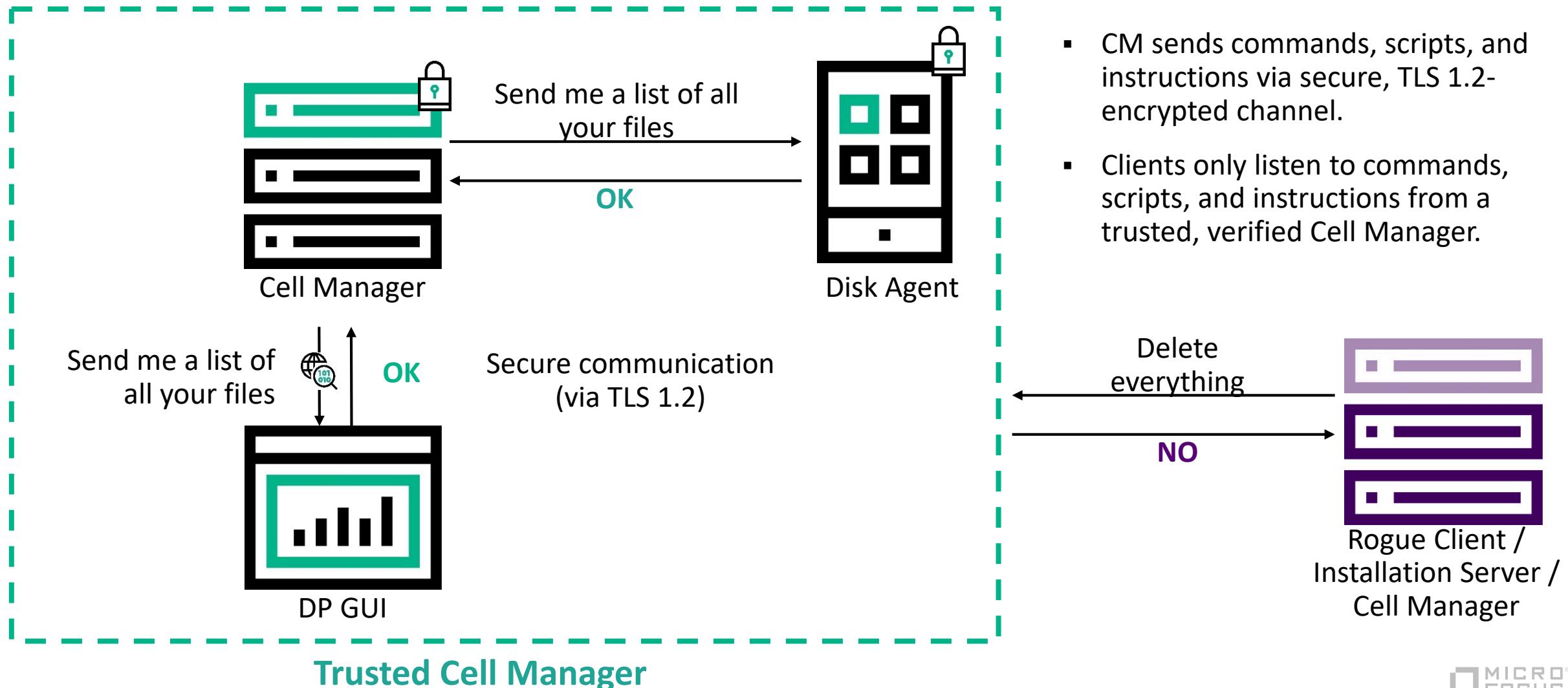


## Secure Peering



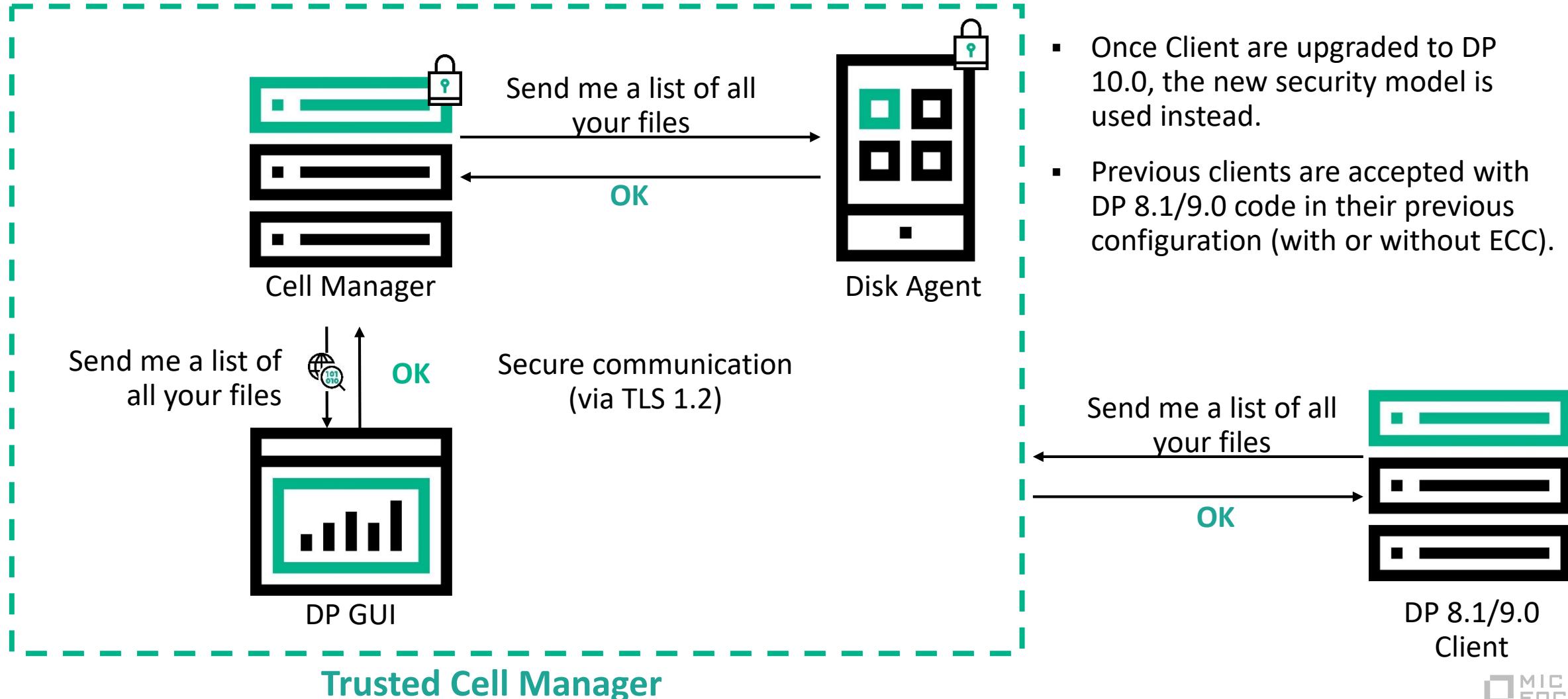
# 5. Centralized Command Execution (CCE)

More secure communication between CM and Clients



# 5. CCE and compatibility with previous clients

Older Clients can join the secure “enclave”



# 6. REST API Security

## Expose REST APIs to customers

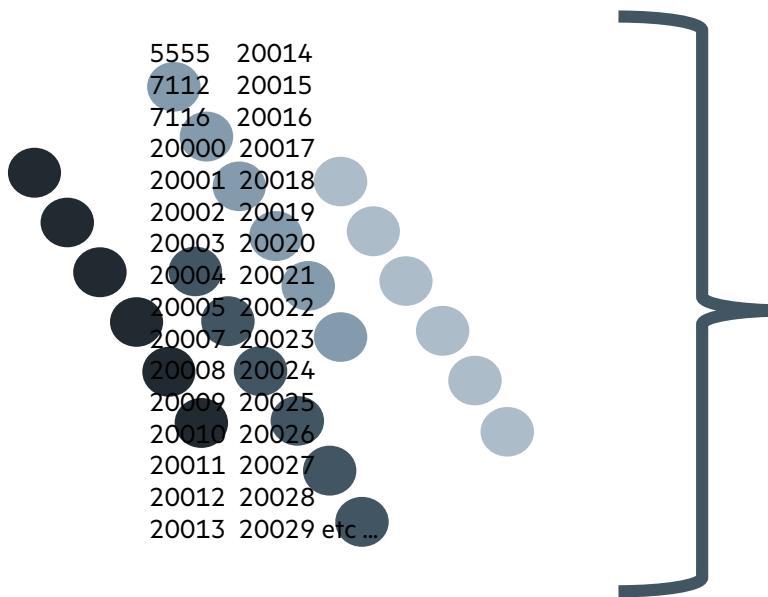
- ✓ **Authentication APIs** for Java “thick client” and Web browsers allows inbound REST API queries to the DP Cell Manager
  
- ✓ **DP 10.0 exposes the APIs for Scheduler, Telemetry and Restore.**
  - Scheduler APIs let Admin perform functions of Legacy Scheduler that were previously accomplished by editing a text file.
  - Telemetry API let Admin perform all new telemetry functions.
  - Restore APIs do not offer complete coverage of functionality by do allow self-service restore of FS, SQL, SAP, Oracle, VEPA, IDB, Disk image, and NDMP backups
  
- ✓ **Benefits are massive!** This is the first step to allowing customers to script all interactions with Data Protector.



# 7. Network Port Consolidation (added in DP 9.09/enhanced in 10.00)

Reduce the number of ports required for DP to function correctly

From 100s or 1000s of ports to ...



3 internal communication ports

-  **5565** General Communication (Apps, MA, DA ...)
-  **7112** DP Internal DataBase
-  **7116** DP Application Server

- Fewer ports means easier to manage, fewer open ports in a Firewall, and greater security.
- More ports may be required for external communication with other parts of the infrastructure, such as NDMP or StorOnce Software.
- Backwards compatibility is available with pre 10.00 agents, as long as the correct ports are opened

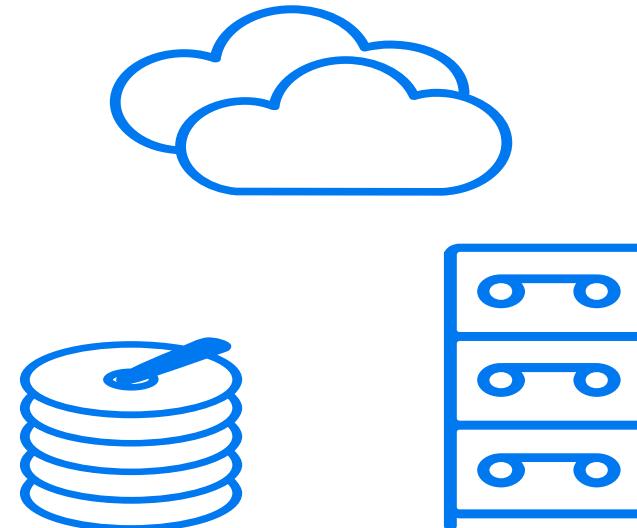
# Devices

- Smart Cache
- Tape
- Disk-Based
- Cloud Backup
- Command Line

# Backup Devices

Data Protector supports the following device types that you can configure (depending on the installed components):

- Standalone
- ■ **Backup-to-Disk device (B2D)**
- SCSI library
- Stacker
- Magazine device
- Jukebox
- Standalone file device
- ■ **File library device**
- External control
- ADIC/GRAU DAS library
- StorageTek ACS library
- ■ **StoreOnce Catalyst**
- ■ **StoreOnce Software Deduplication**
- ■ **Back up to the Cloud**
- Virtual Tape Library



## THINGS TO KEEP IN MIND:

- Support for backup devices changes over time. Always consult the support matrix.
- Backup environment is only as good as its weakest length.

# Smart Cache

Backup-to-disk device that enables recovery from VMware backups

**The Smart Cache device can operate on one of the following mount points:**

- NAS share (CIFS and NFS)
- Disk (SAN, iSCSI, local) formatted with file system
- The Smart Cache device is configured using the GUI.



**NOTE:** Smart Cache devices are supported only on Windows x64 and Linux x64 operating systems.

**NOTE:** A Smart Cache device is available as a target only for VMware backups.

**IMPORTANT:** Encoded or AES 256-bit encrypted VMware backups and object copy to a Smart Cache device is not supported. But objects copies to and from tape devices with hardware encryption are supported.

# Command Line

Most Data Protector functions can be accessed through the Command Line interface



**NOTE:** For details, see *Command Line Interface Reference Guide*.

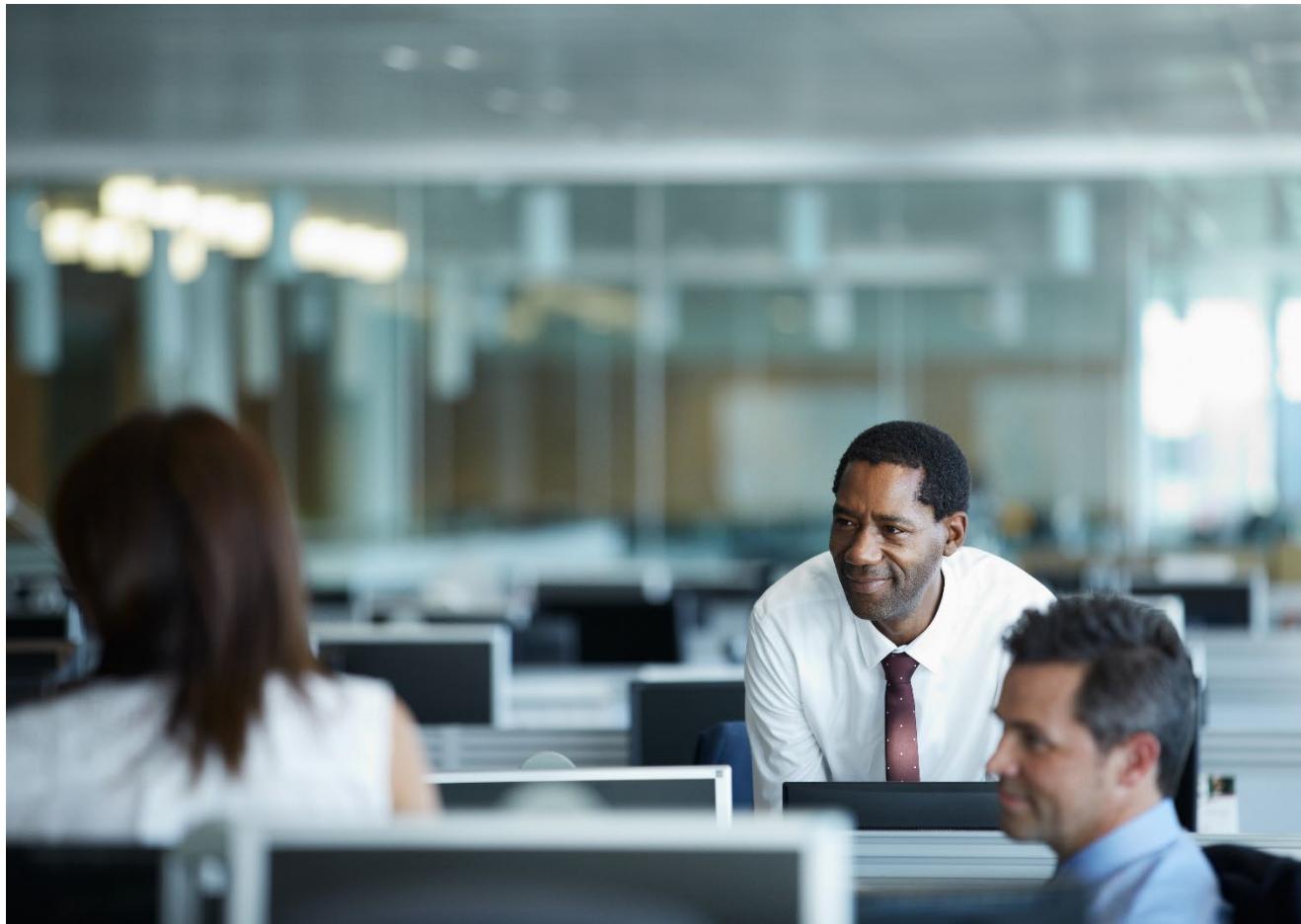


# Wrap-Up

- Summary
- Module Quiz

# Quick Summary

Here's what you learned ...



- IDB stores info about media used for backup.
- IDB structure includes CDB, MMDB, DCBF, SMBF, and SIBF.
- IDB backups include full, incremental, and incr 1-9.
- Security changes include:
  - Secure peering between CM-IM and CM-Client.
  - Secure push installation on Windows and Linux/UNIX
  - Centralized command execution
  - REST API security.
- Full spectrum of backup devices supported.



## Module 4 Quiz

Pause now to take a short interactive quiz to gauge your understanding of what you learned in this module.

# Congratulations!

You completed Module 4.

Stay tuned for Module 5: Backing Up & Restoring Data.

## What's next?

[Move on to the next module.](#)





# Data Protector 10.10

## Module 5: Backing Up & Restoring Data

### Level 310 Technical Deep-Dive

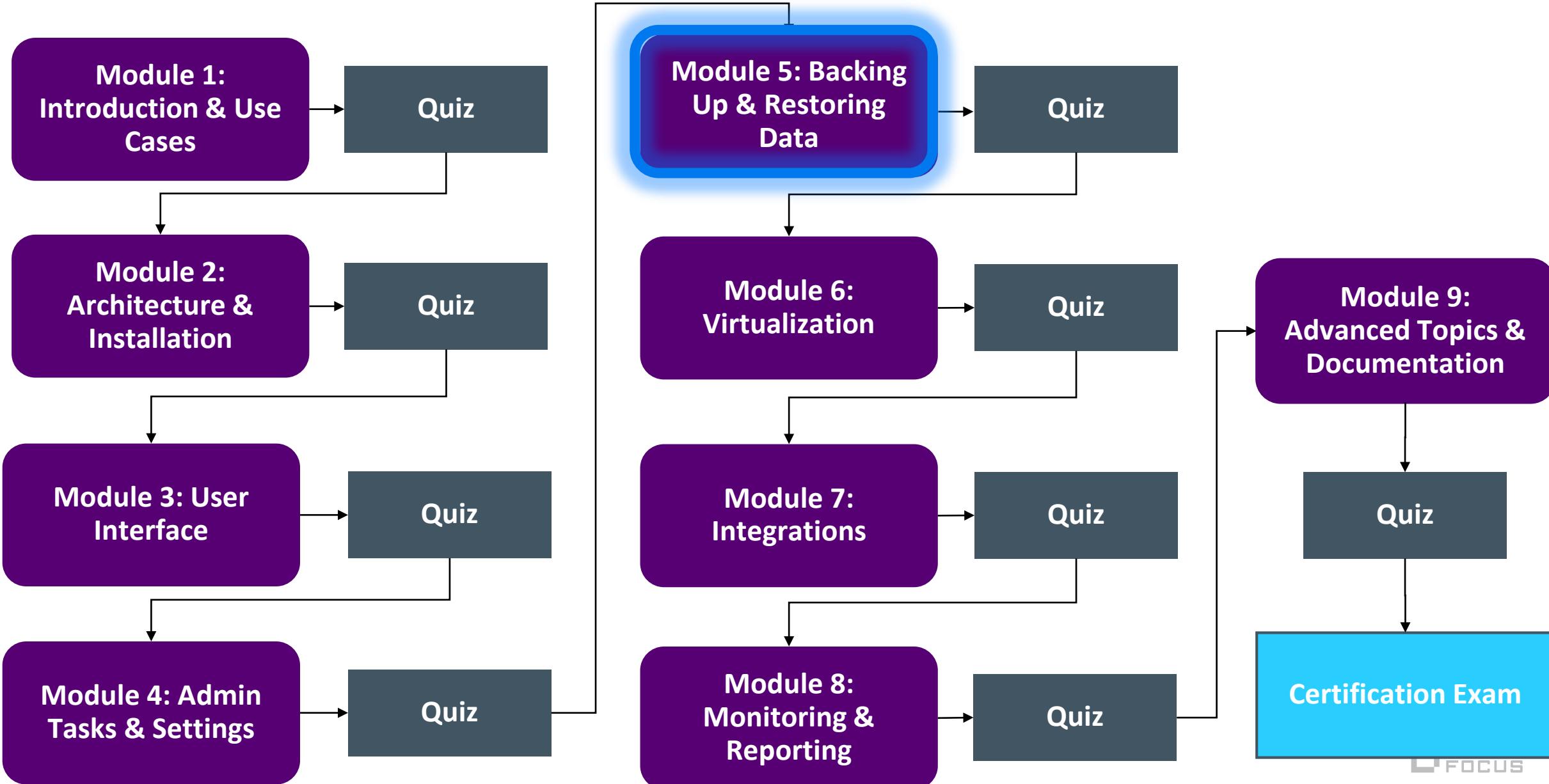
Keith Walls  
Technical Enablement

October 2018

You can:

- Download the presentation.
- Download PowerPoint slides & speaker notes.

# Level 310 Multi-Module Course



# About this Course

## Backup

- Advanced backup features
- Backup process
- Backup Wizard
- Backup specification

## NextGen Scheduler UI

- Web UI
- Scheduler Tasks

## Restore

- Advanced Features
- Restore Methods
- Restore Sequence
- Restore Tabs

## Module Quiz

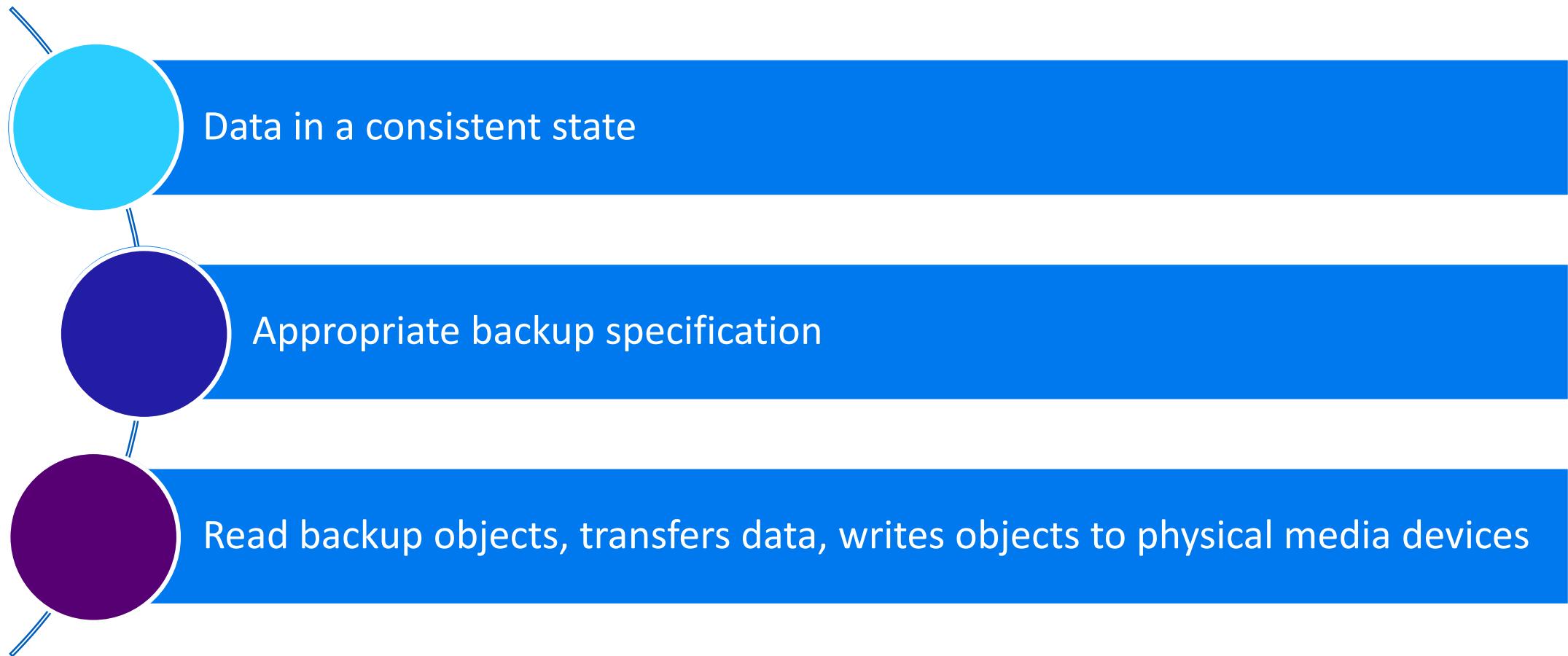
- Take the interactive Module Quiz

# Backup

- Backup
- Advanced backup features
- Backup process
- Backup Wizard
- Backup specification: Source, Destination, Options

# What is a Backup?

Creates a copy of system data onto backup media



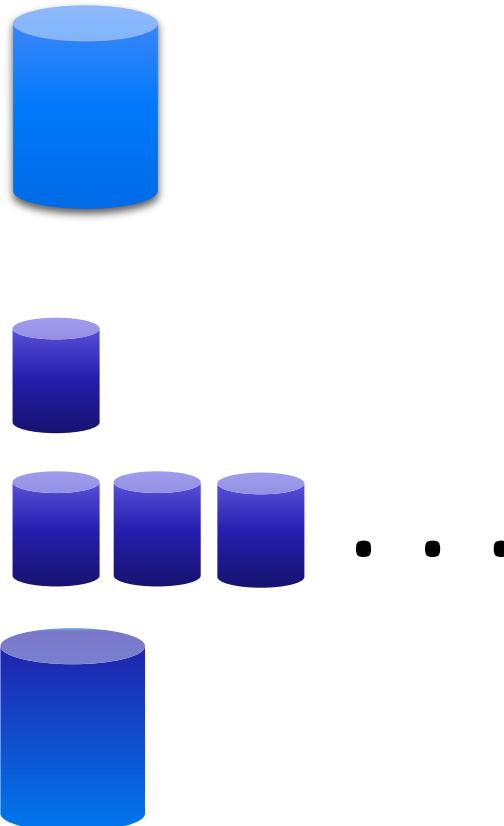
# Advanced Backup Features

- ✓ Automatically balance the usage of devices
- ✓ Back up shared disks
- ✓ Schedule unattended backups
- ✓ Combine full and incremental backups
- ✓ Allow backups to be organized in many different ways
- ✓ Back up to multiple locations simultaneously with object mirror functionality
- ✓ Support 16 different "integrations" with databases and other applications
- ✓ Supports VMware and Microsoft Hyper-V virtual environments.

# Backup Types

Type of backup depends on different factors: time, device, performance, and latency

- Full Backups
- Incremental Backups
  - Incr
  - Incr1-9
  - Differential



# High level view of a backup

Create  
Backup Specification



Save  
Backup Specification



Execute  
Backup Specification

1. Select the data sources on the Disk Agent clients.
2. Select the target backup devices that are connected to Media Agent clients.
3. Select how many additional backup copies to create (optional).
4. Change default settings (optional).
5. Decide when and how frequently the backup should run.
6. Save the configuration.
7. Execute Backup Specification (unattended via the scheduler)
8. Generate reports about performed backups (optional)

# Backup Specification

## Datalists

Backup specifications for backing up standard file systems

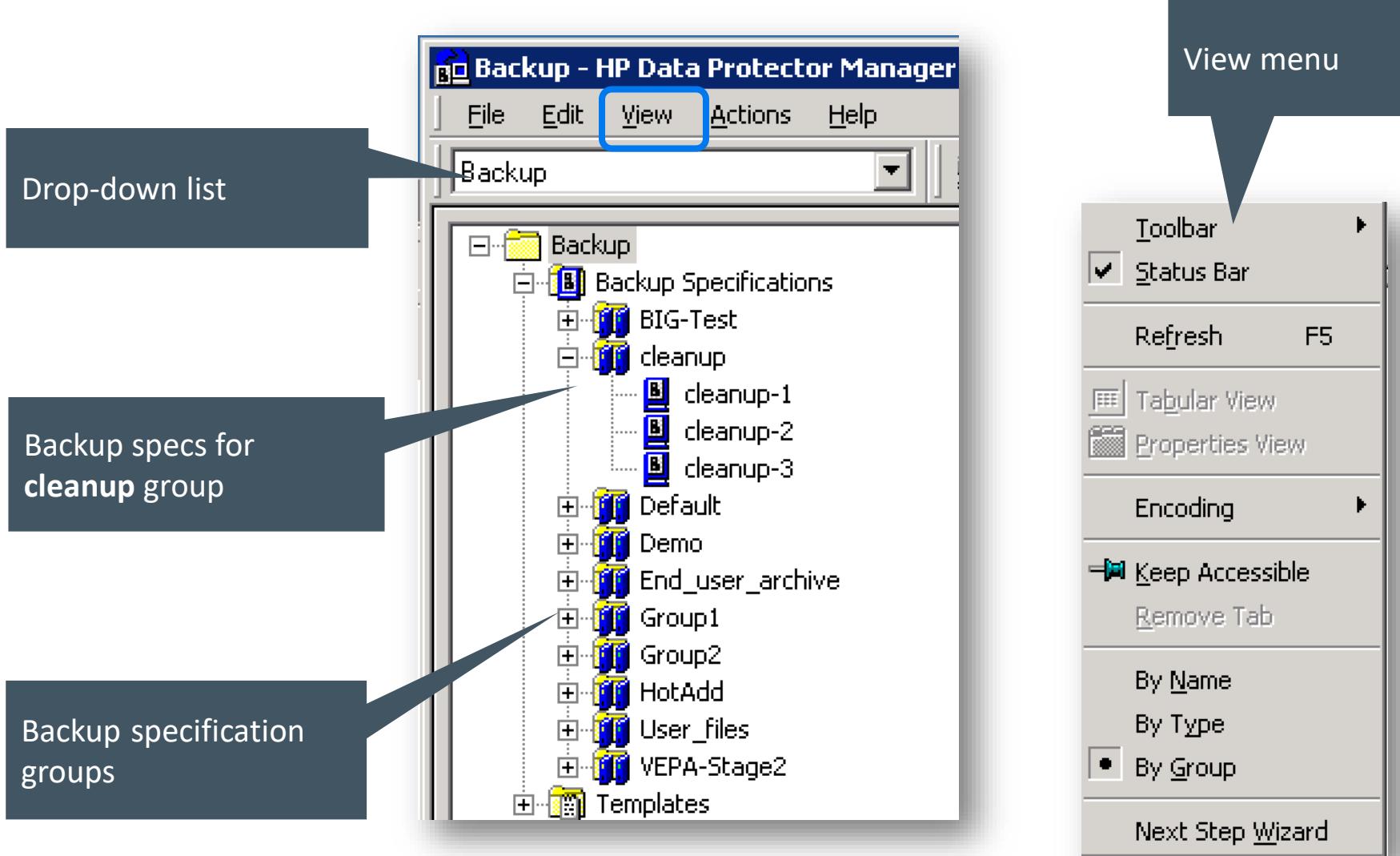
- Filesystem: UNIX or Windows
- Hosts (*expanded at runtime into file system objects*)
- Rawdisk/Disk Partitions
- DP Internal Database

## Barlists

Backup specs for backing up Applications and Databases online  
(integration specific agents)

- Oracle
- SAP
- MS Exchange
- MS Hyper-V
- VMware, ... and many others ...

# Backup specification groups



# Creating a backup specification

The screenshot shows the 'Backup - HP Data Protector Manager' interface. On the left, the 'Backup Specifications' node is selected in a tree view. A tooltip above the tree indicates: 'Right-click Backup Specifications Select Add Backup...'. On the right, a 'Default' configuration window is open. It lists various backup templates in a table:

Name	Application
Blank_Filesystem_Backup	Filesystem
Daily_Intentive	Filesystem
End_User_Archive	Filesystem
Monthly_Full	Filesystem
NT_NNM_template	Filesystem
Unix_NNM_template	Filesystem
Weekly_Full	Filesystem
Weekly_Full_Catalog_Two_Weeks	Filesystem
Weekly_Full_Log_Directories	Filesystem
Weekly_Full_Over_WAN	Filesystem

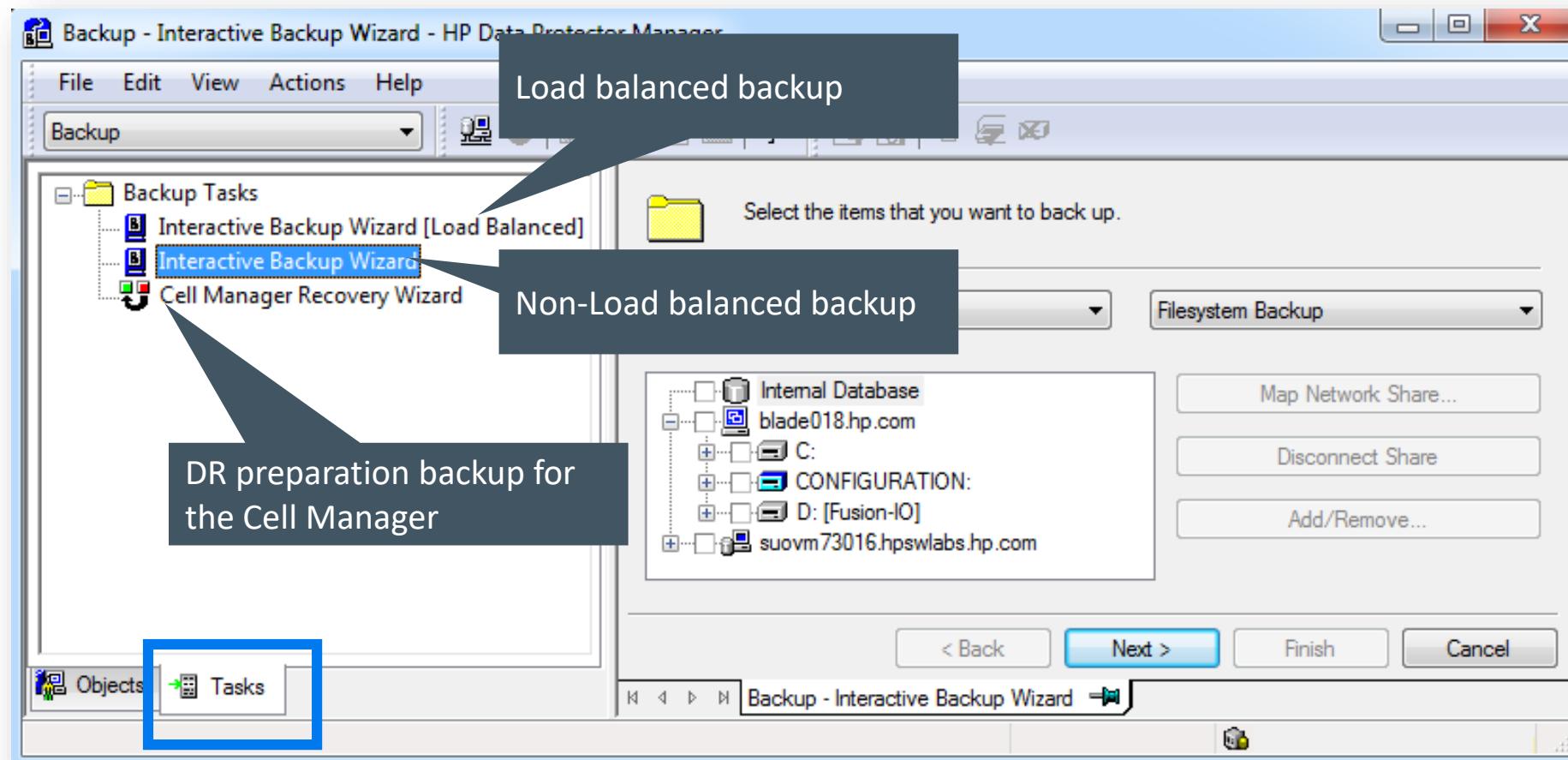
A tooltip next to the table says: 'Choose a template\* for a set of preconfigured options'. Below the table, under 'Backup options', there is a dropdown menu labeled 'Local or network backup'. A tooltip for this dropdown says: 'Default: Local or LAN Backup'. To the right of the dropdown, another tooltip says: 'Static or dynamic assigned devices'. On the far right of the window, there are several checked checkboxes: 'Destination', 'Backup specification', 'Filesystem', 'Force to defaults', and 'Trees'. At the bottom, there are checkboxes for 'Load balanced' and 'Source-side deduplication'.

**\* Template**

Store often-used backup specifics and schedule characteristics in a template to save time.

Then use the template to generate new backup specs.

# Creating a backup specification: Wizards



# Creating a backup specification: Sources

Back up multiple hosts via one backup specification

Choose different data to back up for each host (different color codes)

## 1. Full host directly selected:

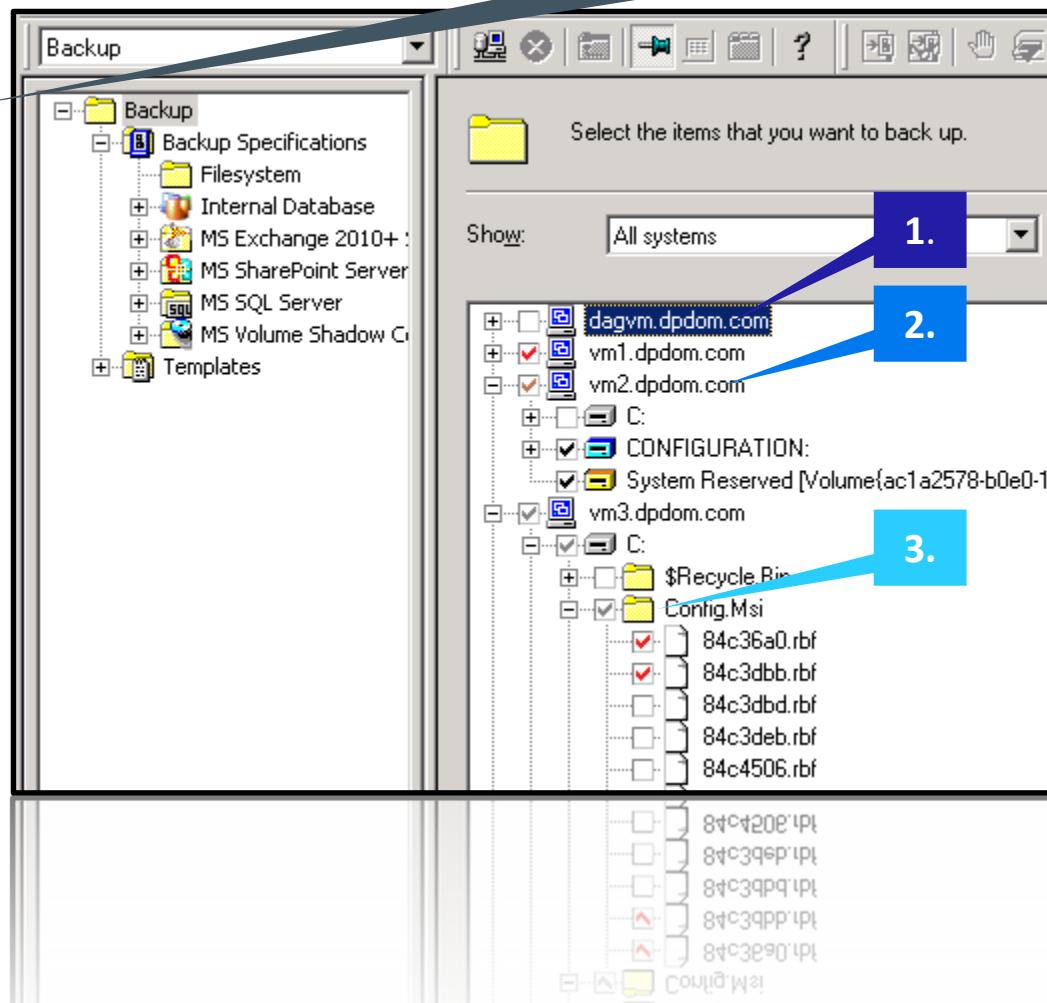
- Primary Selection: Red
- Secondary Selection: Black

## 2. Full host selected, but one or more object de-selected:

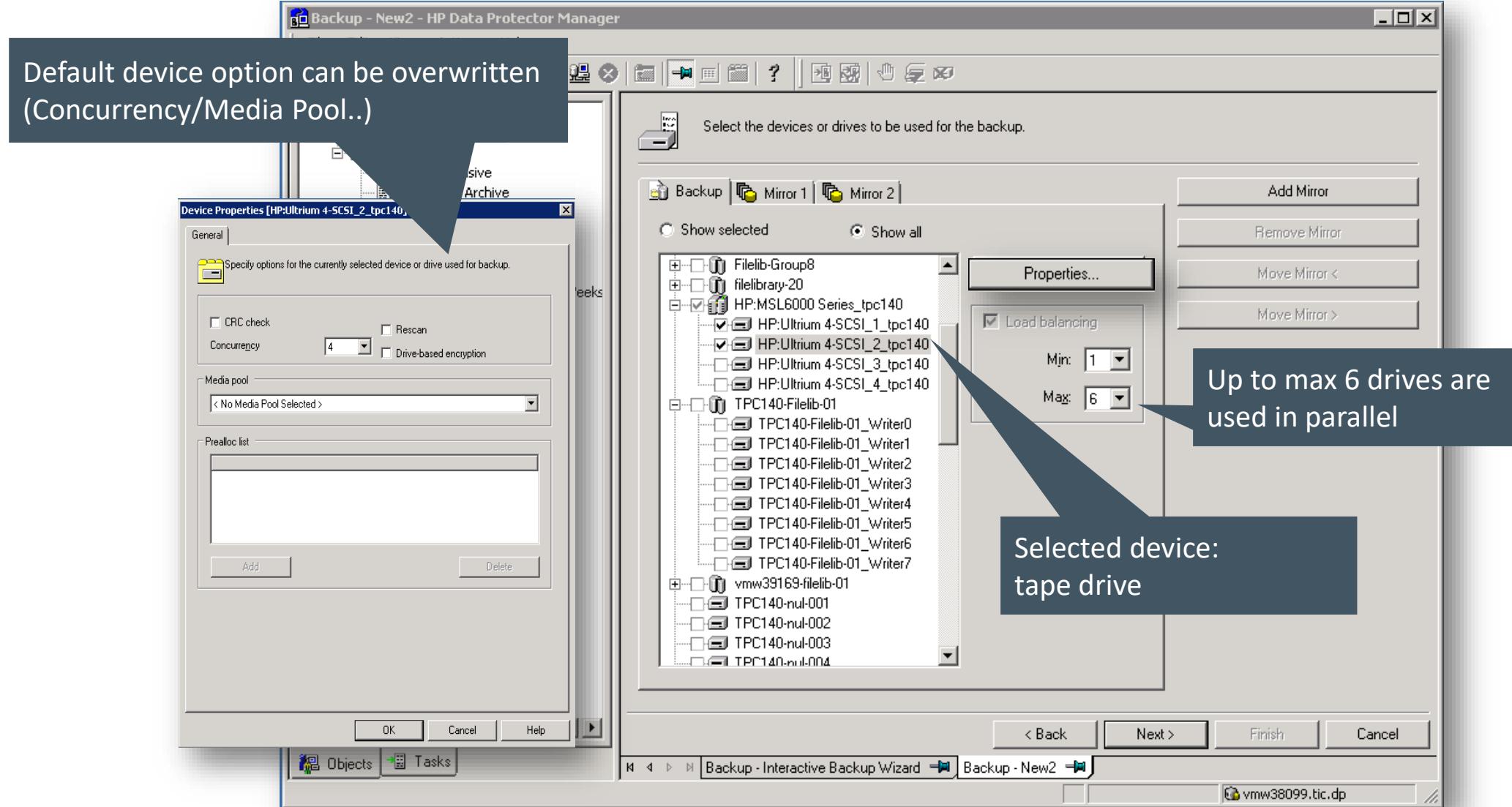
- Partial Primary Selection: Brown
- Secondary Selection: Black

## 3. Single files explicitly selected:

- Primary Selection: Red
- Partial Secondary Selection: Grey

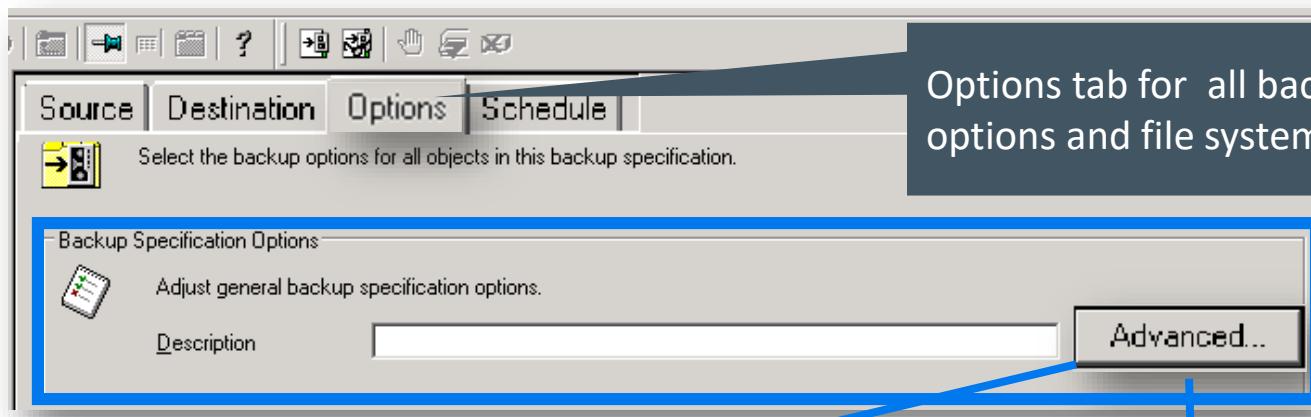
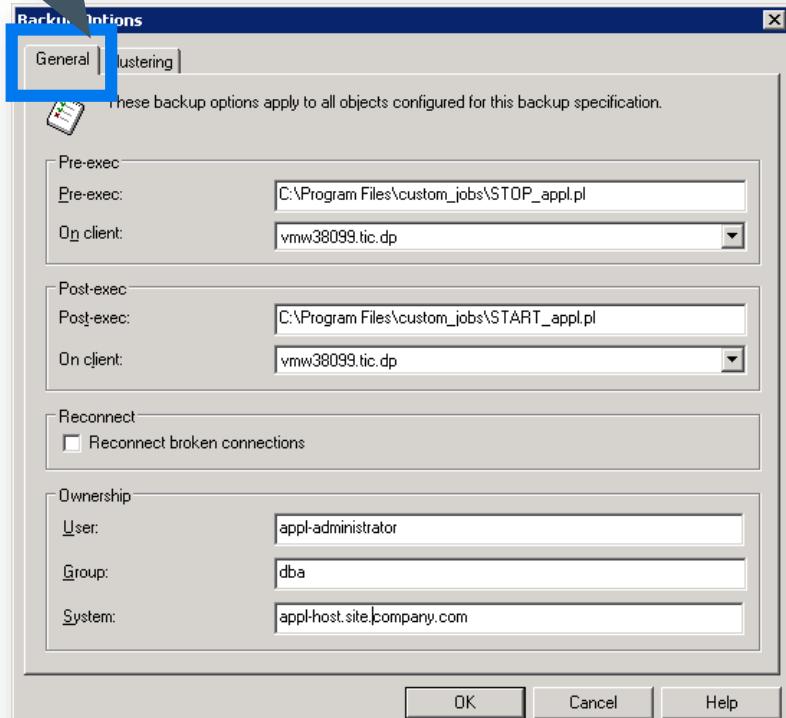


# Creating a backup specification: Destination

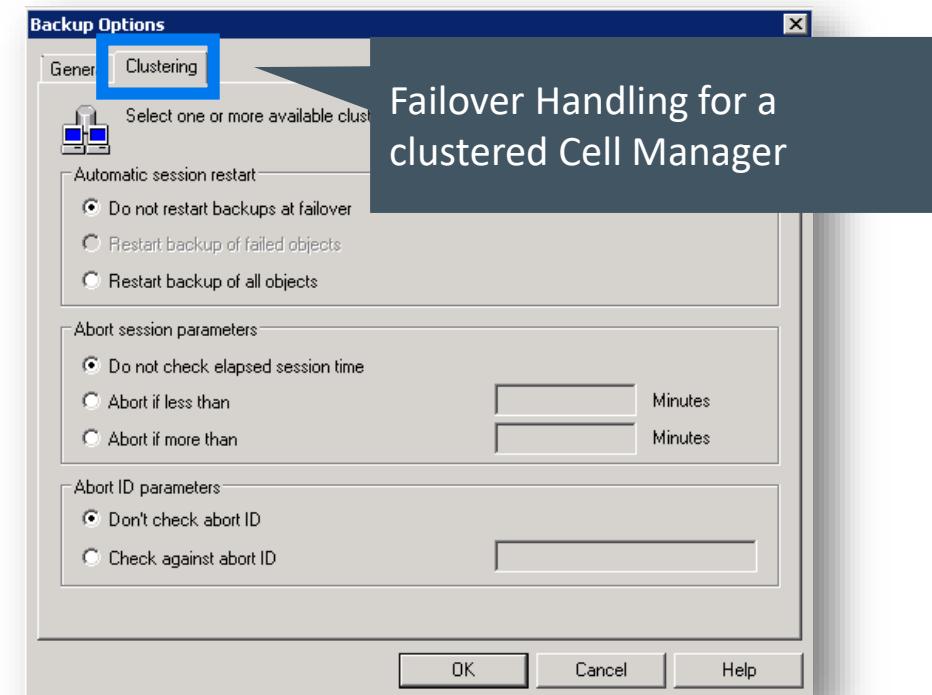


# Creating backup specification: Options

Define Pre- and Post-exec scripts for this backup specification



Options tab for all backup specification options and file system options



Failover Handling for a clustered Cell Manager

# Next Generation Scheduler

- Web UI
- Scheduler Tasks: Specification, Type, Options, Recurrence, Summary

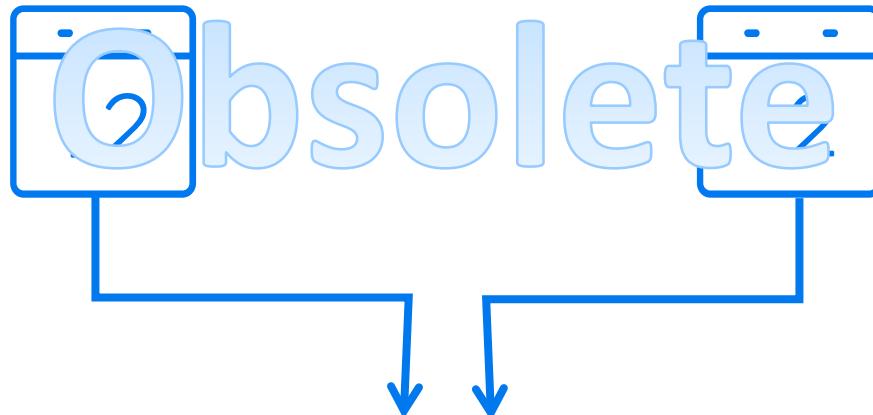
# Next Generation Scheduler

Web-based Scheduler replaces Basic & Advanced Scheduler

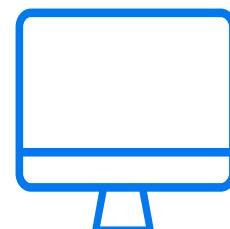
Basic Scheduler



Advanced Scheduler



New Web-based Scheduler

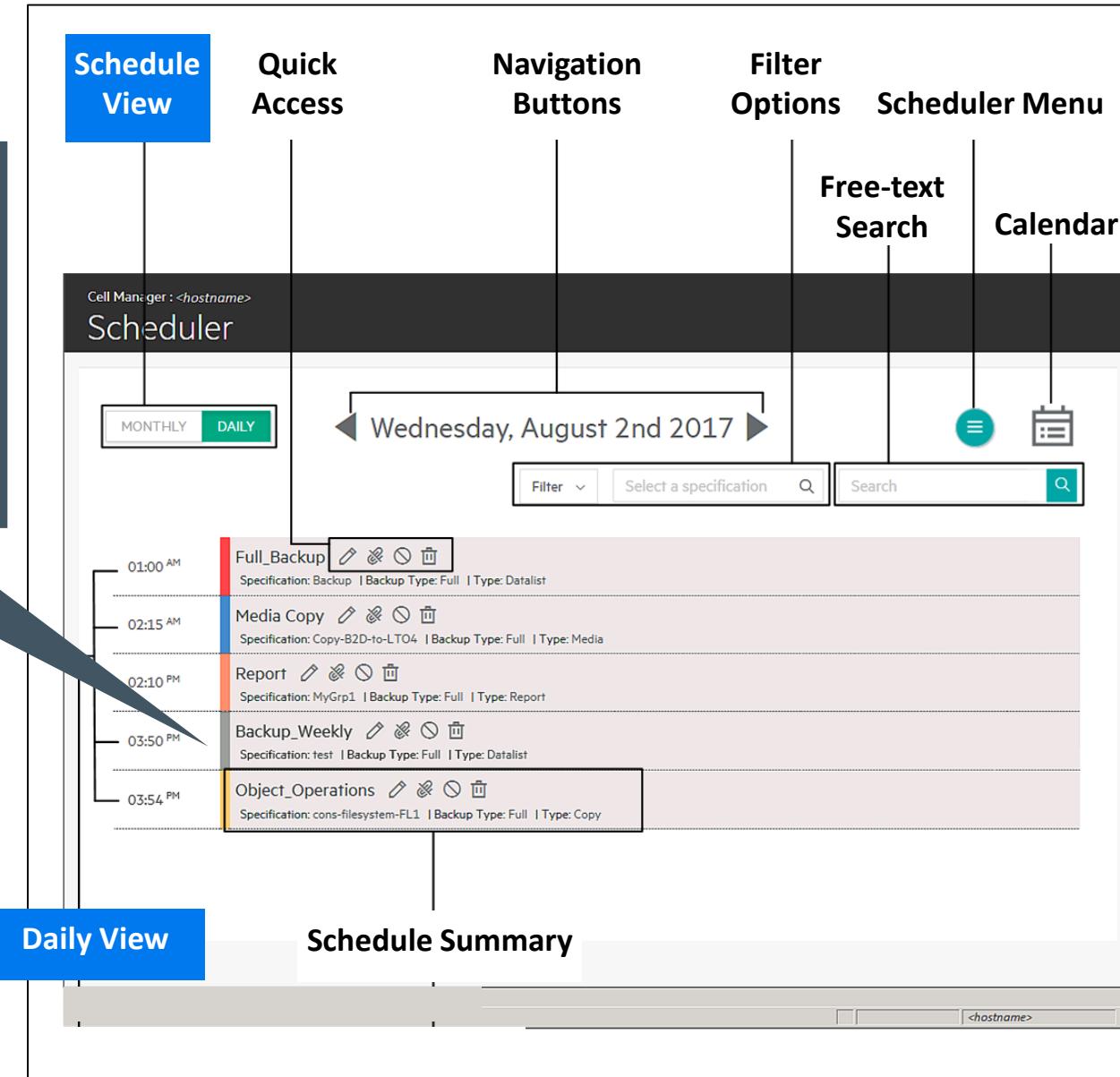


- Web UI
- Wizard for easy schedule management
- Operation automation
- Unattended backup execution of operations

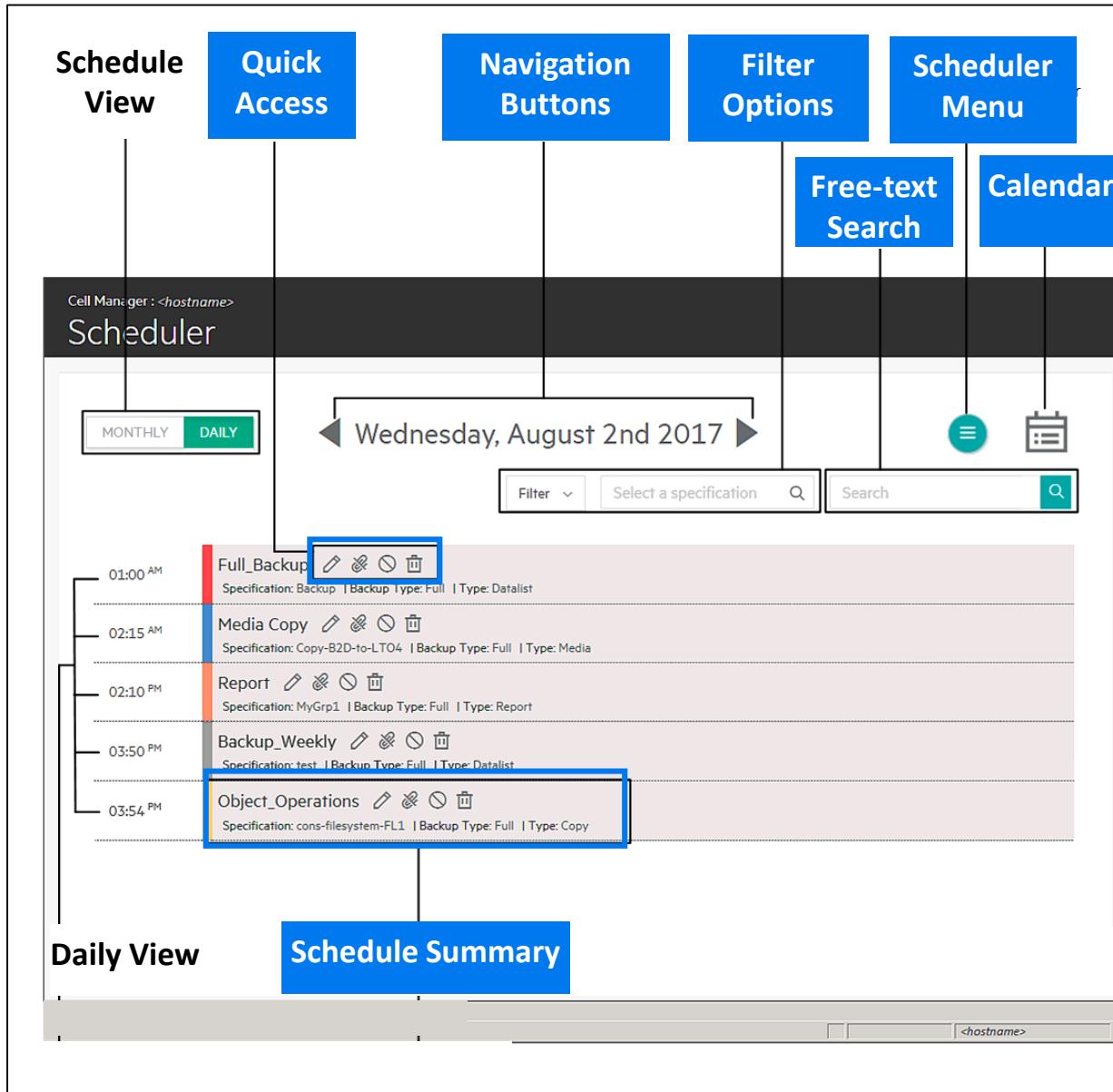
# Next Generation Scheduler: UI

**SCHEDULE COLOR CODING:**

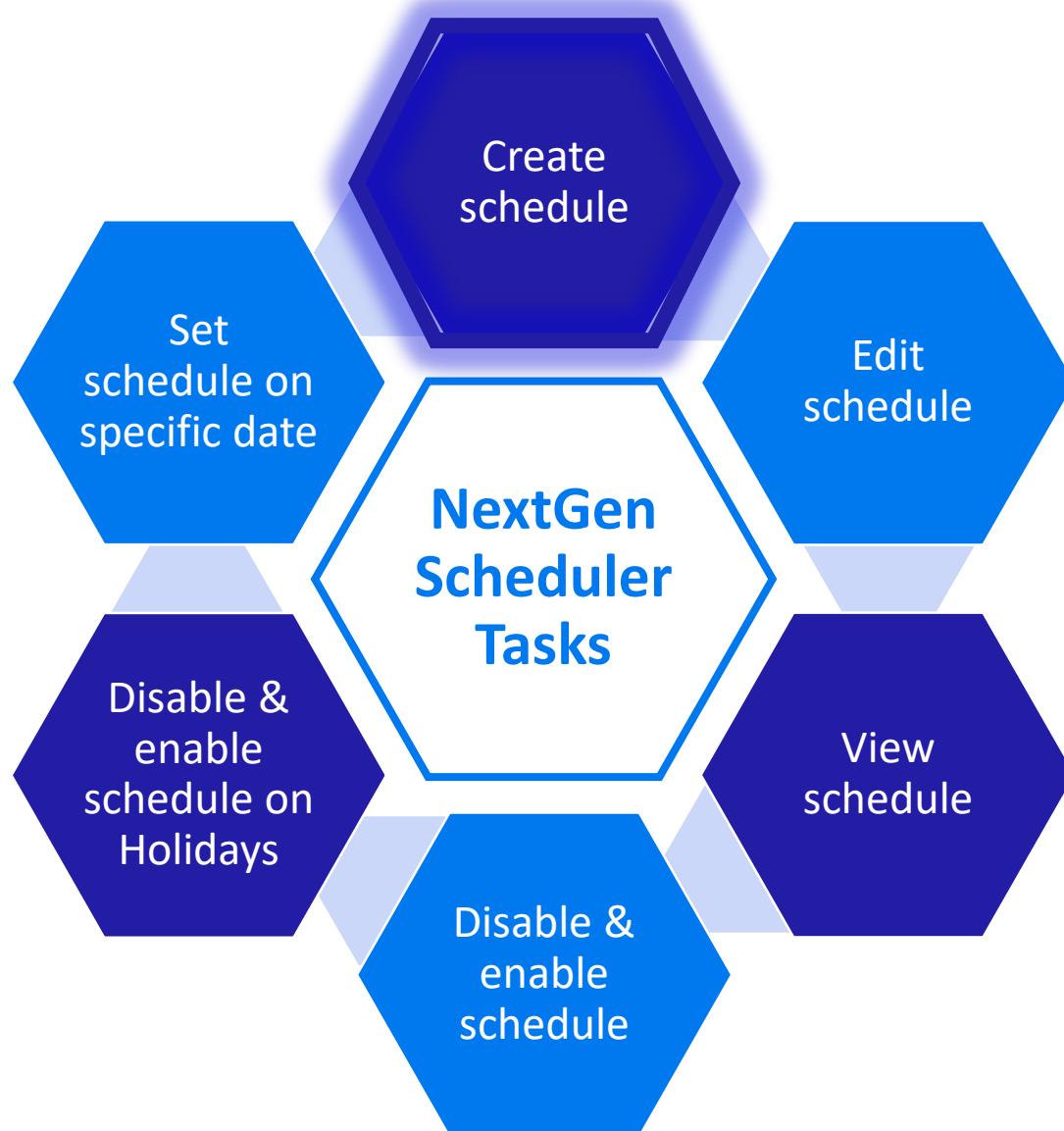
- **Red** = Datalist
- **Blue** = Media Operation
- **Orange** = Report
- **Yellow** = Copy operation
- **Gray** = Disabled Schedule



# Next Generation Scheduler: Quick Access Icons



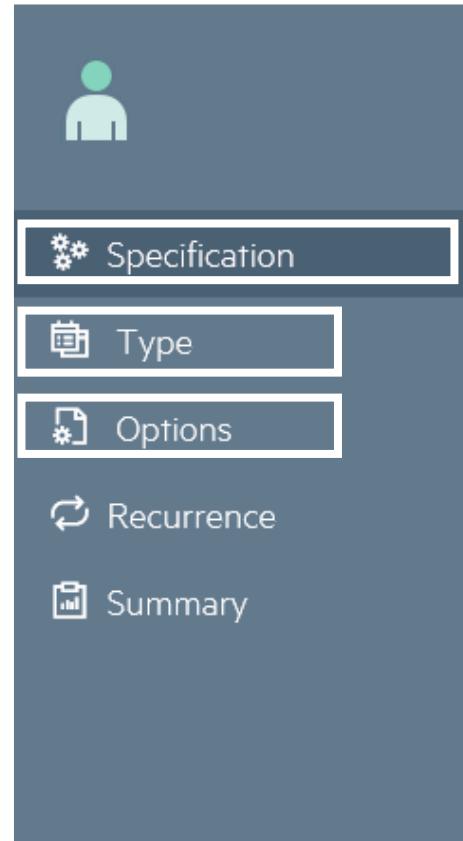
# Next Generation Scheduler Tasks



# Next Generation Scheduler: Specifications and Type

Pre-defined or custom schedule

Full or incremental backup



## Schedule

- >  Backup Specification
- ▽  Object Operation
- ▽  Consolidation
  - cons-filesystem-FL1
  - cons-filesystem-FL2
- ▽  Copy
  - copy-filesystem-FL1
  - copy-filesystem-FL2
- >  Verification
- >  Report
- >  Media Copy
- >  Templates

← Apply template to a specification

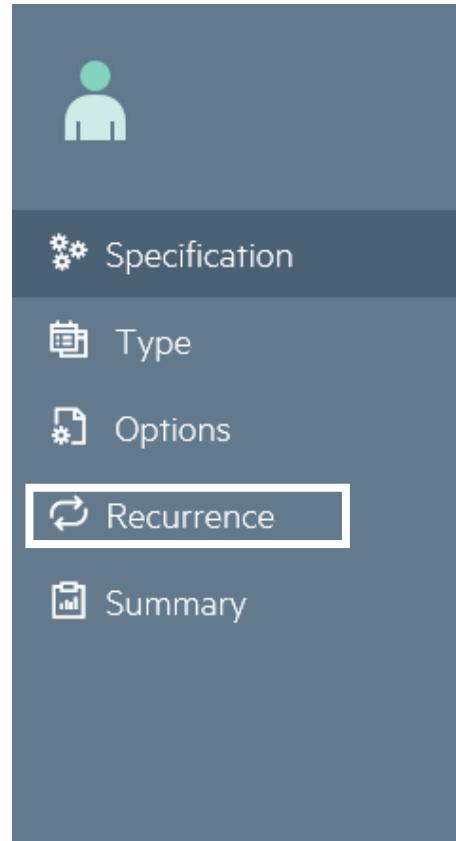
► For More Details: See Administrator's Guide, Chapter 10

# Next Generation Scheduler: Options

## Protection Level

- 1** **None:** Provides no protection.
- 2** **Default:** Info in the IDB about backed up data is protected as long as data is protected.
- 3** **Until:** Info in the IDB cannot be overwritten until noon of the specified date.
- 4** **Days:** Info in the IDB cannot be overwritten for X days.
- 5** **Weeks:** Info in the IDB cannot be overwritten for X weeks.
- 6** **Permanent:** Info in the IDB is available permanently.

# Next Generation Scheduler: Recurrence



## Schedule

- >  Backup Specification
- ✓  Object Operation
  - ✓  Consolidation
    - ✓ cons-fs-FL1
    - ✓ cons-fs-FL2
  - ✓  Copy
    - ✓ copy-fs-FL1
    - ✓ copy-fs-FL2
- >  Verification
- >  Report
- >  Media Copy
- >  Templates

- 1 **Once:** specific date
- 2 **Daily:** recurring every X days
- 3 **Weekly:** recurring on certain day of every X weeks
- 4 **Monthly:** recurring on a certain day of every X months
- 5 **End of Recurrence:** specify an end date, if any

► **For release 10.0:** You cannot select hourly backups using the GUI. You must use the REST API in the Scheduler APIs.

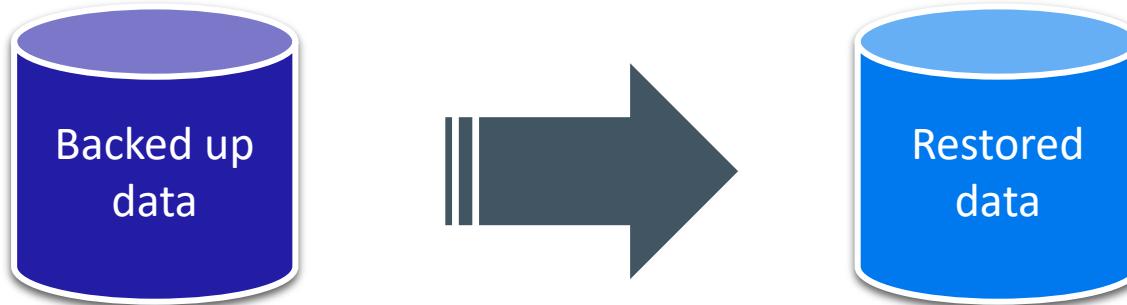
# Restore

- Advanced Features
- Restore Methods
- Restore Sequence
- Restore Tabs: Objects, Session, Restore by Query, Source, Properties, Destination, Options, Media, Copy, Summary

# Restore

## Advanced features of Data Protector restore

**Definition:** Process of re-creating the original data from a backup copy in its original location or a specified location.

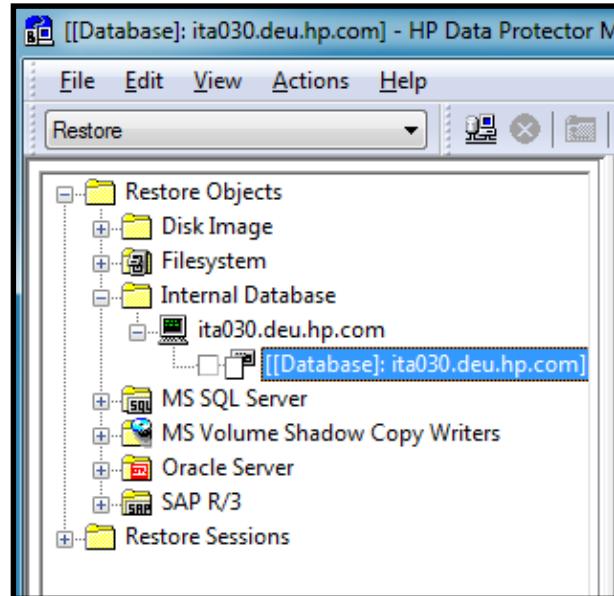
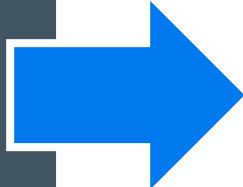


- ✓ Restore data on different levels: session, client, object, directory, specific file, or specific file version
- ✓ Specify an alternative location to restore your data
- ✓ Cross-platform restore (for example, data backed up on UNIX and restored on Windows)
- ✓ Parallel restore of multiple objects from a session, on a client, or in a cell

# Restore methods

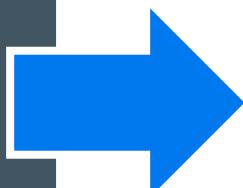
## Restore using the GUI

- by object
- by session
- by query



## Restore using the Command Line Interface (CLI)

- omnir command interactive
- started by a script



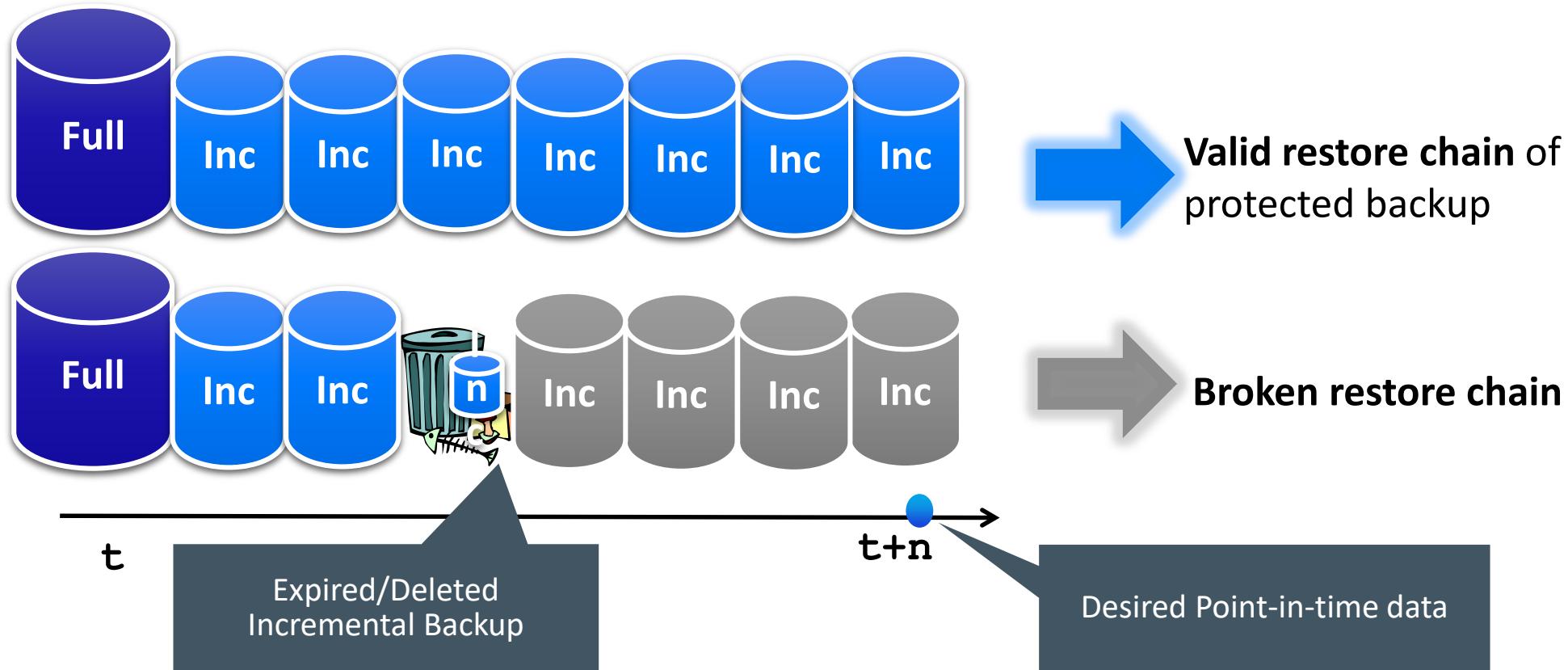
```
D:\Program Files\OmniBack\bin>omnir
Usage synopsis:
omnir -version | -help
omnir SessionOptions [-noexpand] Object [Object .... ]
SessionOptions
-[no_]preview
-report { warning | minor | major | critical }

FILESYSTEM RESTORE
=====
Object
--filesystem | -winfs | -netware > Host:MountPoint Label
--session SessionID [-copyid CopyID]
--tree TreeName...
[DATA_OPTIONS]
[FILESYSTEM_OPTIONS]
[GENERAL_OPTIONS]
[SPLIT_MIRROR_OPTIONS]
```

# Restore prerequisites

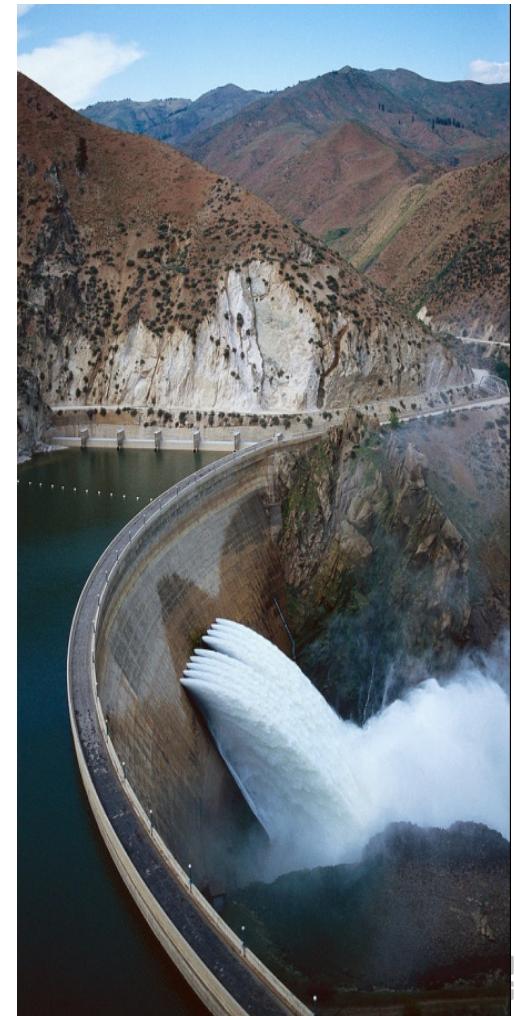
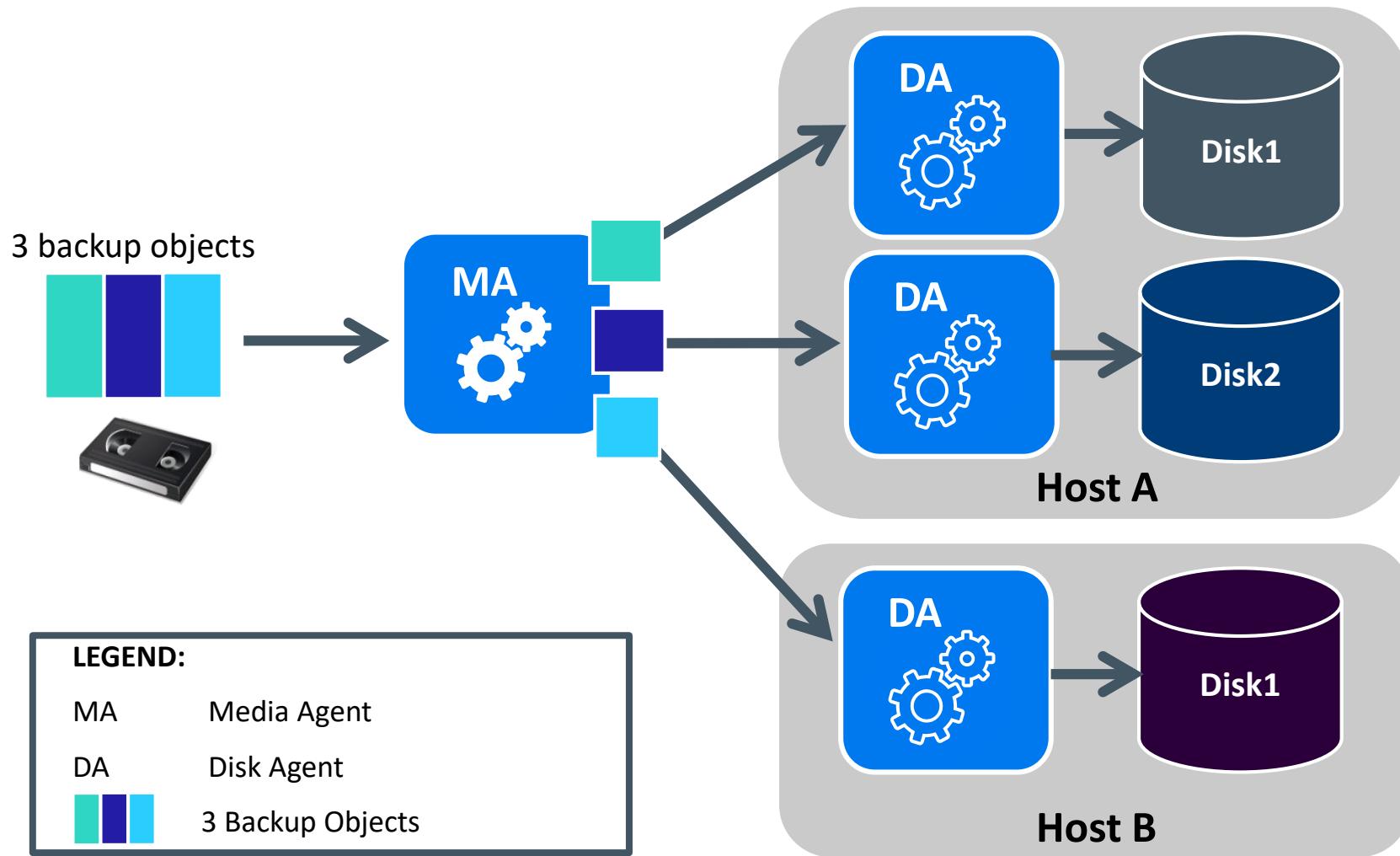
Successful backup requires:

- Appropriate user rights to perform a restore task (defined according to user group)
- Valid, protected, available backup data AND valid restore chain

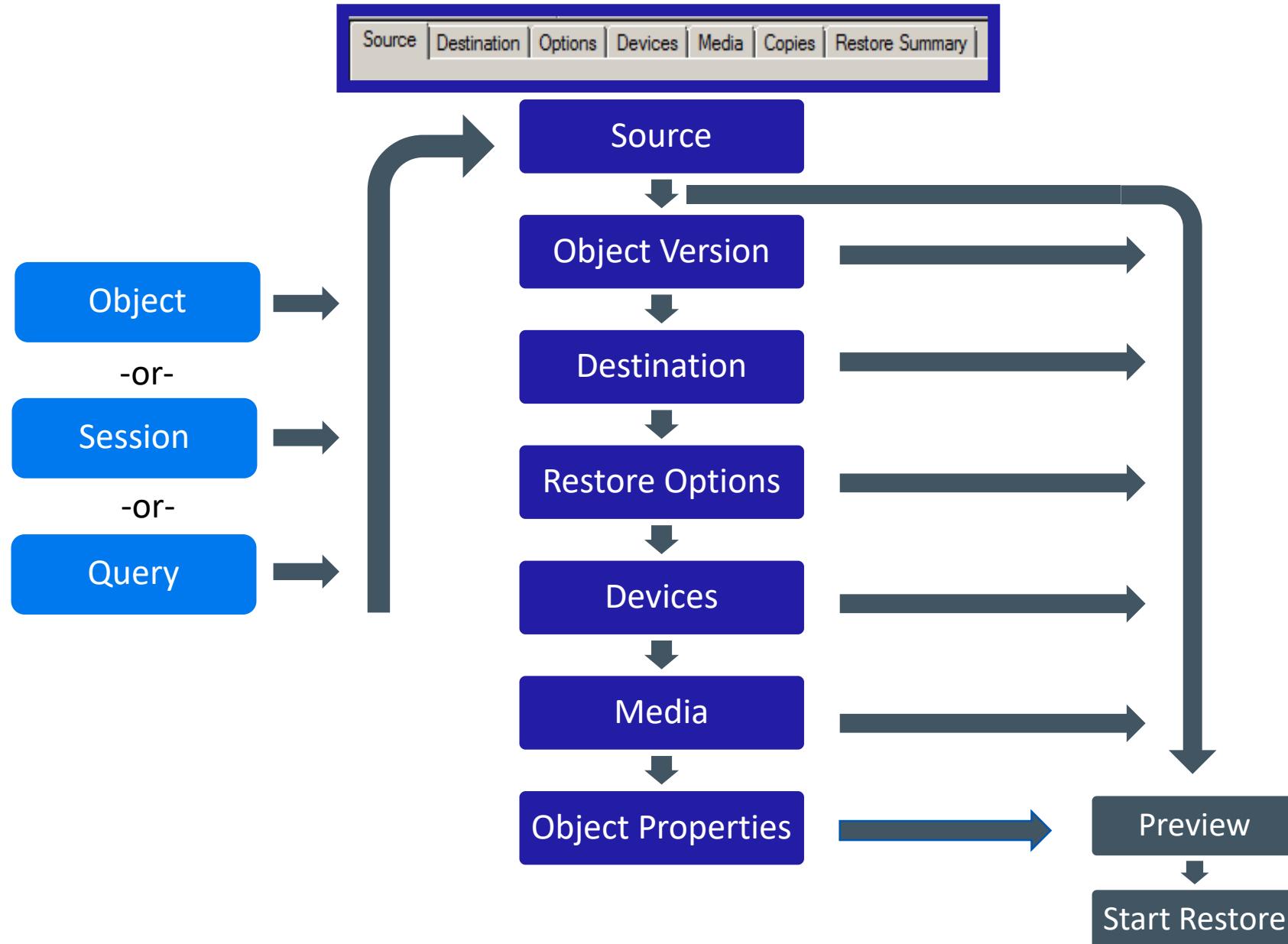


# Concept of Parallel Restore

Restore backed up data to multiple disks at the same time by running multiple Disk Agents that receive data from one Media Agent.



# Data Protector's Restore Sequence



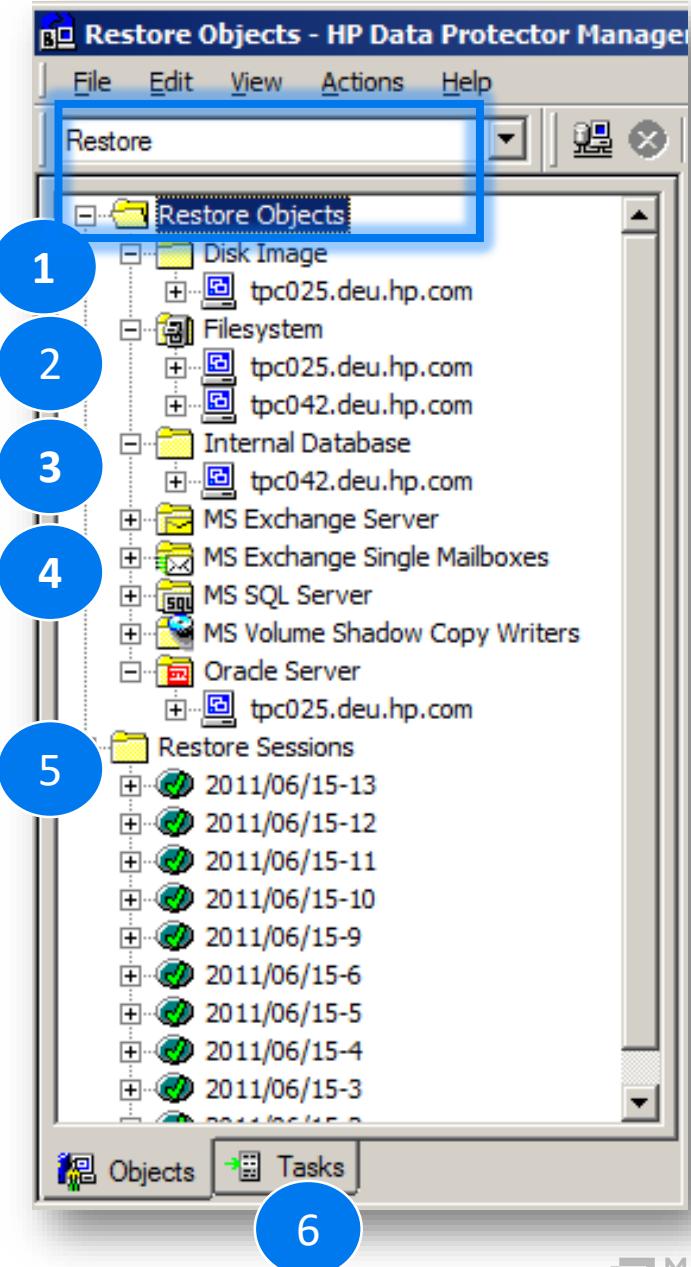
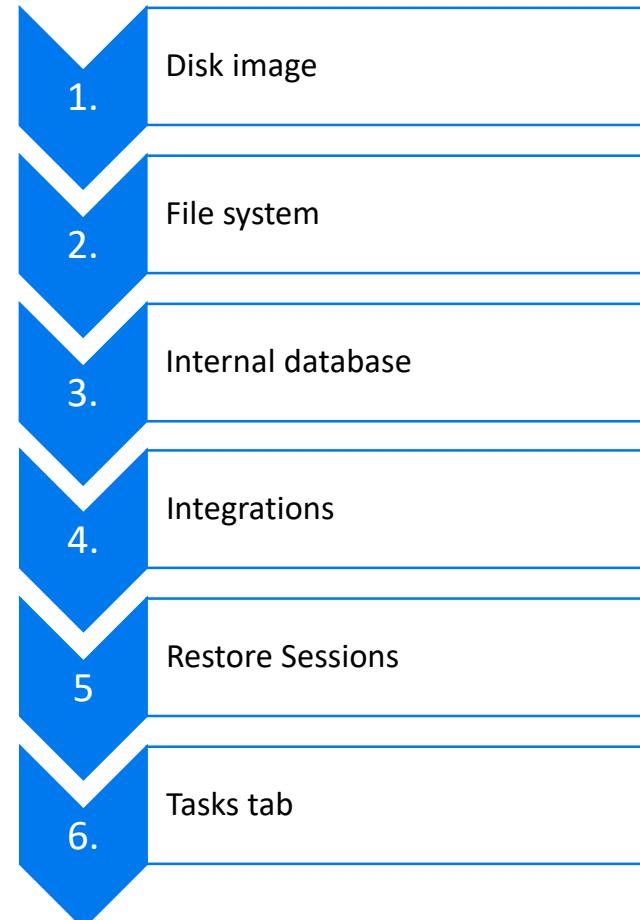
# Restore: Objects

These objects are show up for a Restore:

- Disk Image
- Filesystem
- Internal Database

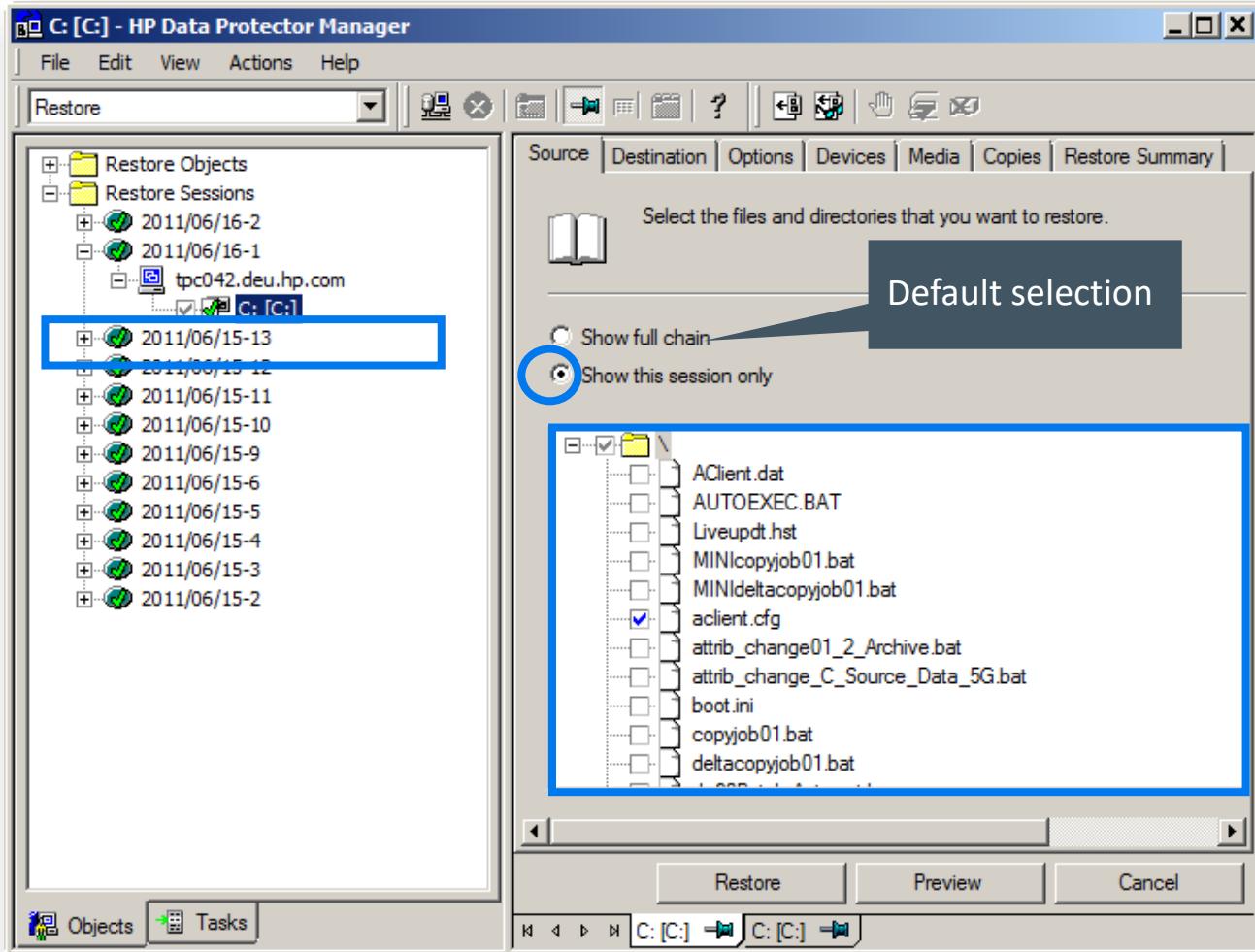
Integration objects only show up if when client has an Integration Agent installed. For example:

- MS SQL Server
- Oracle Server



# Restore: Select session

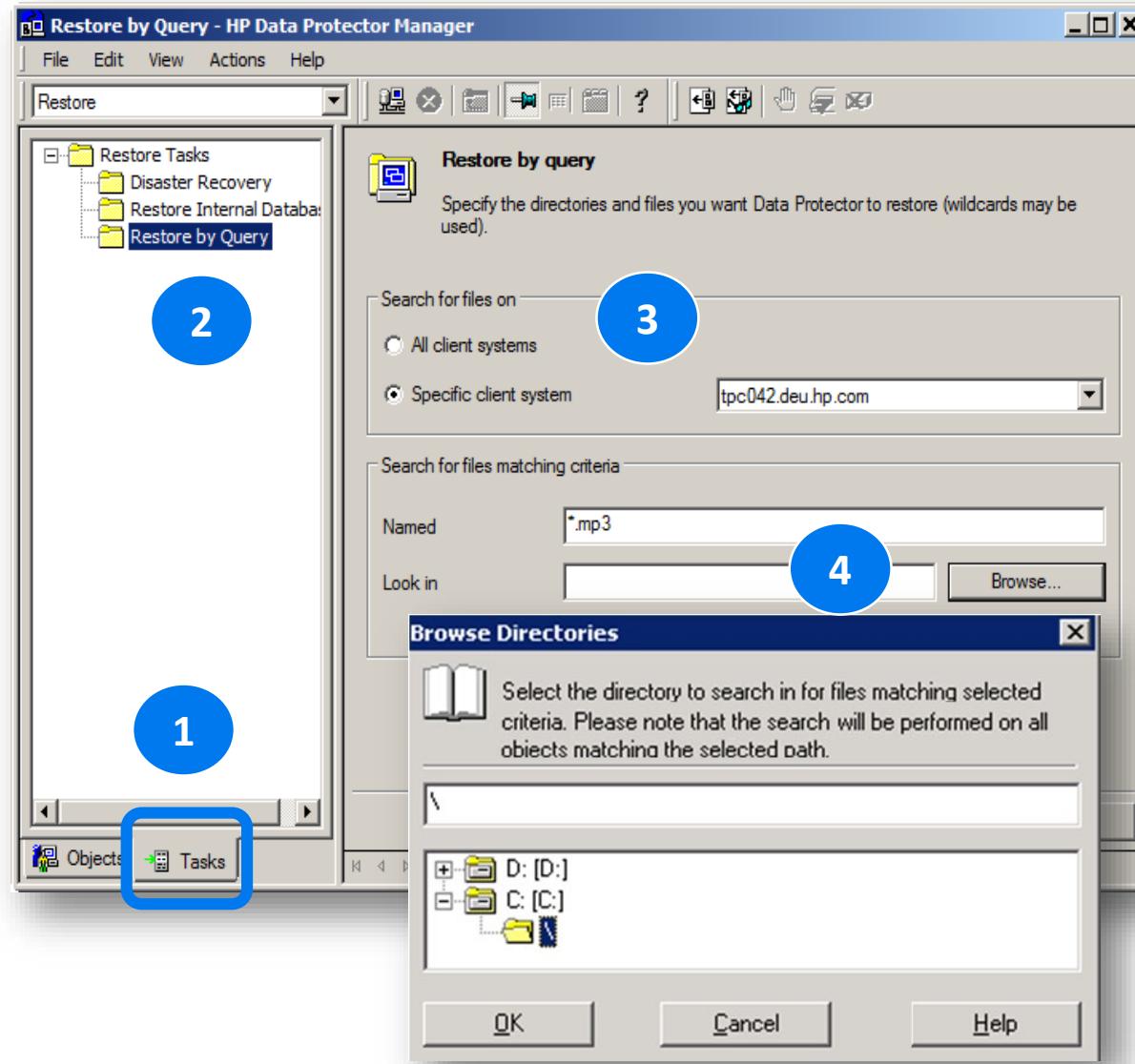
- Restore objects from a single backup session
- Exclude individual objects
- High degree of restore control for each object



# Restore by Query: name & location

Search for files and directories to restore them when you know part of the file name

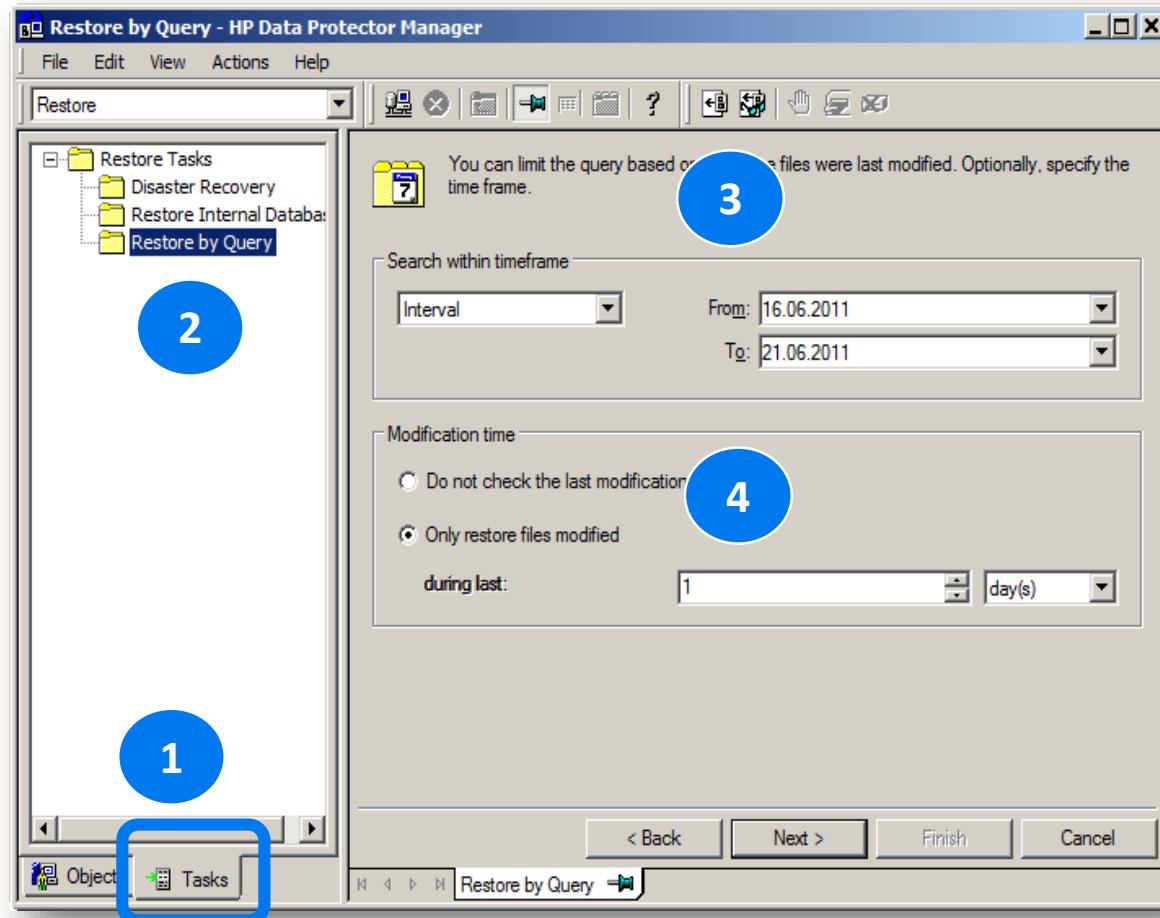
1. Select **Tasks** tab
2. Click **Restore by Query** for Query wizard
3. Select Search location for system
4. Browse directories for file and directory details



# Restore by Query: Backup or modification time

Limit the query based on WHEN the files were backed up or modified

1. Select **Tasks** tab
2. Continue within Query Wizard
3. Select Search timeframe
4. Specify if files were modified within the timeframe



# Restore: Source

1. Select **Source** tab

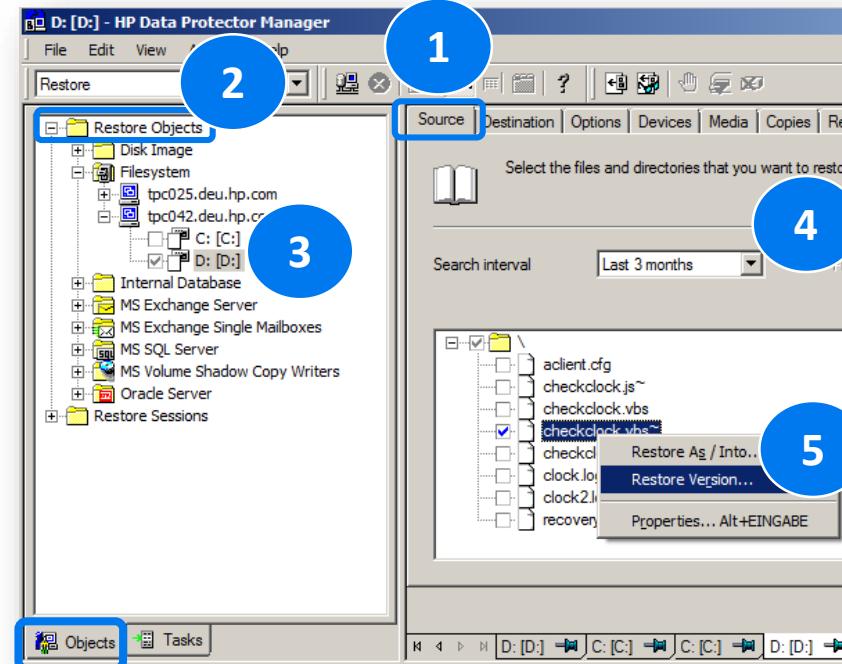
2. Select from **Restore Objects** or **Restore Sessions**

3. Select object to prepare properties

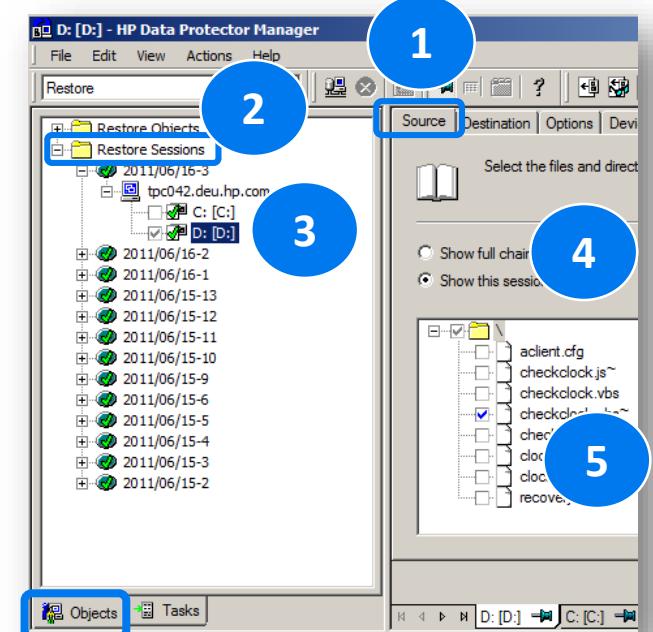
4. Select time interval to browse for backup object versions

5. Configure properties for object

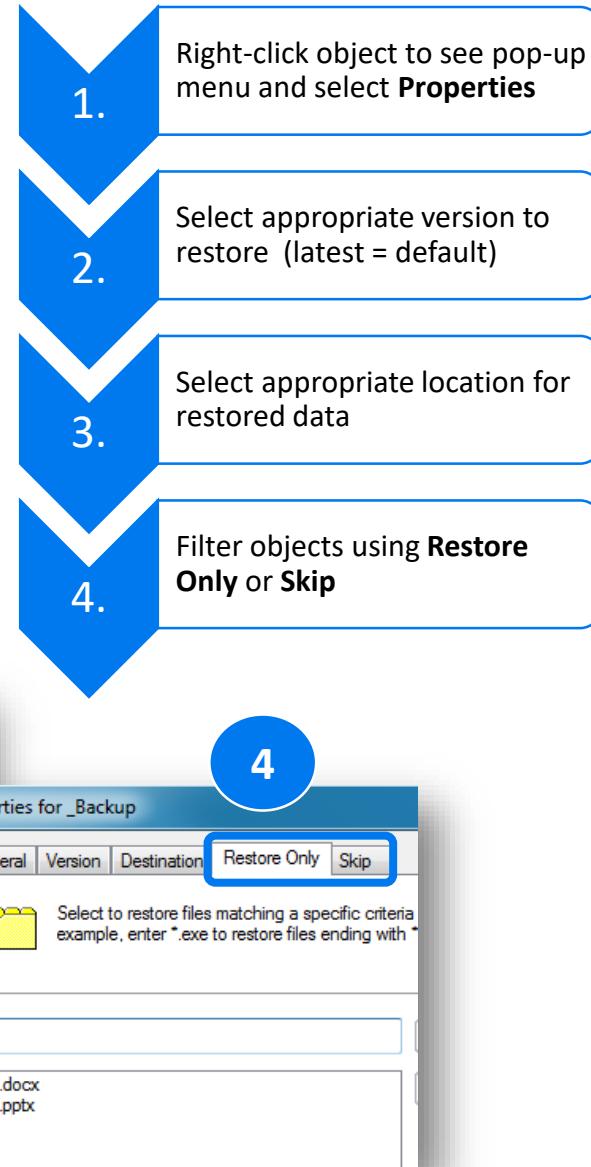
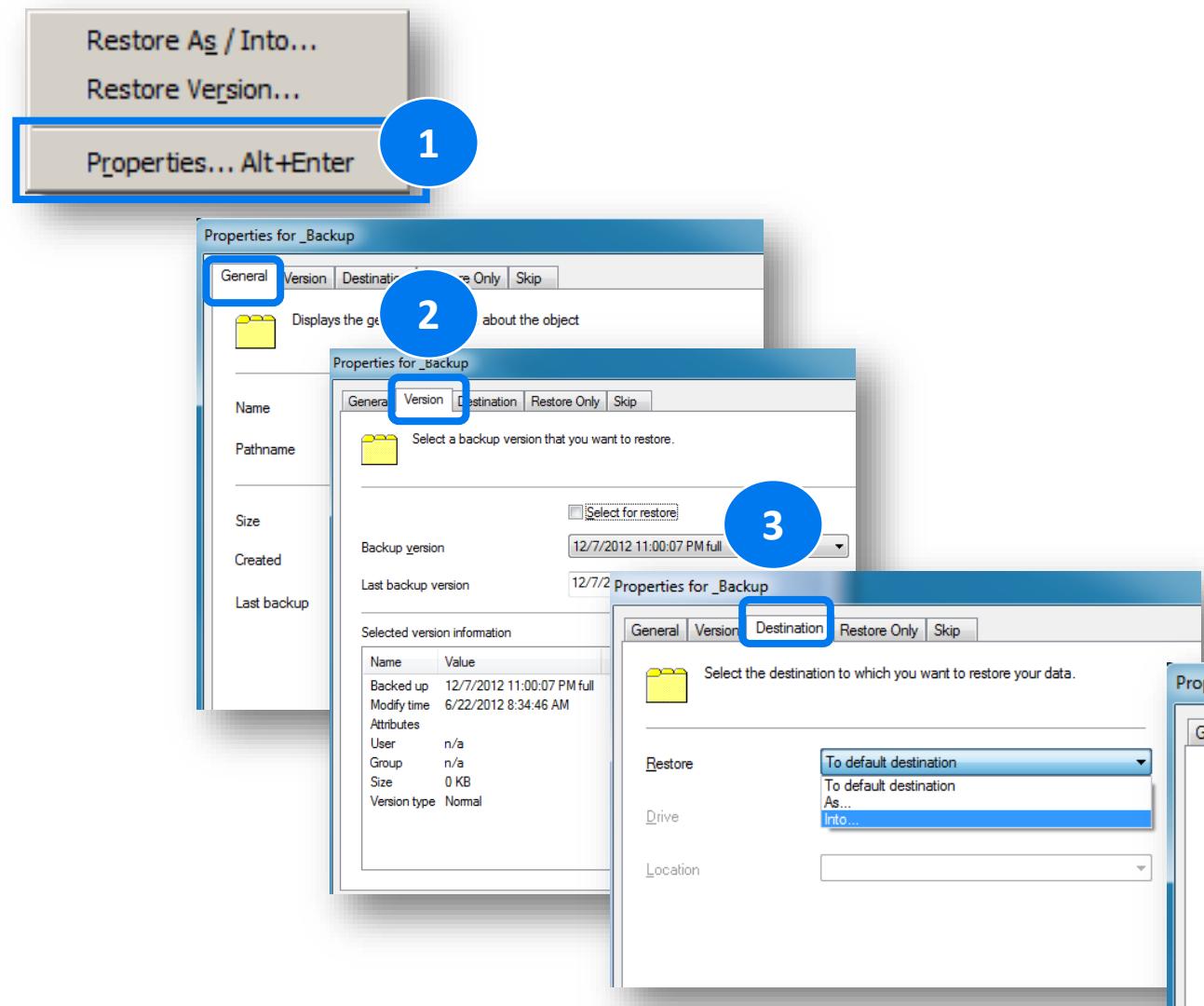
## Example 1: Restore Objects



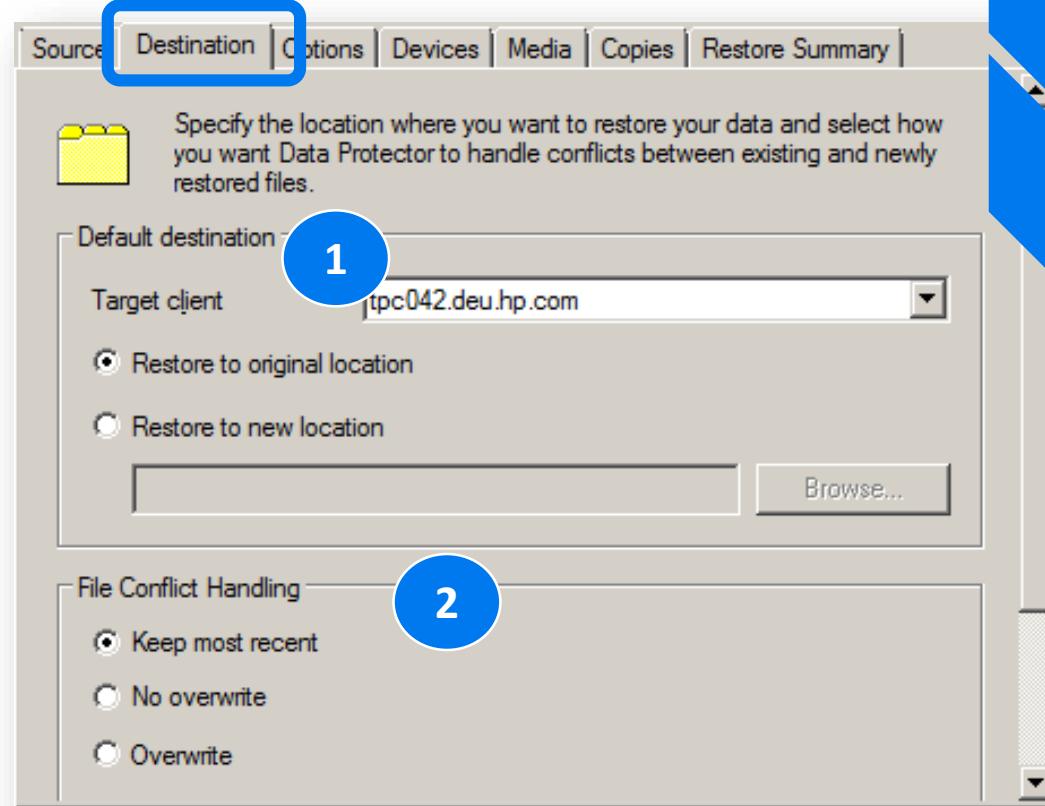
## Example 2: Restore Sessions



# Restore: Object properties



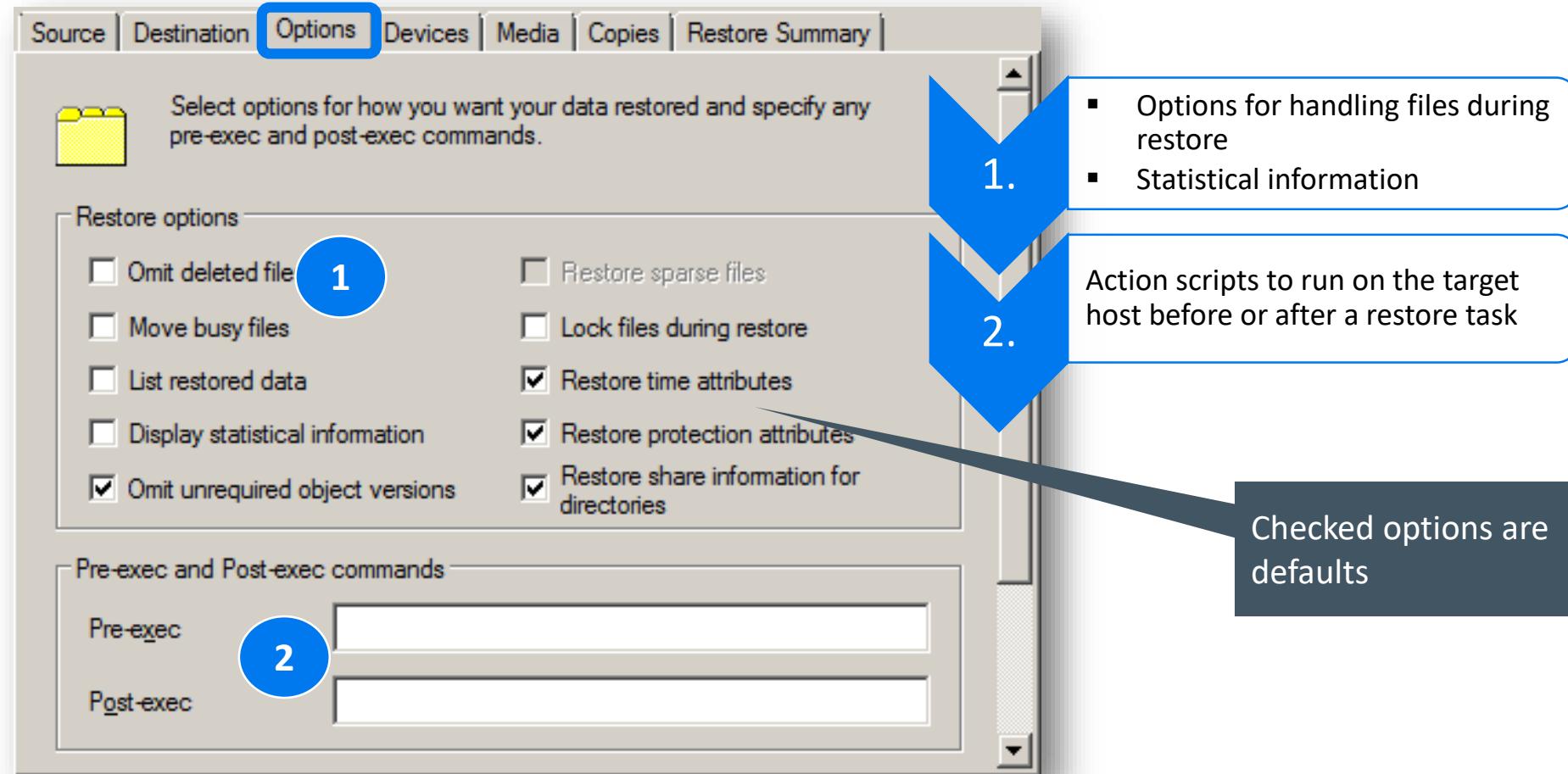
# Restore: Destination



1.
  - Default destination = Original location (same Client)
  - New location = any DA Client or Cell

2. Decide how to handle data conflicts

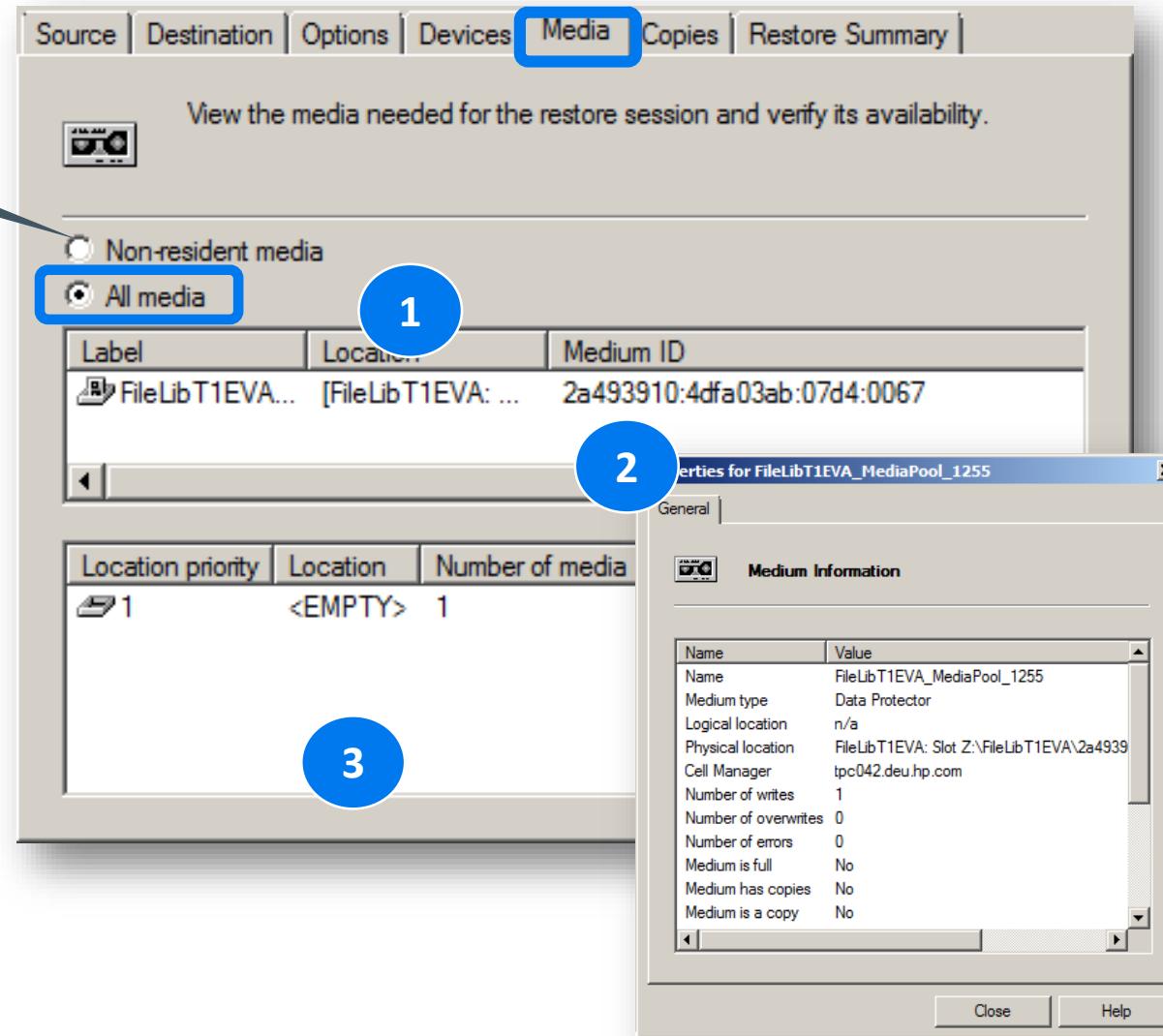
# Restore: Options



# Restore: Media

Make sure listed media are available during restore

Media kept outside  
a library



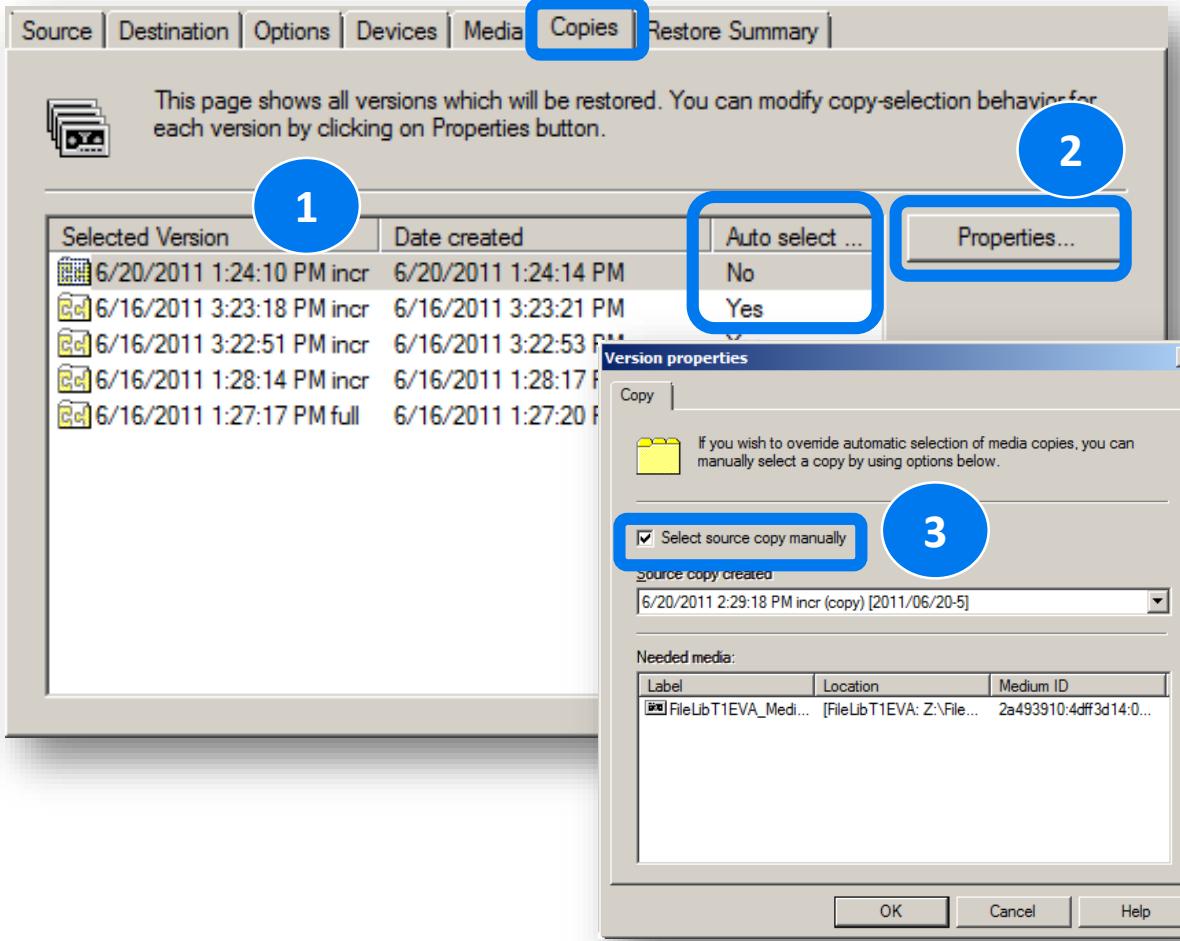
Select **All media** to view media used for restore

Right-click media to view its properties

Influence default media set selection

# Restore: Media/object copies

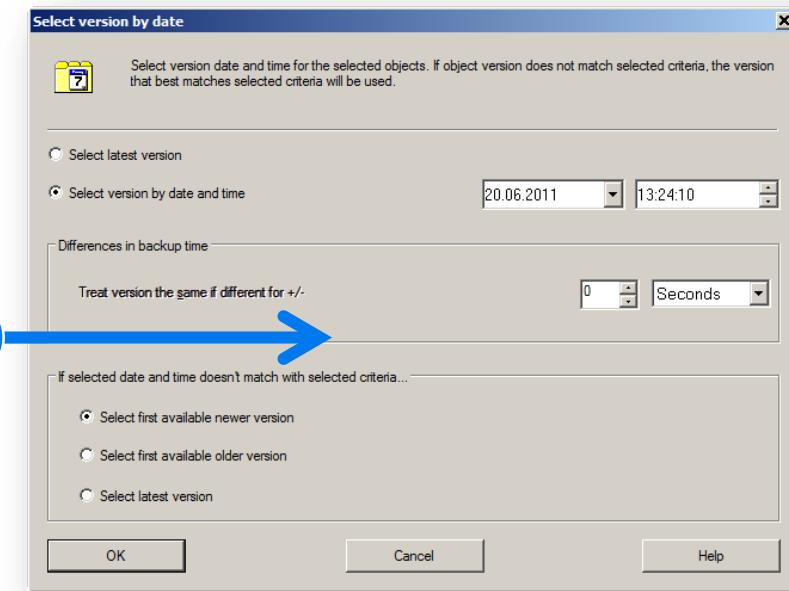
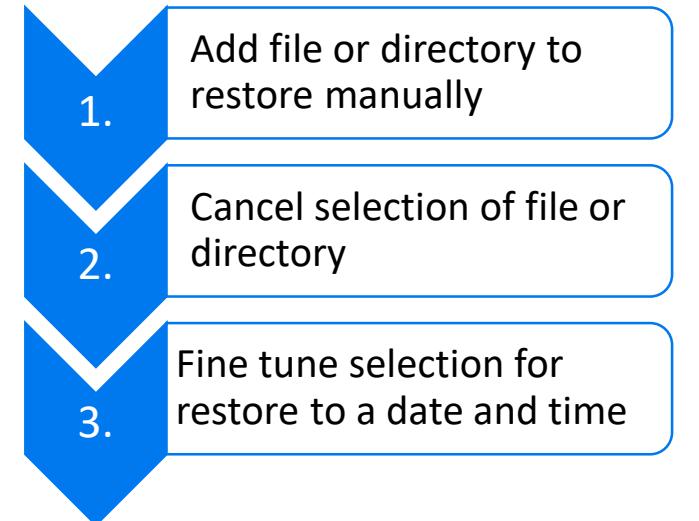
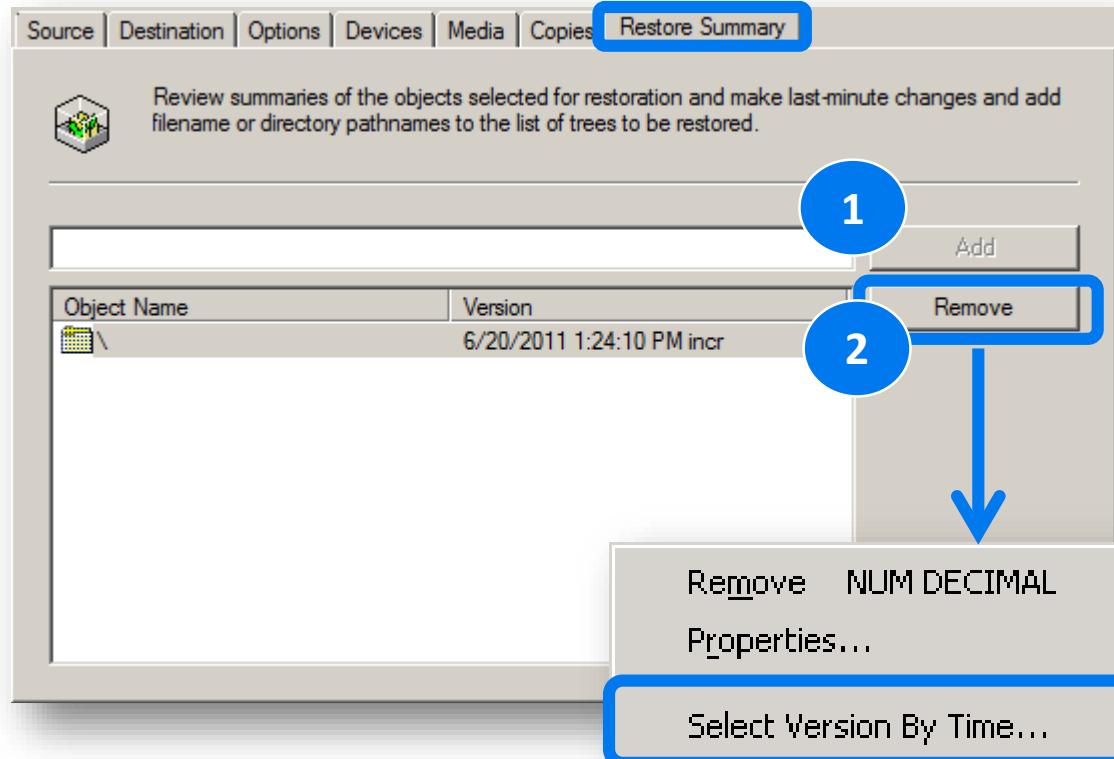
Modify automatic copy selection behavior for each object version



1. Select object version to restore from a copy
2. Click **Property** to view version properties
3. CAREFUL! Selected source option overrides standard selection

# Restore: Summary

## Allow last-minute changes



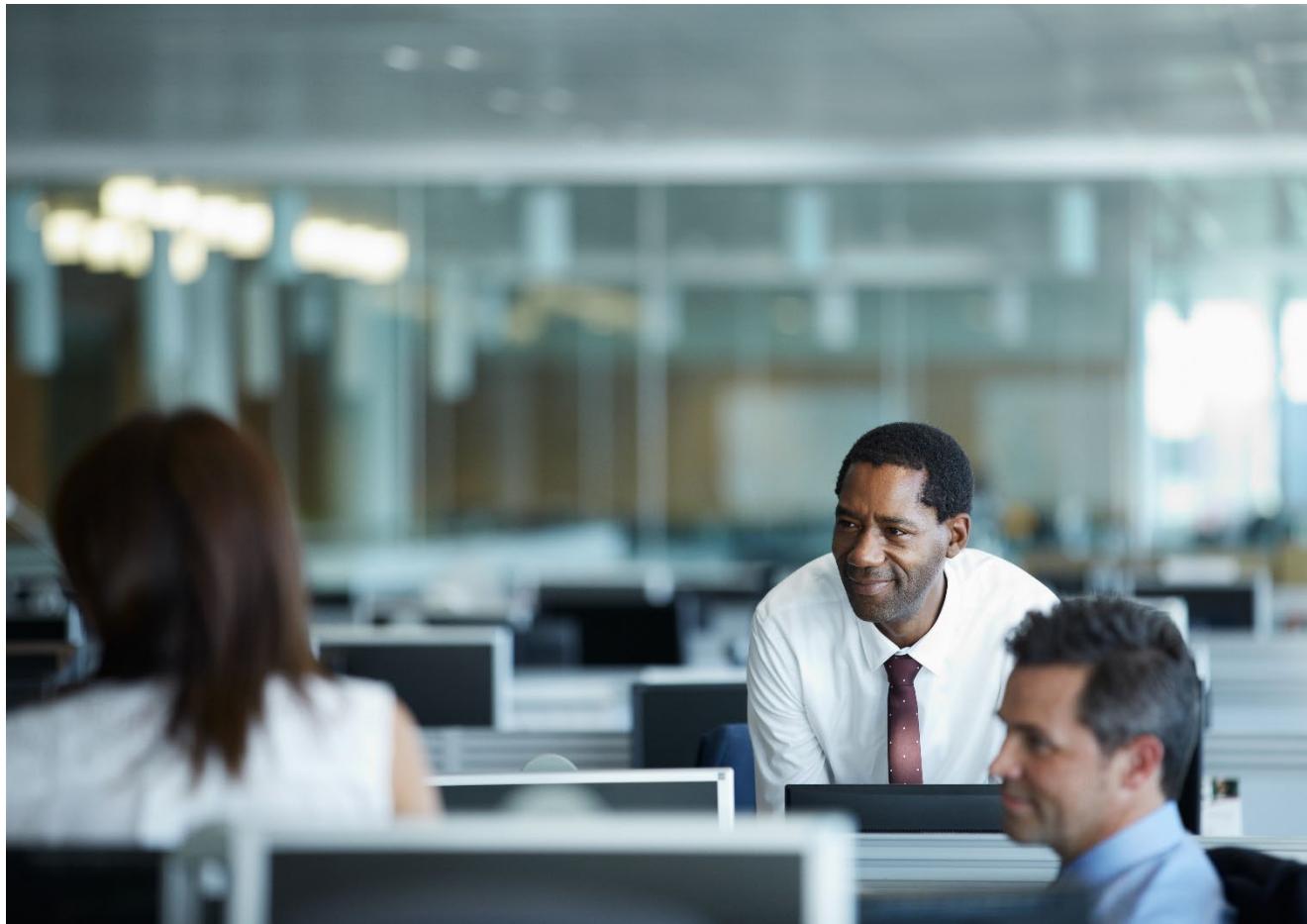


# Wrap-Up

- Summary
- Module Quiz

# Quick Summary

Here's what you learned ...



- **DP Backup** does full and incremental backup.
- **DP Backup** parameters include: Source, Destination, and Options
- **NextGen Scheduler** replaces Basic & Advanced Scheduler to schedule backup, media, consolidation, report, or copy operations
- **NextGen Scheduler** allows recurrence and data protection
- **NextGen Scheduler** parameters include: Specification, Type, Options, Recurrence, and Summary
- **DP Restore** is done via the GUI or command line
- **DP Restore** allows parallel restore and restore by object, session, or query
- **DP Restore** parameters include: Source, Destination, Options, Devices, Media, Copies, and Summary



## Module 5 Quiz

Pause now to take a short interactive quiz to gauge your understanding of what you learned in this module.

# Congratulations!

You completed Module 5.

Stay tuned for Module 6: Integrations

## What's next?

[Move on to the next module.](#)





# Data Protector 10.10

## Module 6: Virtualization

### Level 310 Technical Deep-Dive

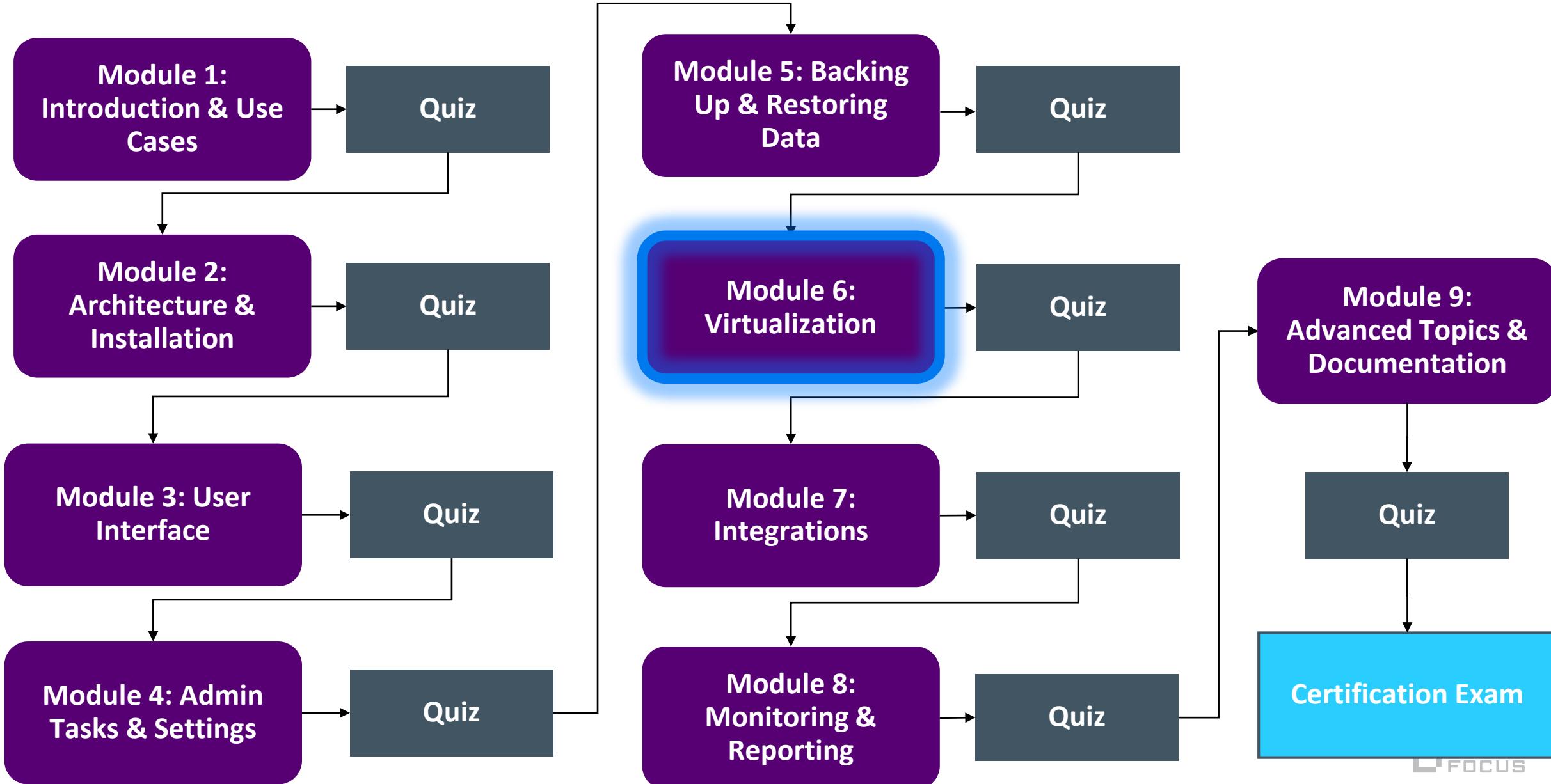
Keith Walls  
Technical Enablement

October 2018

You can:

- Download the presentation.
- Download PowerPoint slides & speaker notes.

# Level 310 Multi-Module Course



# About this Course

## Integration with VMware

- What can you back up?
- What are the backup types?
- Where can you restore?
- What environments are supported?

## Integration with Hyper-V

- What are the Hyper-V backup types?
- What are the VSS backup types?
- What environments are supported?

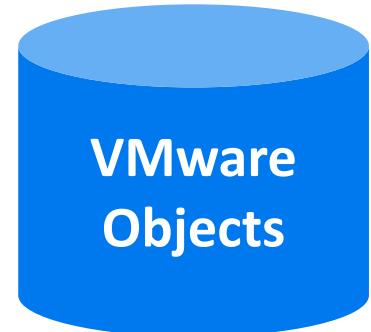
## Module Quiz

- Take the interactive Module Quiz

# Data Protector Integrations with VMware

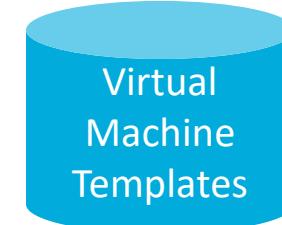
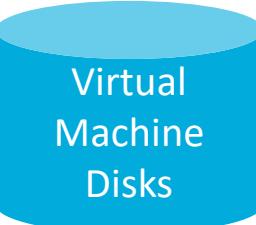
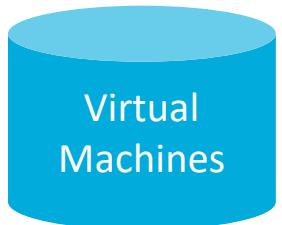
- Types of VMware backups and restores
- vCenter and stand-alone environments
- Theory of operation for vStorage Image backup
- Backup and restore considerations

# Data Protector VMware Integration



**Data Protector integrates with VMware vSphere and VMware vCloud Director (including ESX Server, ESXi Server systems, and vCenter Server systems) to back up and restore VMware objects online or offline**

## What data can you back up?



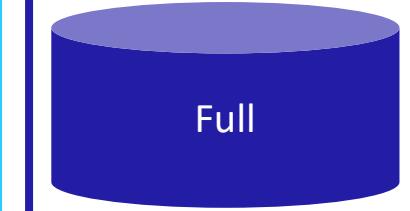
## Where can you restore?



## Backup Types



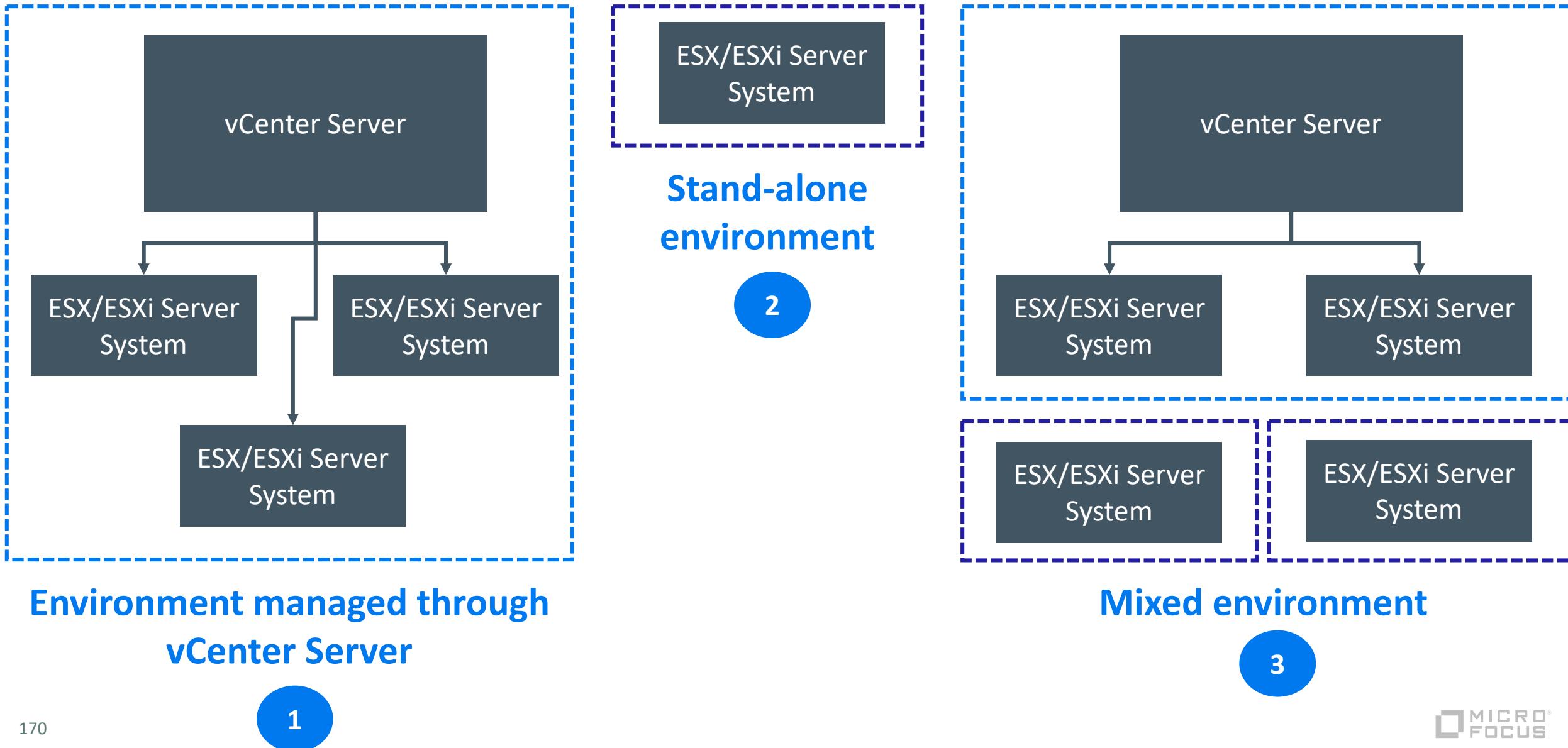
## Restore Types



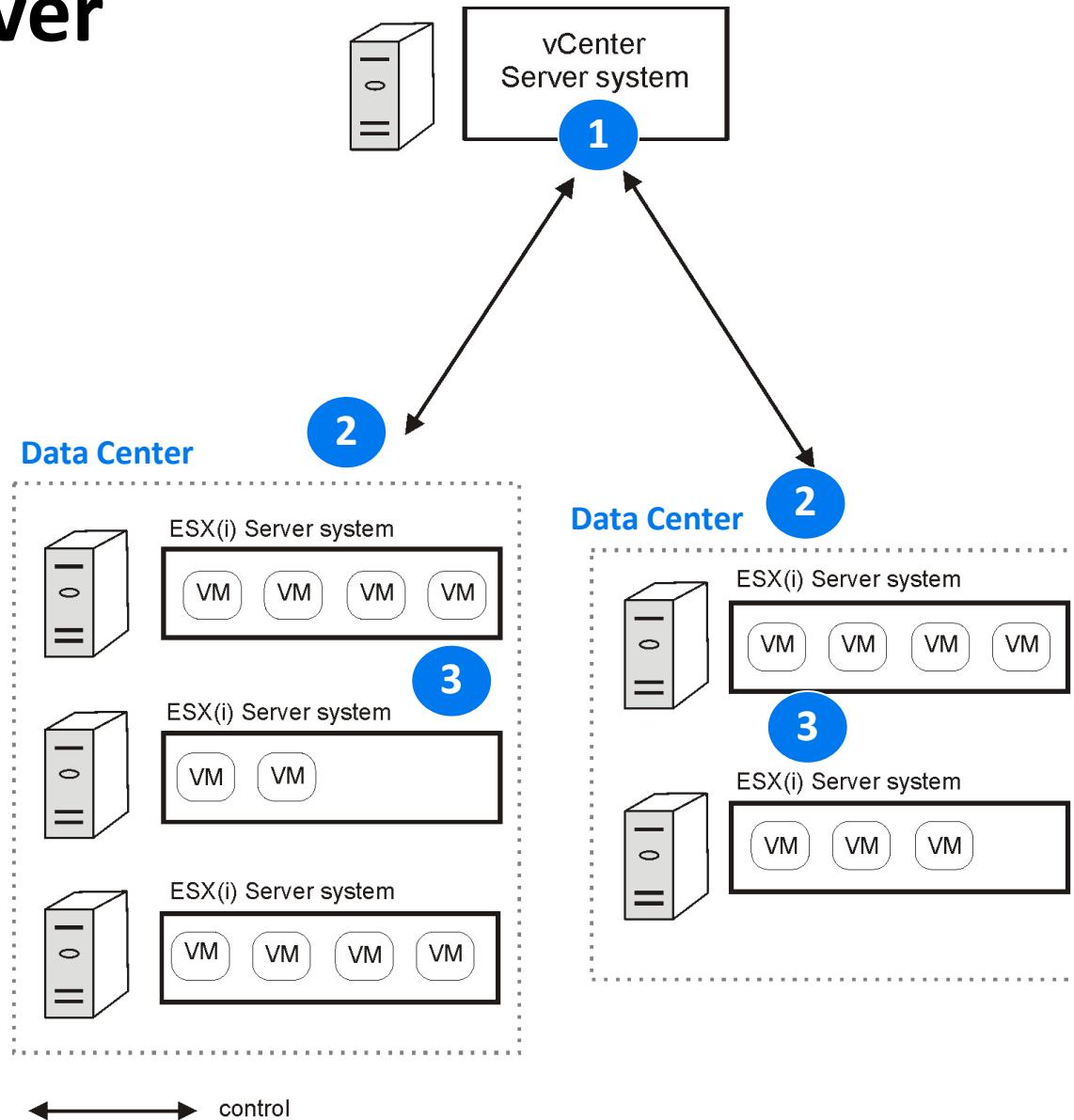
**NOTE:** Virtual machine disks are considered to be objects and are backed up in parallel, NOT serially.

**NOTE:** Restoring an incremental or differential backup means restoring the complete backup chain

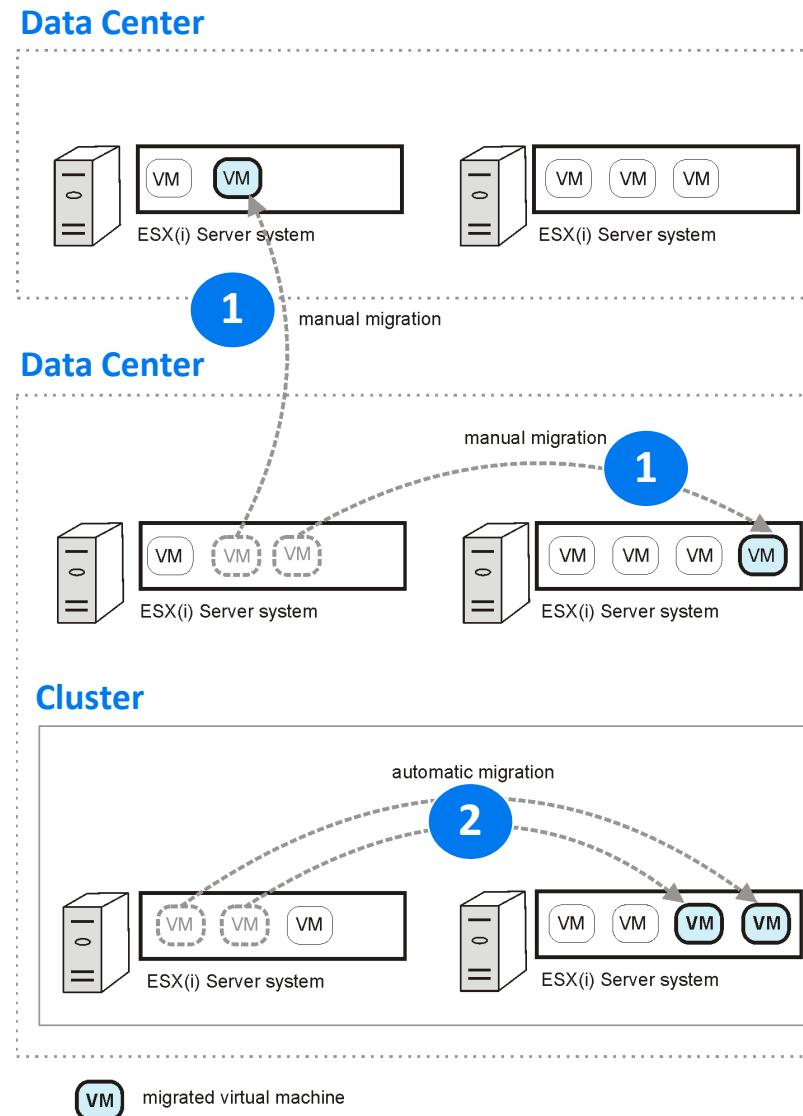
# Supported Environments



# Data Protector Integration for VMware Architecture: vCenter Server



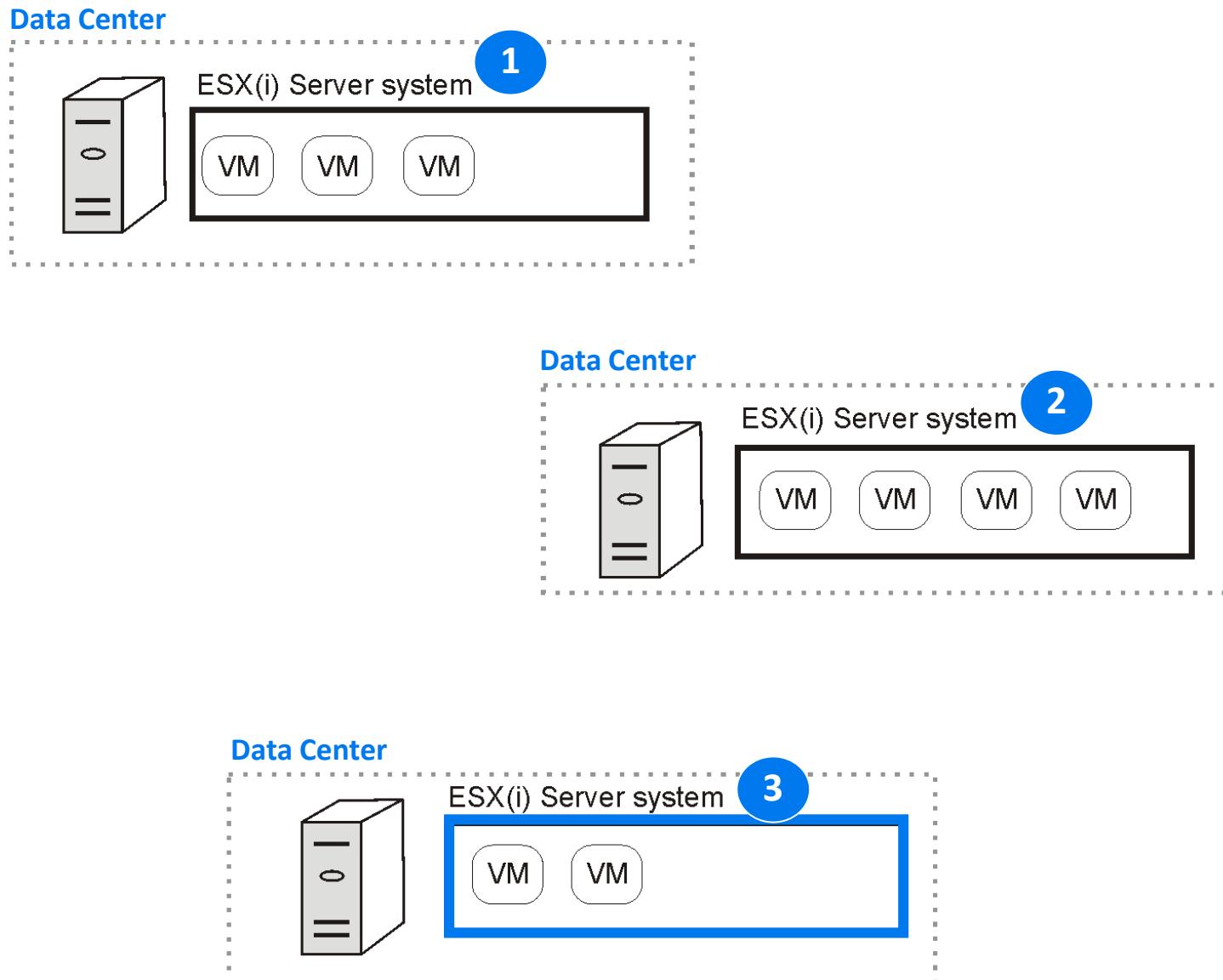
# Migrating Virtual Machines between Physical Servers



## Migration for:

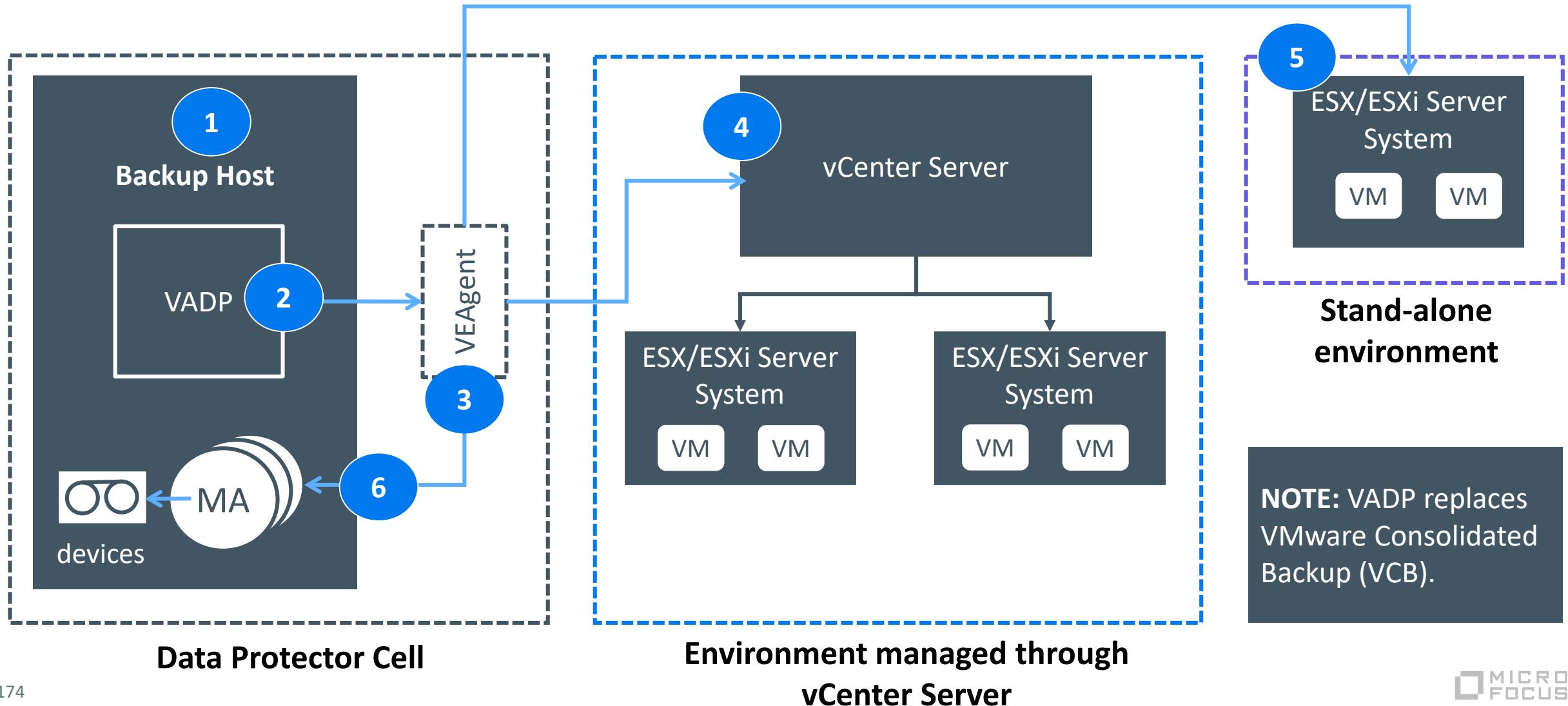
- High availability
- Load balancing
- Maintenance

# Data Protector Integration for VMware Architecture: Stand-alone ESX and EXS(i) Server Environments

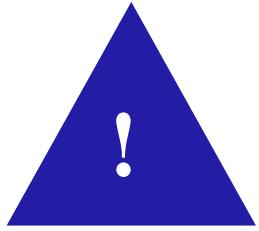


# Backup Theory of Operation

Data Protector Virtual Environment integration uses the vStorage Image backup method



# Considerations: VMware Backup



1. Changed Block Tracking (CBT) and Mixed Snapshot-handling mode
2. Concurrent backup sessions
3. Transportation modes (SAN or NBD)
4. Thick and thin disks
5. Presentation of LUN
6. Back up to StoreOnce Catalyst device
7. Data Protector licenses

**FOR FULL DETAILS:** Refer to *Integration Guide*, Chapter 19.

# Considerations: VMware Restore



1. Concurrent sessions
2. Failed restore sessions
3. Virtual machines in vApp
4. Partial restore from a vStorage image backup
5. Transportation Modes – SAN or NBD

**FOR FULL DETAILS:** Refer to *Integration Guide*, Chapter 19.

# Powerful Restore Features: Power On and Live Migrate



## Power On

1. Instantly power on a VM and spin up a backup image to check backup validity
2. Backup image must reside on 3PAR replica, Smart Cache, or StoreOnce Catalyst device
3. Power on VM and present backup image to destination ESX server
4. New VM is created – its data points to Data Protector backup image
5. Other files reside on destination data center

**NOTE:** Changes to VM are available until cleanup operation.



## Live Migrate

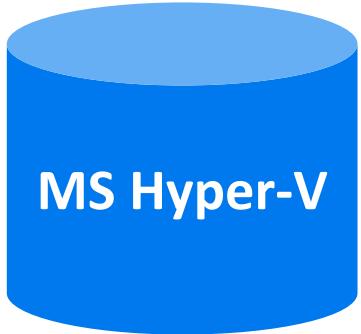
1. Instantly power on a VM from backup image AND start data migration
2. Minimum impact on usage and accessibility of VM
3. All modifications to VM data are consolidated
4. After migration, VM starts accessing destination data store; backup image is removed

# Data Protector Integrations with Microsoft Hyper-V

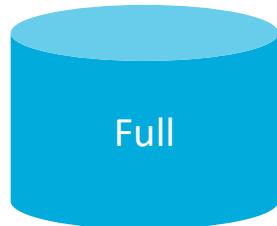
- Types of backups and restores
- Stand-alone and clustered environments

# Data Protector Virtual Environment Integration for Microsoft Hyper-V

The Data Protector Integration for Hyper-V supports standalone and clustered environments. The integration is based on the Data Protector Volume Shadow Copy (VSS) integration feature.



## Hyper-V Backup Types



## Where can you restore?

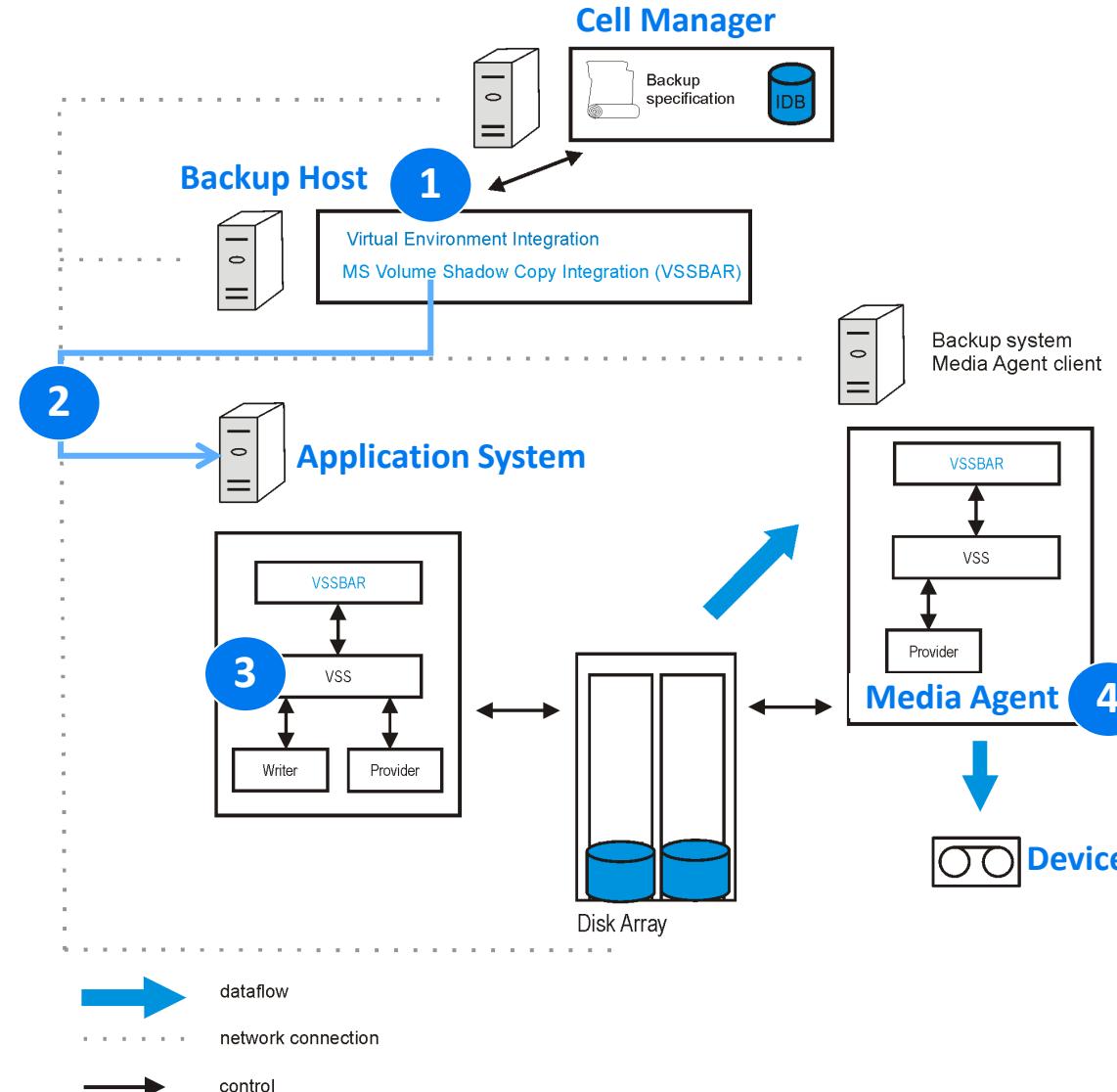


## VSS Backup Types

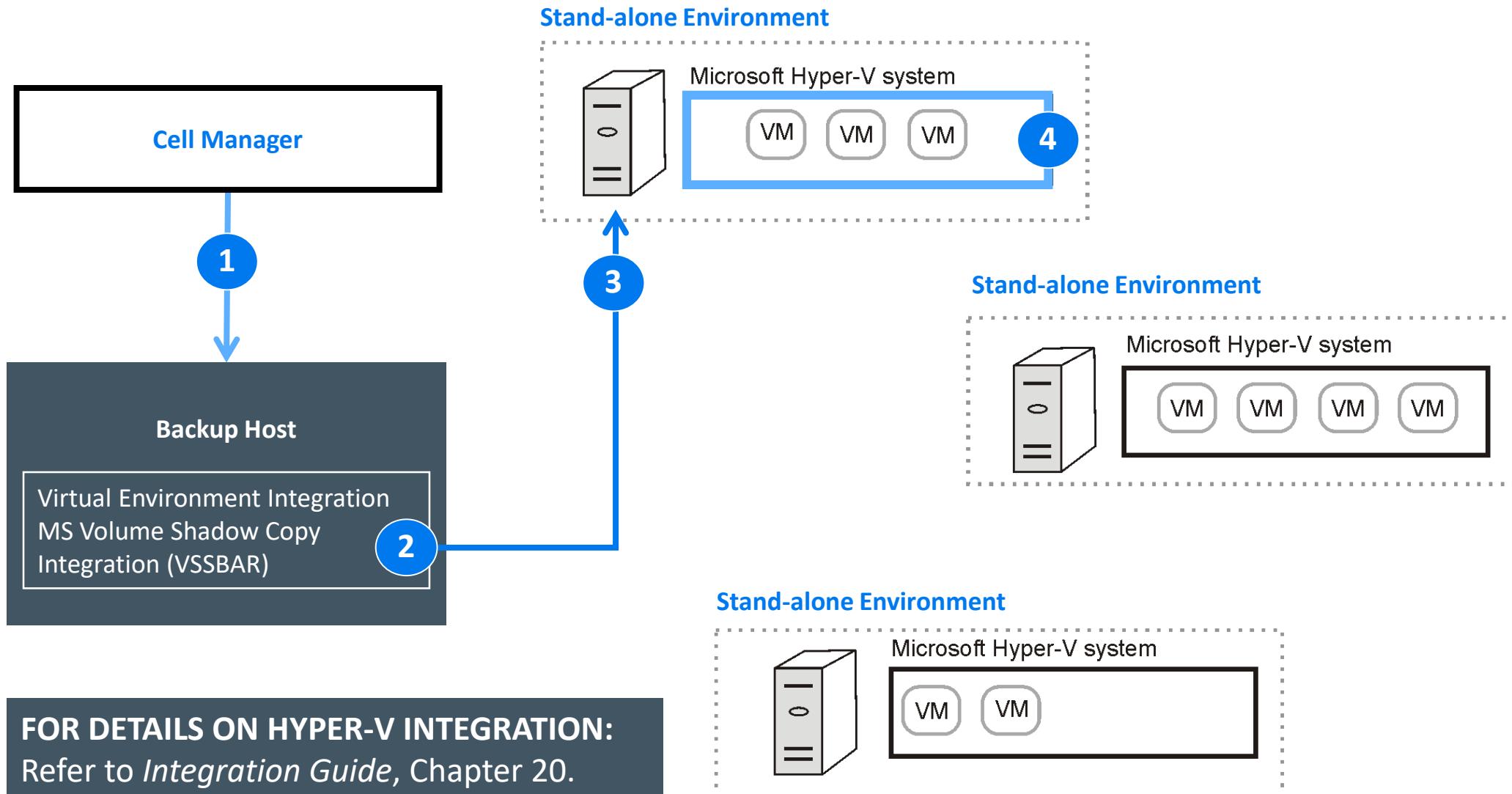


**NOTE:** Data Protector Virtual Environment integration does NOT support instant recovery.

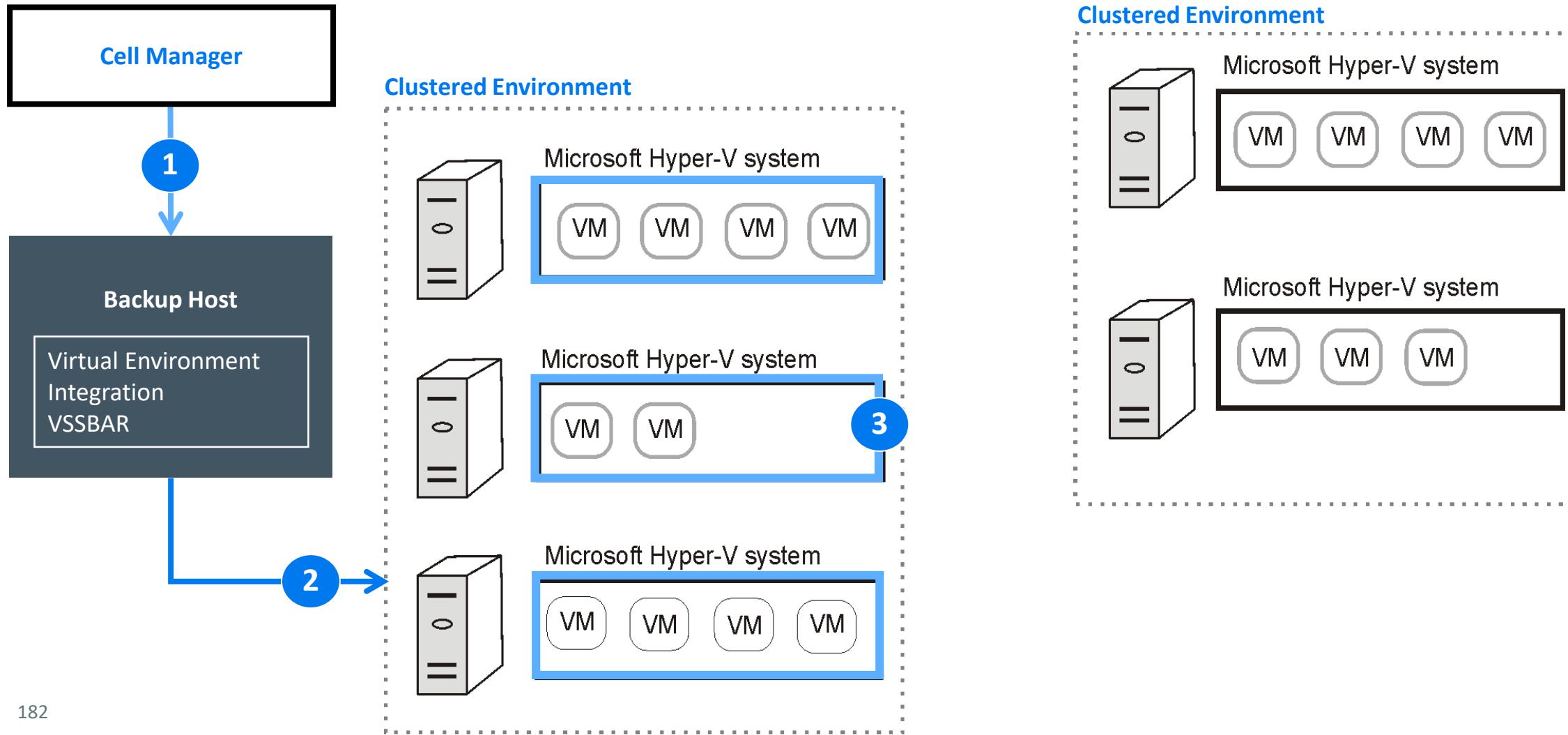
# Microsoft Hyper-V Backup Method (VSS Transportable Backup)



# Data Protector Virtual Environment Integration for Microsoft Hyper-V: Stand-Alone Environment



# Data Protector Virtual Environment Integration for Microsoft Hyper-V: Clustered Environment





# Wrap-Up

- Summary
- Module Quiz

# Quick Summary

Here's what you learned ...



## VMware

- Back up VMs, VM disks, and VM machine templates
- Do full, incremental, or differential backups and restores
- Restore to data center or directory
- Supports stand-alone, vCenter, and mixed environments

## MS Hyper-V:

- Hyper-V Backups: Full, incremental
- VSS Backups: Local or network, VSS Transportable
- Restore to original location, different location, directory
- Supports stand-alone or clustered environments



## Module 6 Quiz

Pause now to take a short interactive quiz to gauge your understanding of what you learned in this module.

# Congratulations!

You completed Module 6.

Stay tuned for Module 7:  
Standard Integrations

## What's next?

[Move on to the next module.](#)





# Data Protector 10.10

## Module 7: Standard Integrations

### Level 310 Technical Deep-Dive

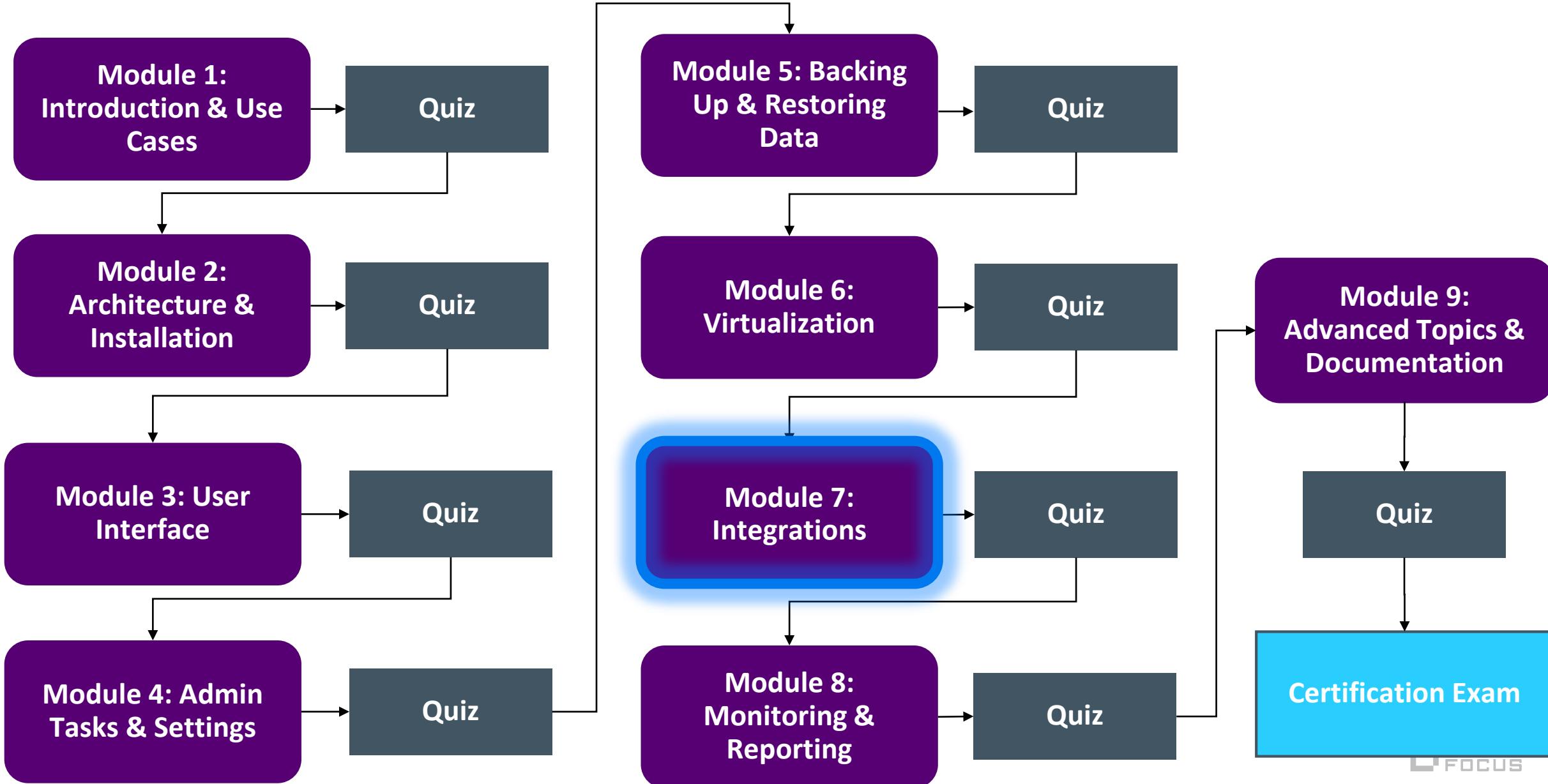
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- Download PowerPoint slides & speaker notes.

# Level 310 Multi-Module Course



# About this Course

## Integration with IBM Applications

- Informix Server
- DB2 UDB
- Lotus Notes/  
Domino Server

## Integration with Microsoft Applications

- MS SQL
- MS SQL Server
- MS Share Point  
Server (VSS-based)
- MS Server
- MS Exchange Single  
Mailbox

## Oracle and SAP

- Oracle Server
- MySQL
- SAP R/3
- SAP MaxDB
- SAP HANA  
Appliance

## Sybase and PostgreSQL

- Sybase Server
- Sybase IQ
- Sybase Server
- PostgreSQL

## Module Quiz

- Take the  
interactive  
Module Quiz

**IMPORTANT!** In all these integrations, Data Protector handles the orchestration of the backups and recoveries, but the applications handle the flow of data.

# Supported Integrations with DP 10.10

Vendor	Application
IBM	<ul style="list-style-type: none"><li>• Informix Server integration</li><li>• DB2 UDB integration</li><li>• Lotus Notes/Domino Server integration</li></ul>
Microsoft	<ul style="list-style-type: none"><li>• Microsoft SQL Server integration</li><li>• Microsoft SharePoint Server 2010/2013 integration</li><li>• Microsoft SharePoint Server VSS based solution</li><li>• Microsoft Exchange Server 2010 integration</li><li>• Microsoft Exchange Single Mailbox integration</li></ul>
Oracle and SAP	<ul style="list-style-type: none"><li>• Oracle Server integration</li><li>• MySQL integration</li><li>• SAP R/3 integration</li><li>• SAP MaxDB integration</li><li>• SAP HANA Appliance integration</li></ul>
Sybase	<ul style="list-style-type: none"><li>• Sybase Server integration</li><li>• Sybase IQ integration</li></ul>
NDMP (Network Data Management Protocol Server)	<ul style="list-style-type: none"><li>• NDMP (Network Data Management Protocol Server) integration</li><li>• NetApp SnapManager solution</li><li>• NetApp ONTAP C-mode</li></ul>
Virtualization	<ul style="list-style-type: none"><li>• Virtual Environment integration for VMware</li><li>• Virtual Environment integration for Microsoft Hyper-V</li></ul>
PostgreSQL	<ul style="list-style-type: none"><li>• PostgreSQL integration</li></ul>
Microsoft Volume Shadow Copy Service	<ul style="list-style-type: none"><li>• Microsoft Volume Shadow Copy Service</li></ul>
Zero Downtime Backup	<ul style="list-style-type: none"><li>• Oracle Server ZDB integration</li><li>• SAP R/3 ZDB integration</li><li>• Microsoft SQL Server ZDB integration</li><li>• Microsoft Exchange Server 2010 ZDB integration</li><li>• Microsoft SharePoint Server VSS based solution</li><li>• Virtual Environment ZDB integration for VMware</li></ul>

# Data Protector Integrations with IBM Applications

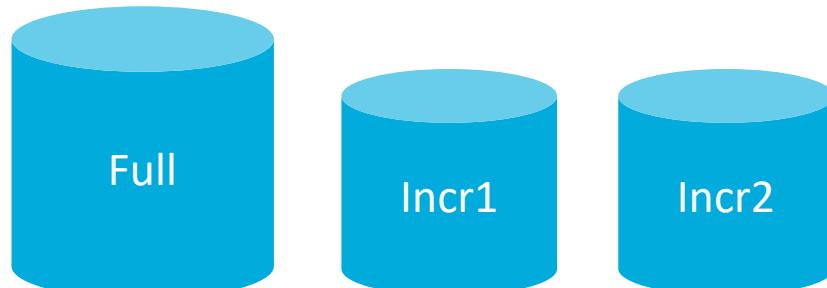
- Informix Server integration
- DB2 UDB integration
- Lotus Notes/Domino Server integration

# Data Protector Informix Server Integration

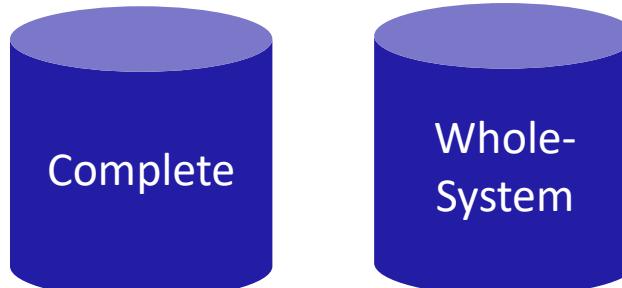
DP integrates with Informix Dynamic Server to back up database objects online.



## Backup Types

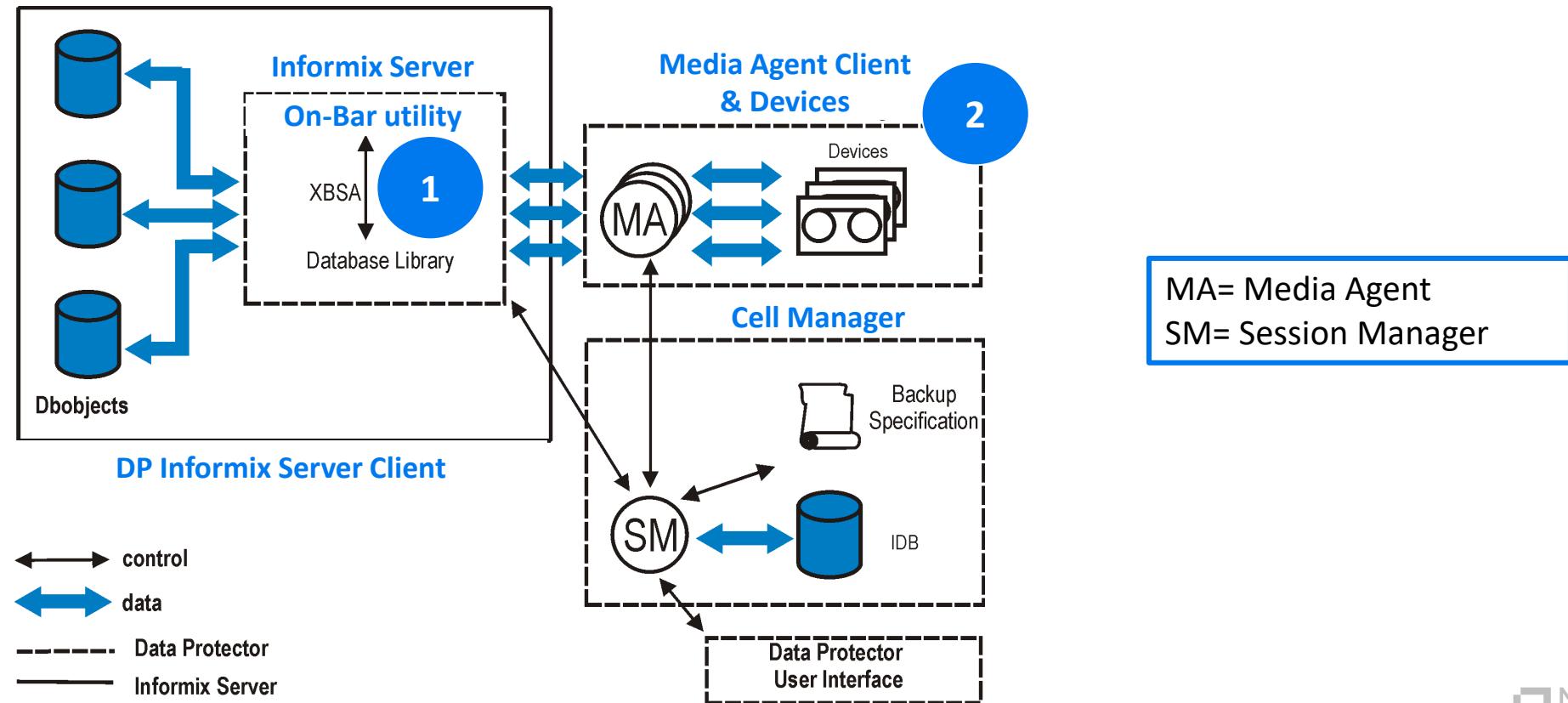


## Restore Types



# Data Protector Informix Server Integration architecture

- Data Protector integrates with Informix Server through **Data Protector Database Library**.
- The Data Protector Database Library uses the XBSA interface to channel communication between the Data Protector Session Manager, and the Informix Server's **ON-Bar utility**.

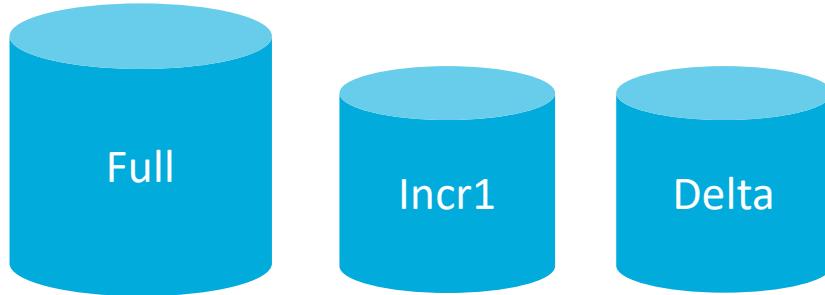


# Data Protector DB2 UDB Integration

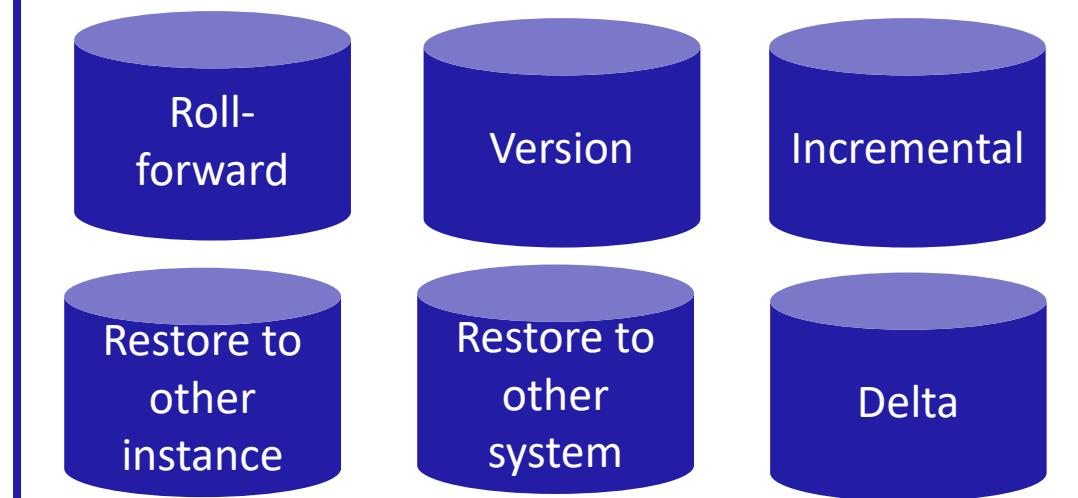
DP integrates with IBM DB2 Universal Database Server (DB2 Server) to back up DB2 database objects and table spaces online and offline.



## Backup Types

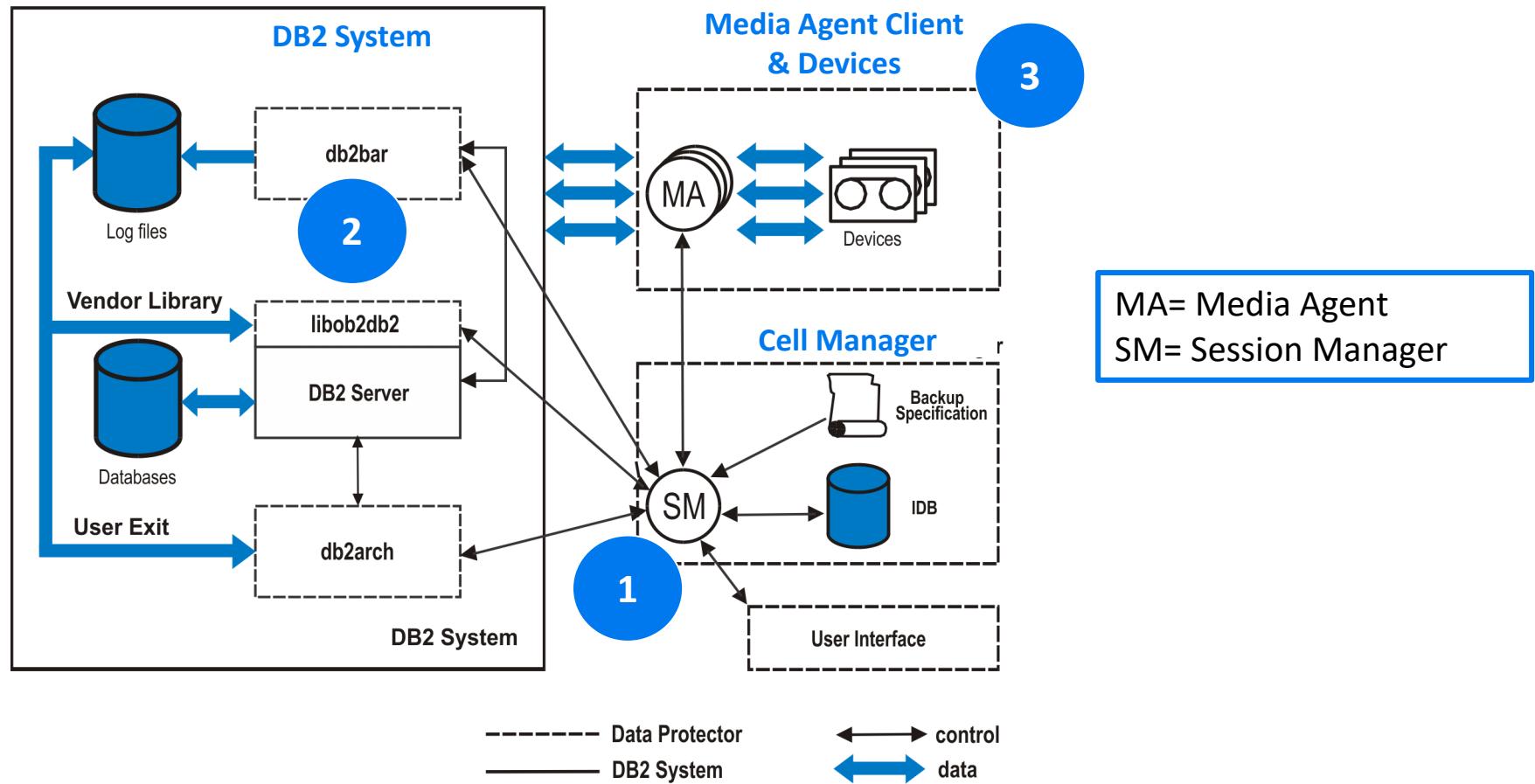


## Restore Types



# Data Protector DB2 UDB Integration Architecture

Data Protector integrates with the DB2 Server through a set of modules responsible for data backup and restore.

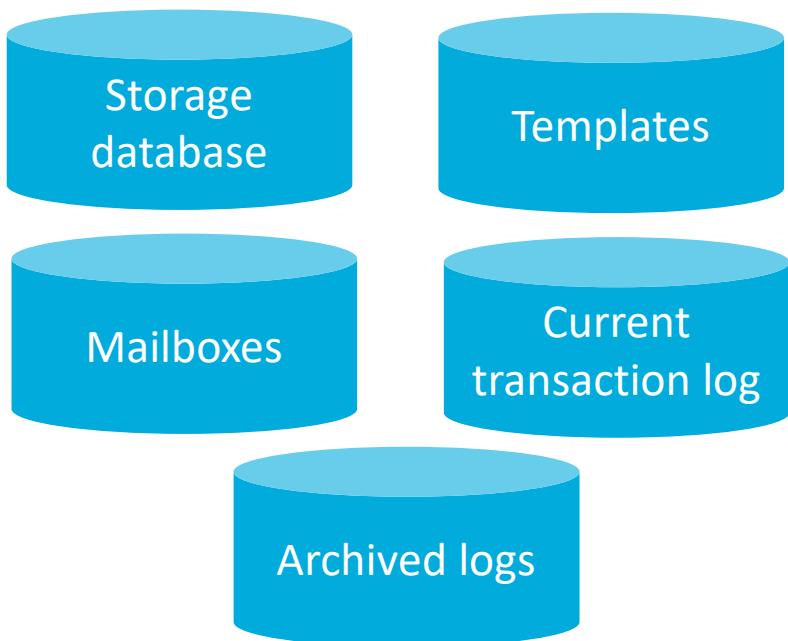


# Data Protector Lotus Notes/Domino Server Integration

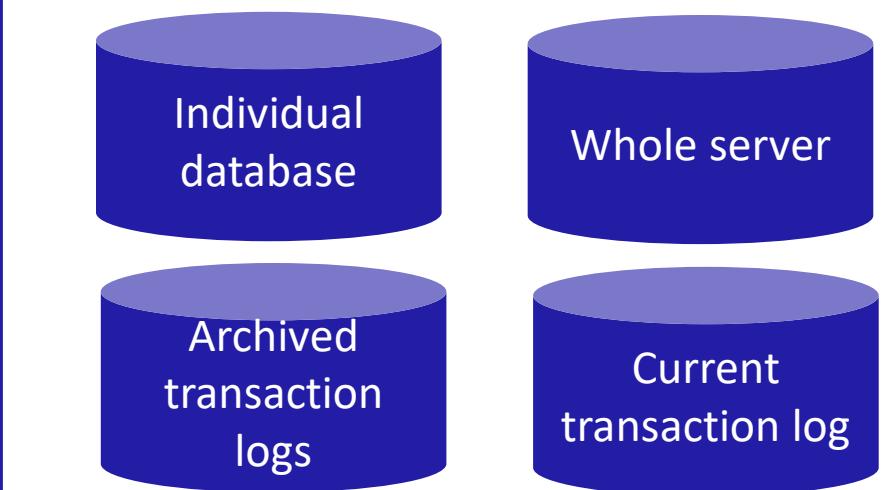
Data Protector integrates with Lotus Notes/Domino Server to perform online back up of databases and transaction logs.



## What can you back up?



## What can you restore?



# Backing up Lotus Notes/Domino Server Databases



## Full Backup

- Selected databases
- Archived logs (if archived logs are selected) and current log file



## Incremental Backup

Occurs only if:

- Changes have occurred since last backup
  - OR-
- Size of changes exceeds the value set with **Amount of log changes (KB)** option

# Restoring Lotus Notes/Domino Server Databases

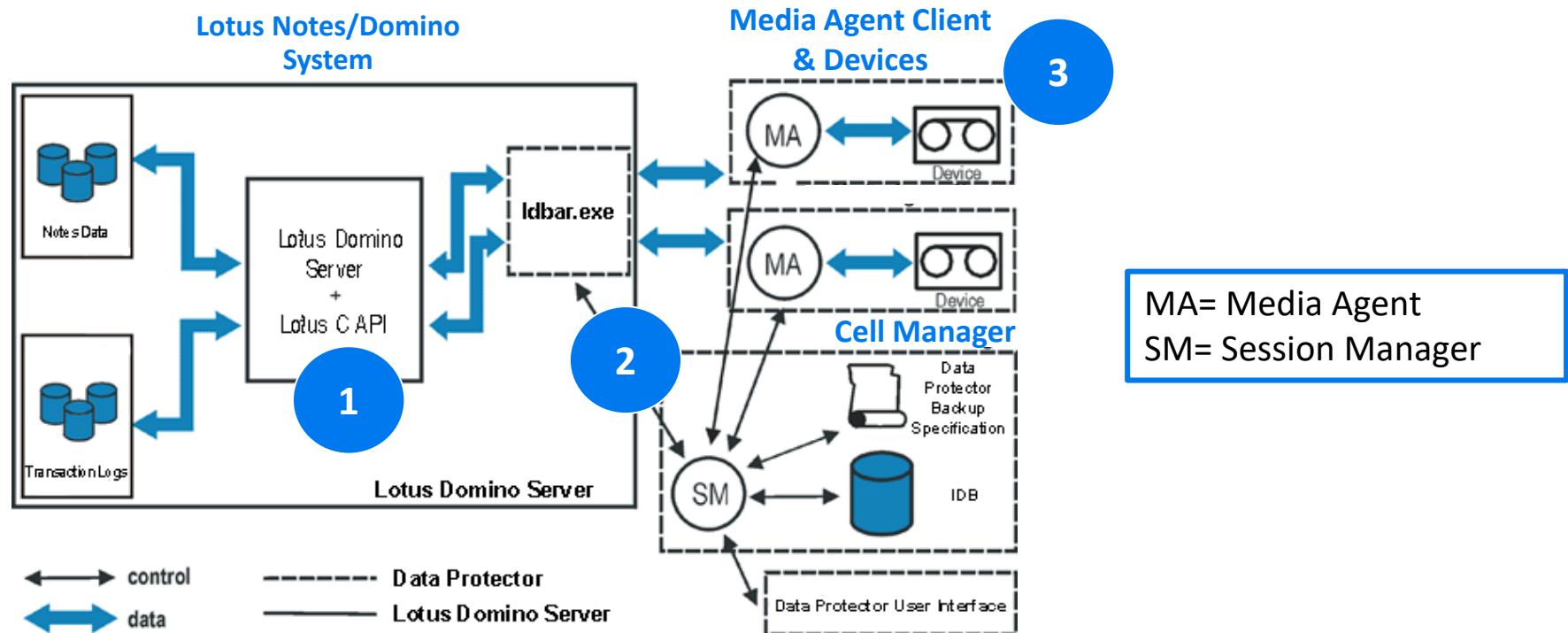


- Restore without recovery
- Restore specific backup version + changes since last transaction log backup
- Restore databases to specific time or to the latest consistent state
- Restore databases to a Lotus Notes/Domino Server in a different location
- Restore transaction logs in case of recovery

**IMPORTANT!** An online database restore is possible while Lotus Notes/Domino Server is running, with no impact on other databases currently in use. The Lotus Notes/Domino Server must be set to use archived transaction logging.

# Data Protector Lotus Notes/Domino Server Integration Architecture

Data Protector integrates with the Lotus Notes/Domino Server using the Lotus C API.



# Data Protector Integrations with Microsoft

- Microsoft SQL Server 2007/2010/2014/2016 integration
- Microsoft SharePoint Server integration (VSS-based)
- Microsoft Exchange Server 2010/2013/2016 integration

# Data Protector Microsoft SQL Server Integration

Data Protector integrates with Microsoft SQL Server to perform online and scheduled backup of databases and transaction logs.



## What can you back up?



Whole Server



User Databases



Availability  
Group  
Databases

## What can you restore?



Individual  
database



Whole server

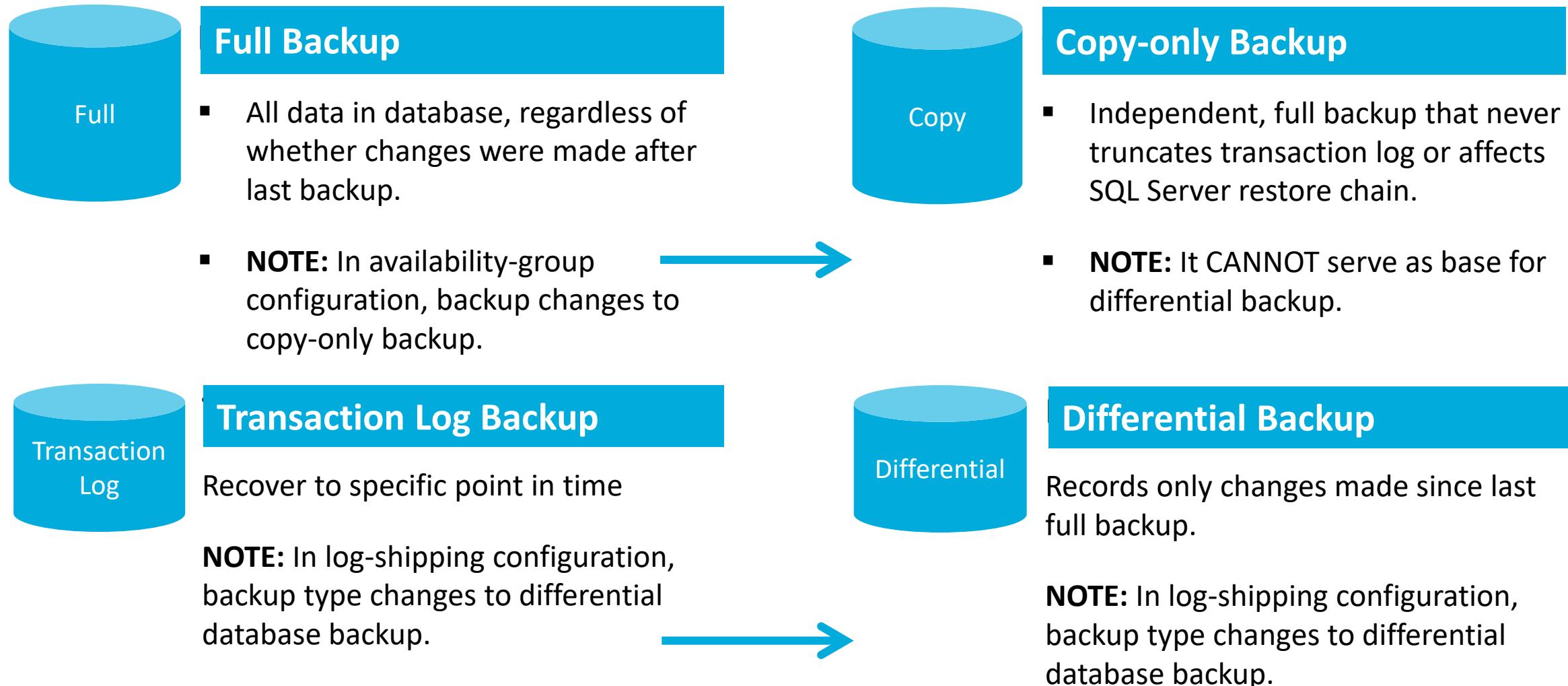


Archived  
transaction  
logs



Current  
transaction log

# Backing up Microsoft SQL Server Databases



# Restoring Microsoft SQL Server Databases

Data Protector offers different restore types, depending on your needs.

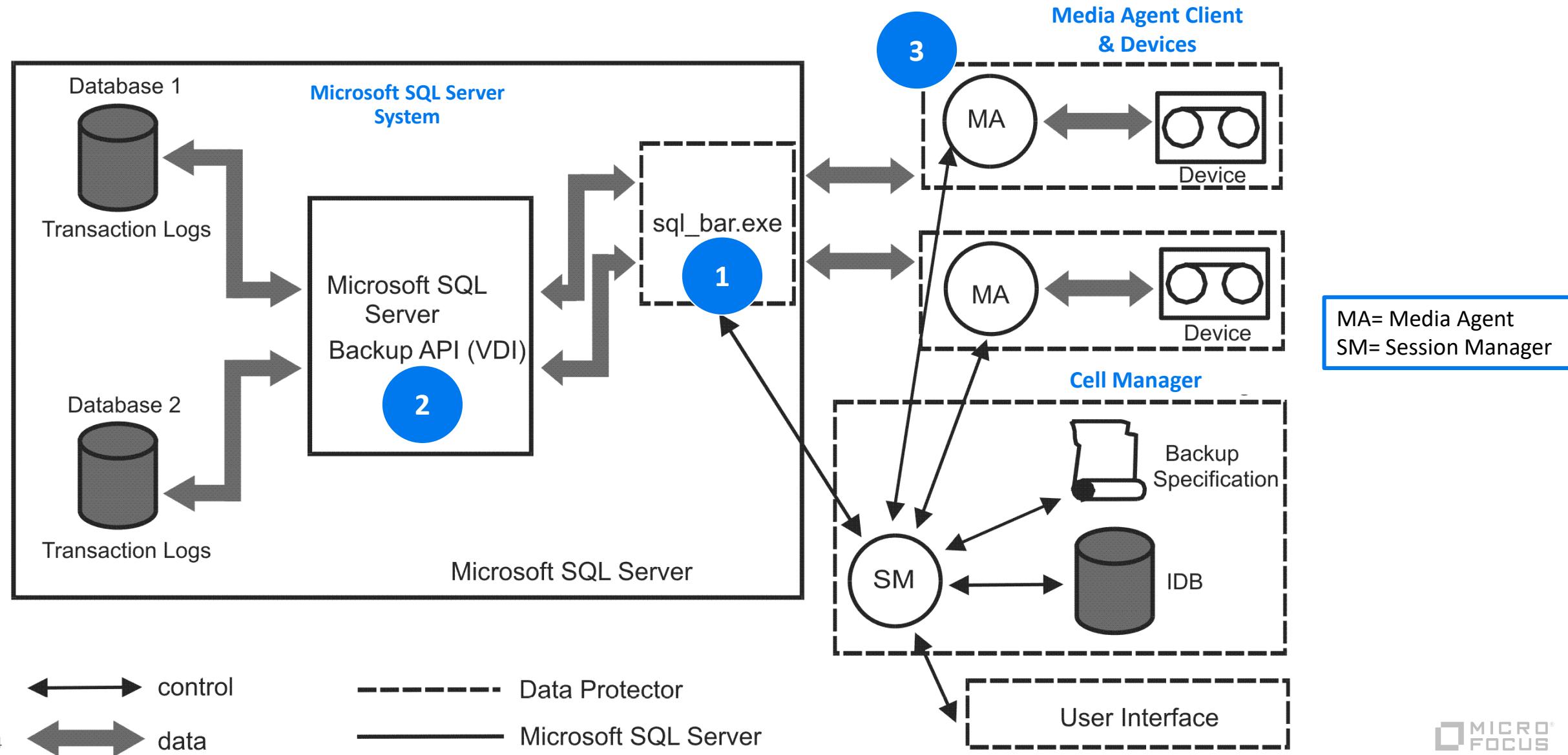


Restored database

- Full database restore
- Restore a version
- Point-in-time restore
- And restore files to a new location, different SQL Server, or different SQL Server instance
- Stop at a particular time
- Restore only this backup
- Force restore over the existing database
- Put database in single-user mode and log off all users
- Set recovery completion state
- Restore a database with a new name
- Restore to the most recent state possible

**FOR DETAILS:** Refer to *Integration Guide*

# Data Protector Microsoft SQL Server Integration Architecture



# Data Protector Microsoft SharePoint Server VSS-based Solution

Sharepoint backup and restore solution is based on Data Protector Microsoft Volume Shadow Copy Service integration (VSS integration)



## Limitations

- Use DP Protector PowerShell command to start backup sessions; use GUI and Command line for restore sessions.
- INCREMENTAL backups are possible only for FAST Search index files; FULL backups are possible for all other SharePoint Server data.

**FOR DETAILS ON VSS CONCEPTS:** Refer to *HPE Data Protector Integration Guide for Microsoft Volume Shadow Copy Service*



Additional background required to back up and restore Microsoft SharePoint Server 2010 and Microsoft SharePoint Server 2013 data stored in Microsoft SQL Server databases.

- Configuration database (SharePoint\_Config)
- Content databases (SharePoint\_AdminContent\_Label, WSS\_Content\_Label, etc.)
- SharePoint Service Applications databases (SSA\_DB) (Microsoft SharePoint Server 2010/2013)

**FOR DETAILS ON ADDITIONAL CONCEPTS:** Refer to *Data Protector 10 Integration Guide*, Chapter 6

# Data Protector Microsoft Exchange Server Integration

Data Protector integrates with Microsoft Exchange Server 2010 and 2013 to perform online backup of mailbox databases and public folder databases.



## Microsoft Exchange Server 2010



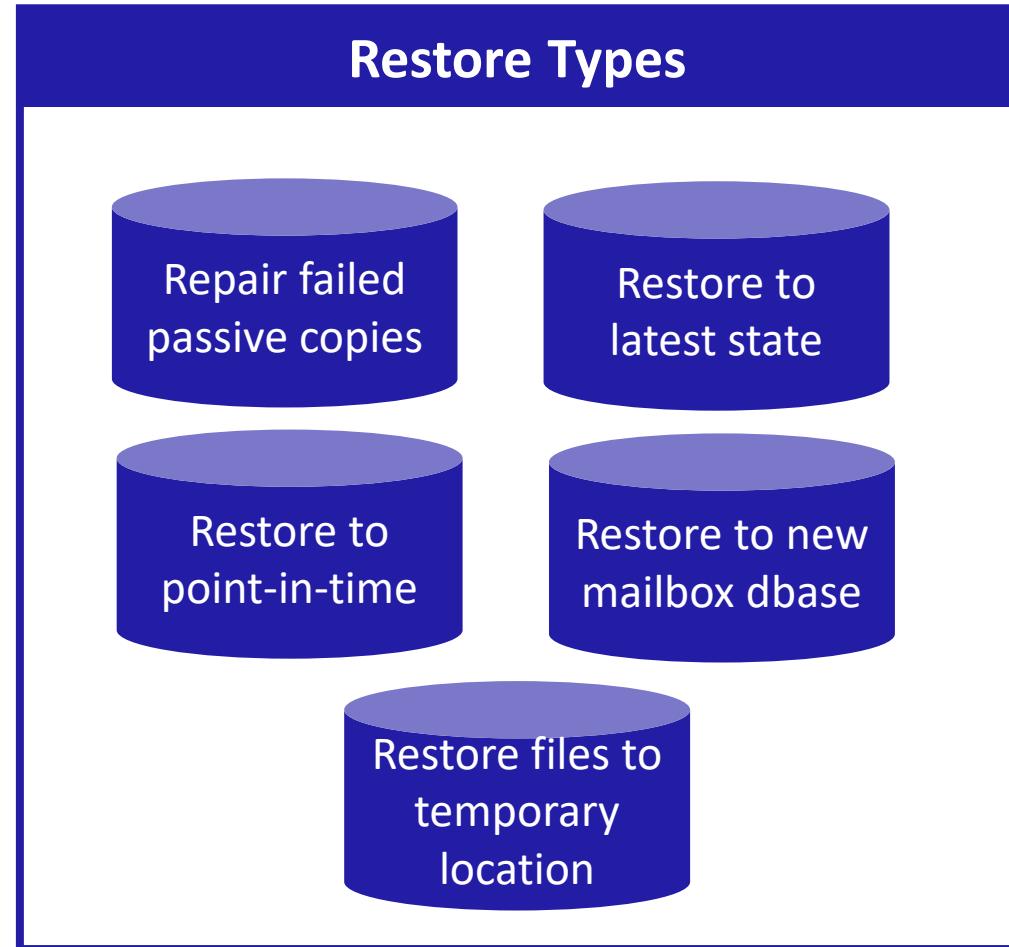
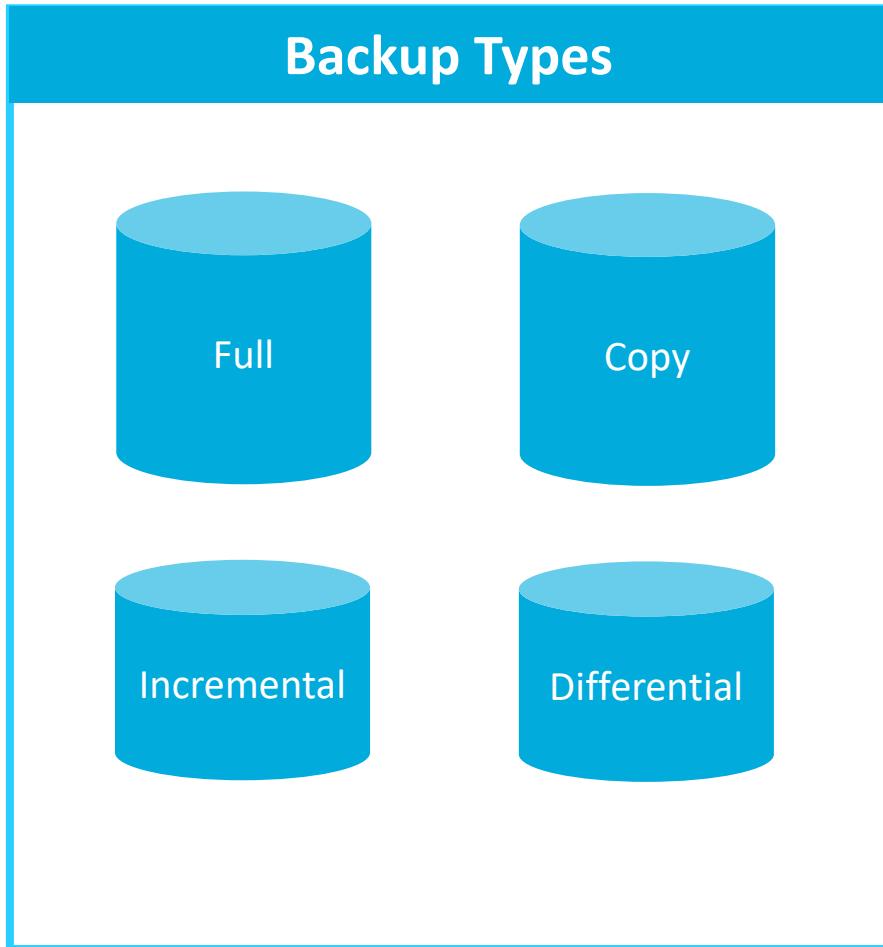
Integration based on VSS Technology

## Microsoft Exchange Server 2013

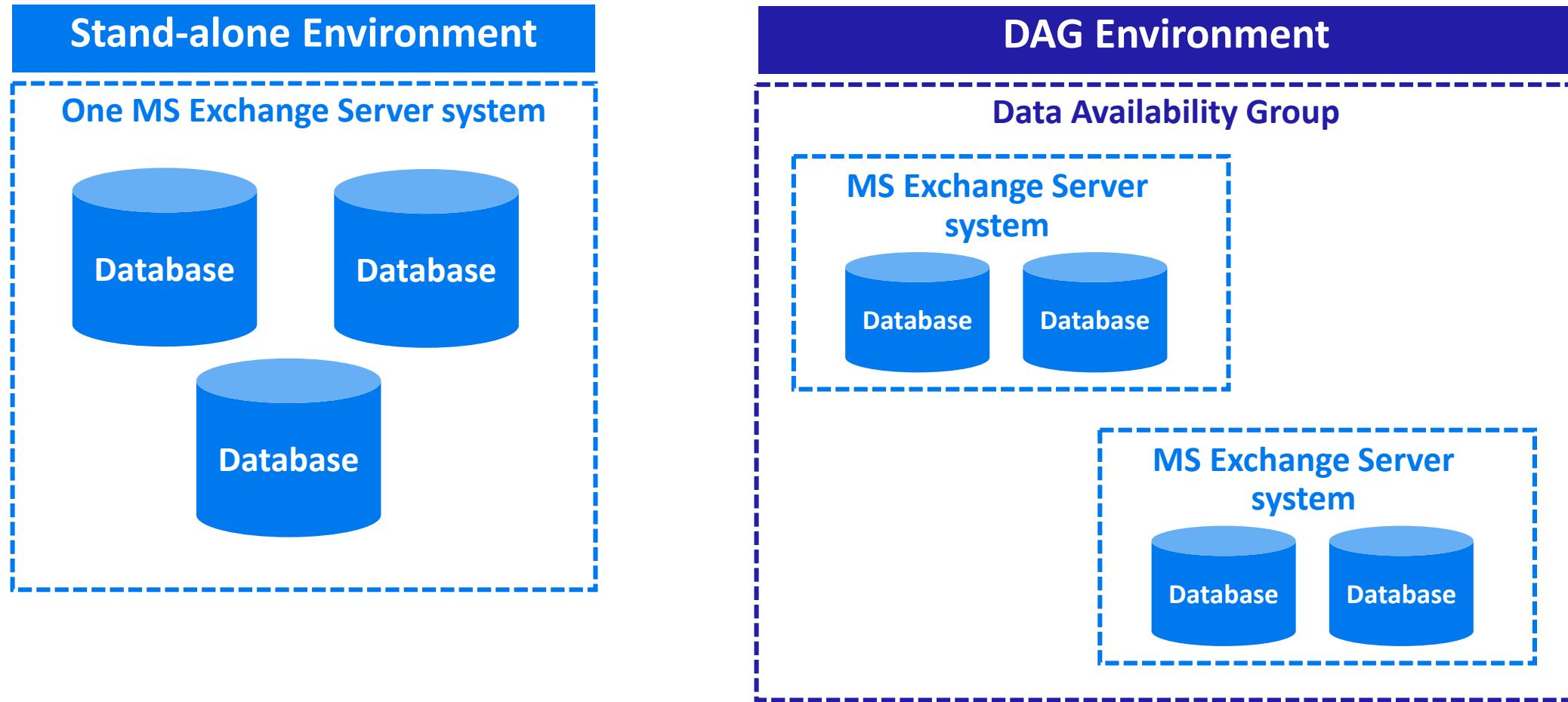


**FOR DETAILS ON VSS:** Refer to *HPE Data Protector Integration Guide for Microsoft Volume Shadow Copy Service*

# Backing up & Restoring Microsoft Exchange Server Databases

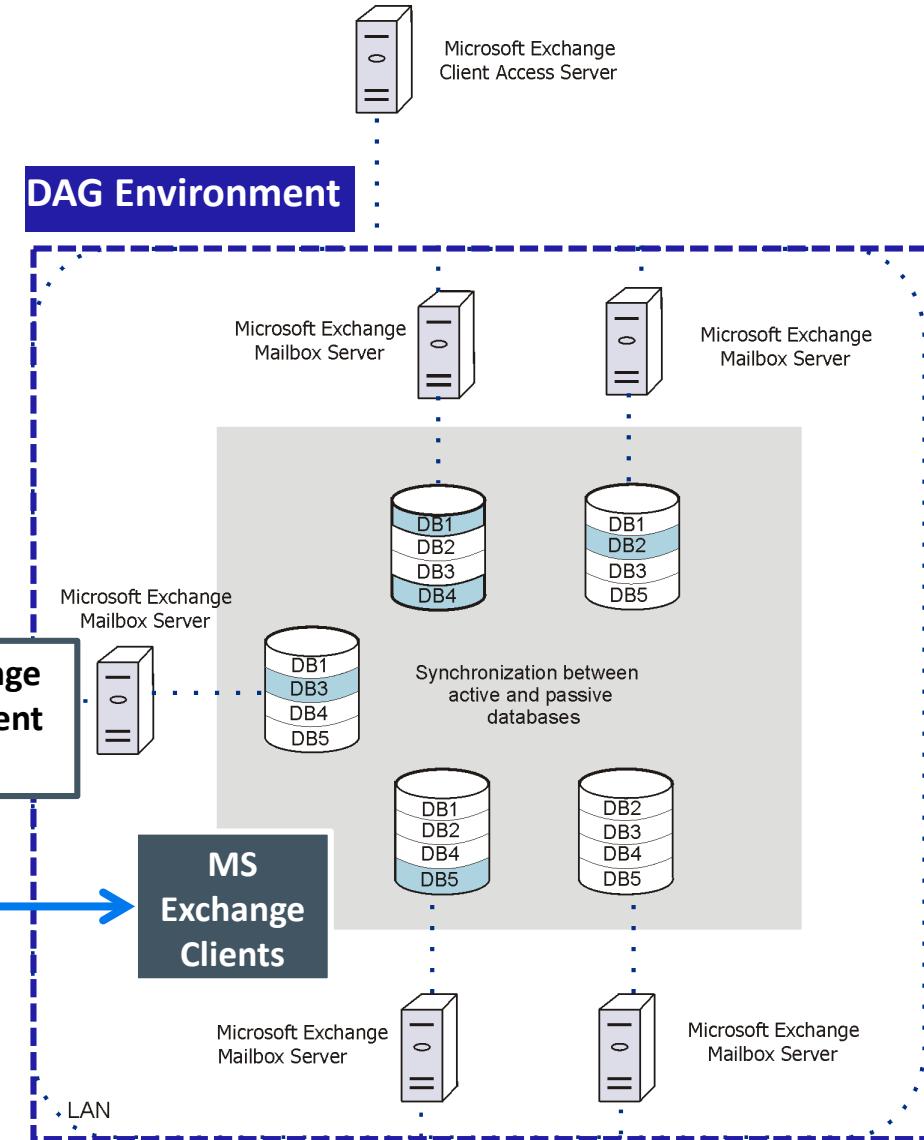
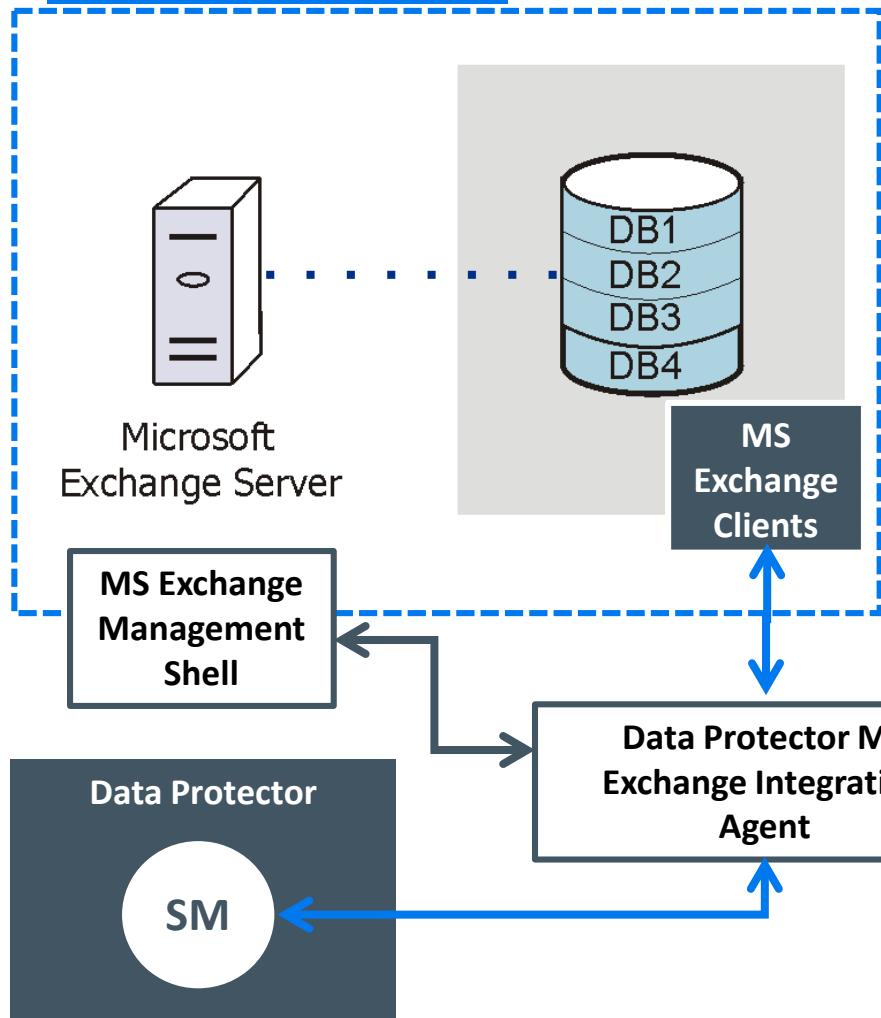


# Data Protector Microsoft Exchange Server Integration Environments



# Data Protector Microsoft Exchange Server Integration Architecture

## Stand-alone Environment



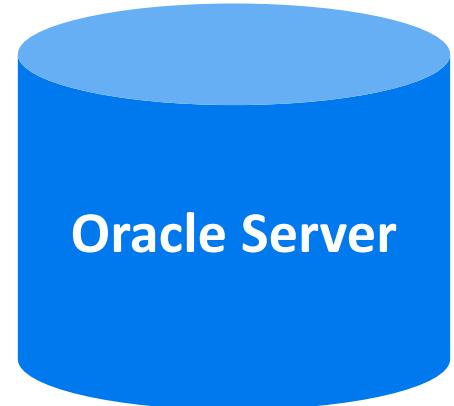
FOR DETAILS ON MS EXCHANGE BACKUPS & RESTORES: Refer to *Data Protector 10.0 Integration Guide*, Chapter 7

# Data Protector Integrations with Oracle and SAP applications

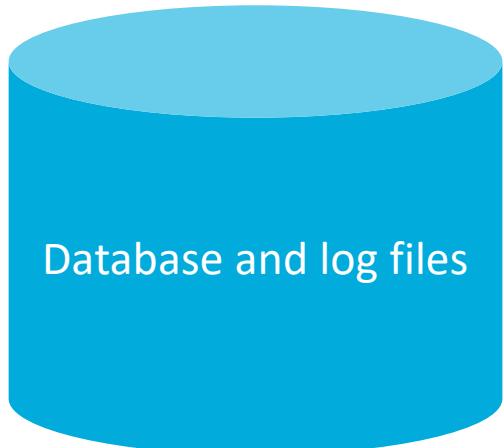
- Oracle Server integration
- MySQL integration
- SAP R/3 integration
- SAP MaxDB integration
- SAP HANA Appliance integration

# Data Protector Oracle Server Integration

Data Protector integrates with Oracle Server to perform online and offline back up of databases and transaction logs.

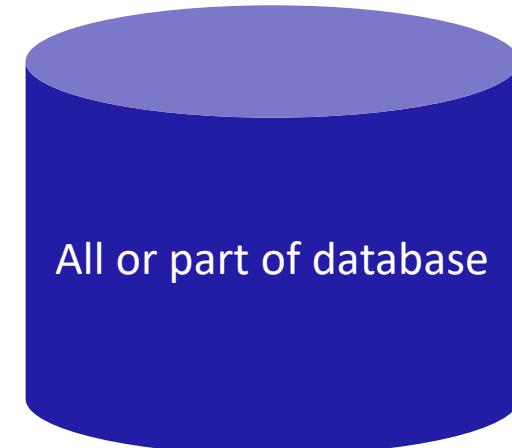


## BACKUP



Database and log files

## RESTORE



All or part of database

**NOTE:** Recover from online backup requires ARCHIVLOG mode.

# Backing up Oracle Server

## Backup Types



- Online backup of a whole database or parts of it
- Online incremental backup
- Offline backup of a whole database
- Backup of archived redo logs only
- Backup of the Oracle database recovery catalog
- Backup of the Oracle control files
- Backup of recovery files in the flash recovery area
- Backup of standby database (in Oracle Data Guard Environment)

**NOTE:** Flashback logs, the current control file, and online redo logs are NOT backed up.

# Restoring Oracle Server

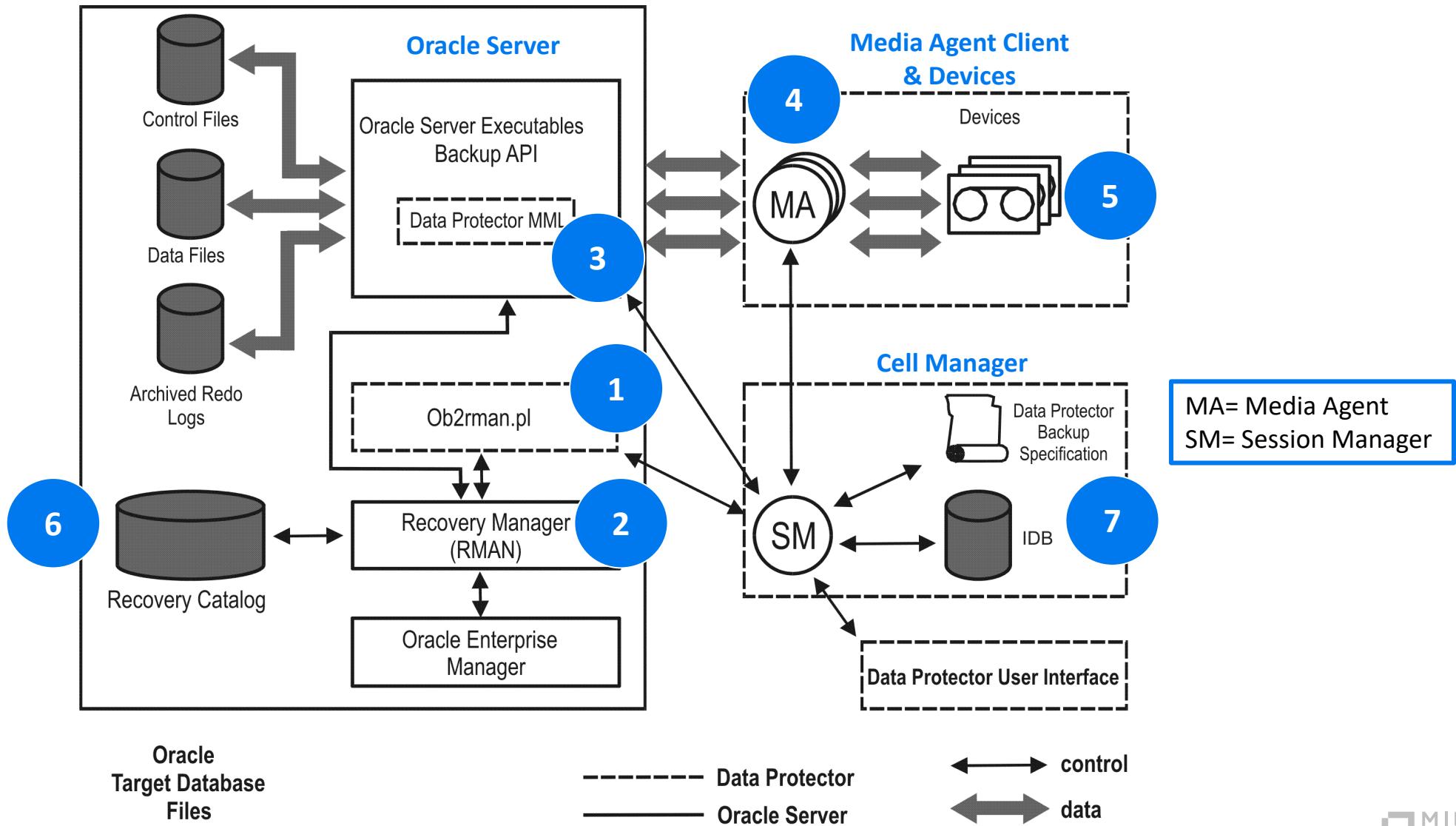


## Restore Types

- The whole database or parts of it
- The database to a specific point-in-time
- An incremental backup
- Restore a database to a different host
- Restore a datafile to a different location
- Restore a catalog before restoring the database
- Restore a database from a chain of incremental backups

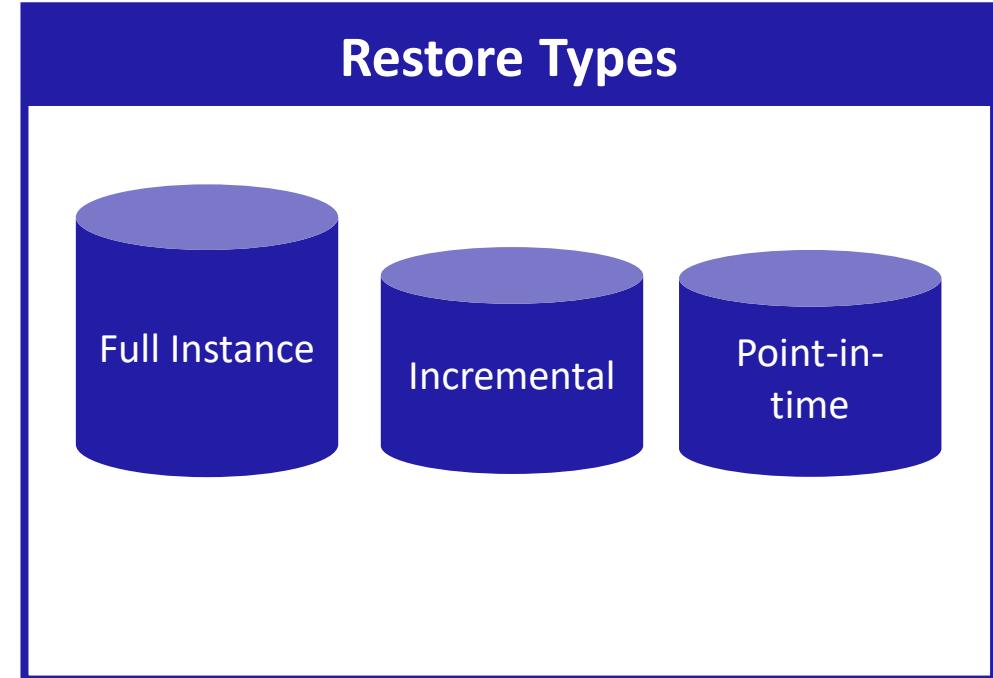
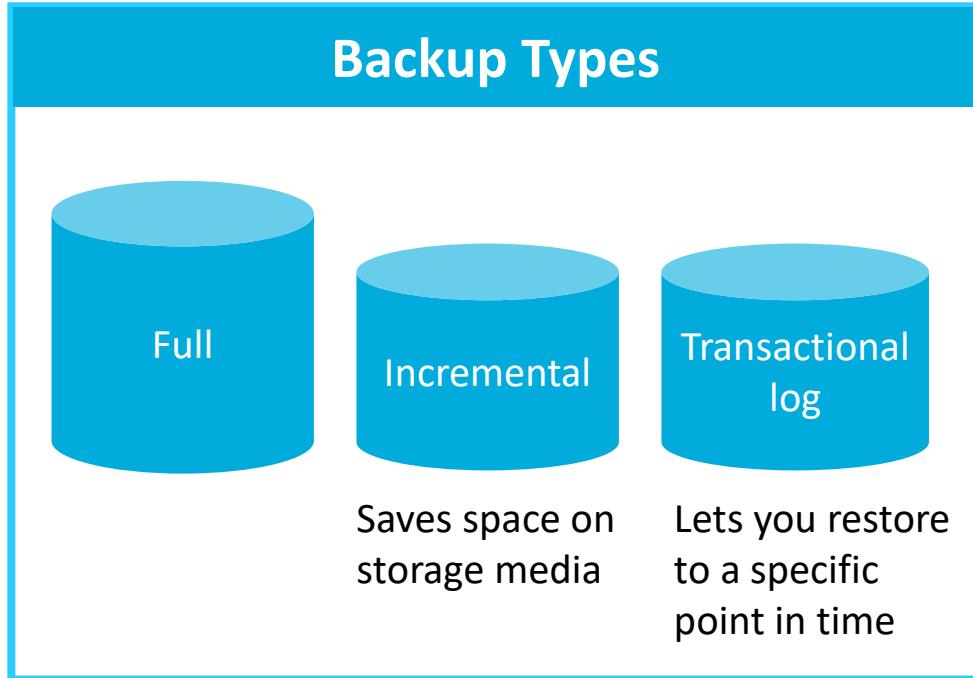
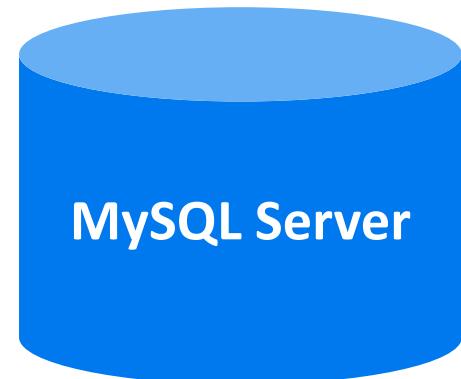
**NOTE:** To enable database recovery from an online backup, the respective Oracle Server instance must operate in the ARCHIVELOG mode.

# Data Protector Oracle Server Integration Architecture



# Data Protector MySQL Integration

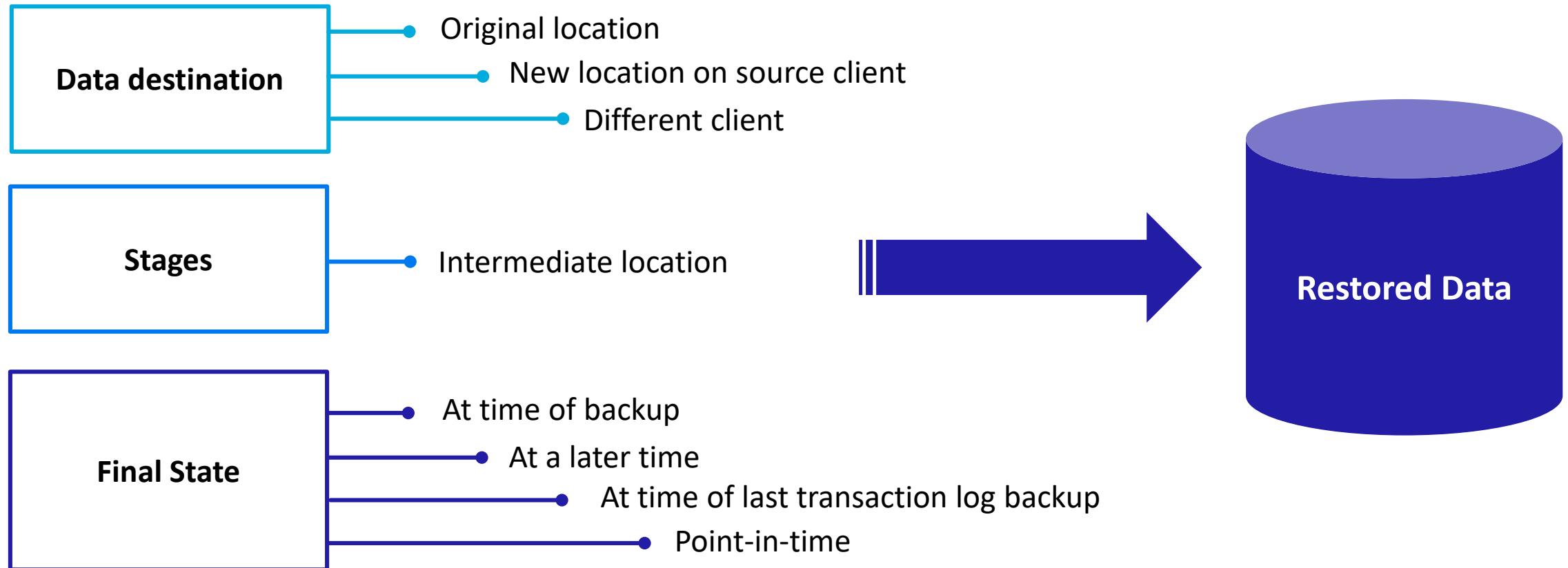
Data Protector supports hot and warm backup of MySQL data, depending on the underlying storage engine used for the chosen MySQL database tables



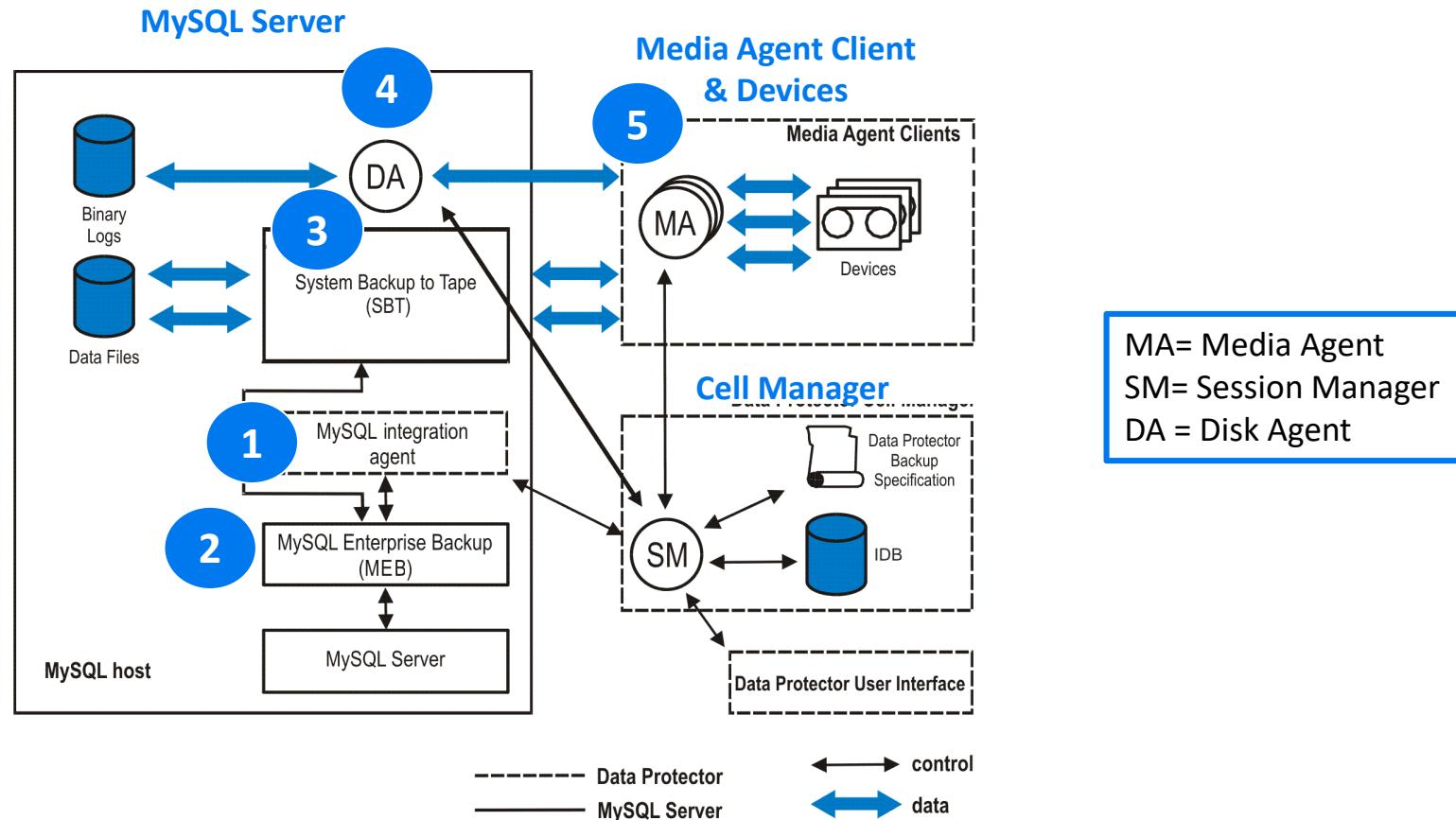
**NOTE:** The Data Protector MySQL integration does not support zero downtime backup.

# Narrowing the Restore Scope

You can narrow your restore scope to particular databases and database tables.



# Data Protector MySQL Integration Architecture



# Limitations: MySQL Integration



1. Cannot back up MySQL configurations with a circular binary log implementation
2. Incremental backups only available for database tables with underlying InnoDB storage engine
3. For MySQL Cluster environment, supports transaction backup of active (master) MySQL server only
4. Does not support multiple data streams — backup parallelism for full and incremental backup is always 1

# Data Protector SAP R/3 Integration

Data Protector integrates with SAP R/3 with a backend Oracle database to perform online and offline backups of SAP R/3 objects

SAP/R3 with  
back-end Oracle  
Database

## What data can you back up?



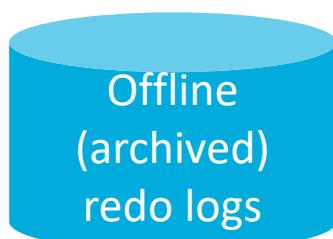
Data files



Control files



Online redo  
logs

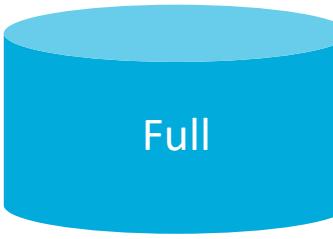


Offline  
(archived)  
redo logs



SAP/R3 logs &  
parameter  
files

## Backup Types

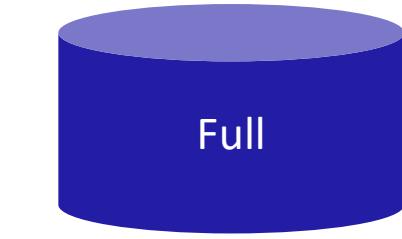


Full



Incremental

## Restore Types



Full

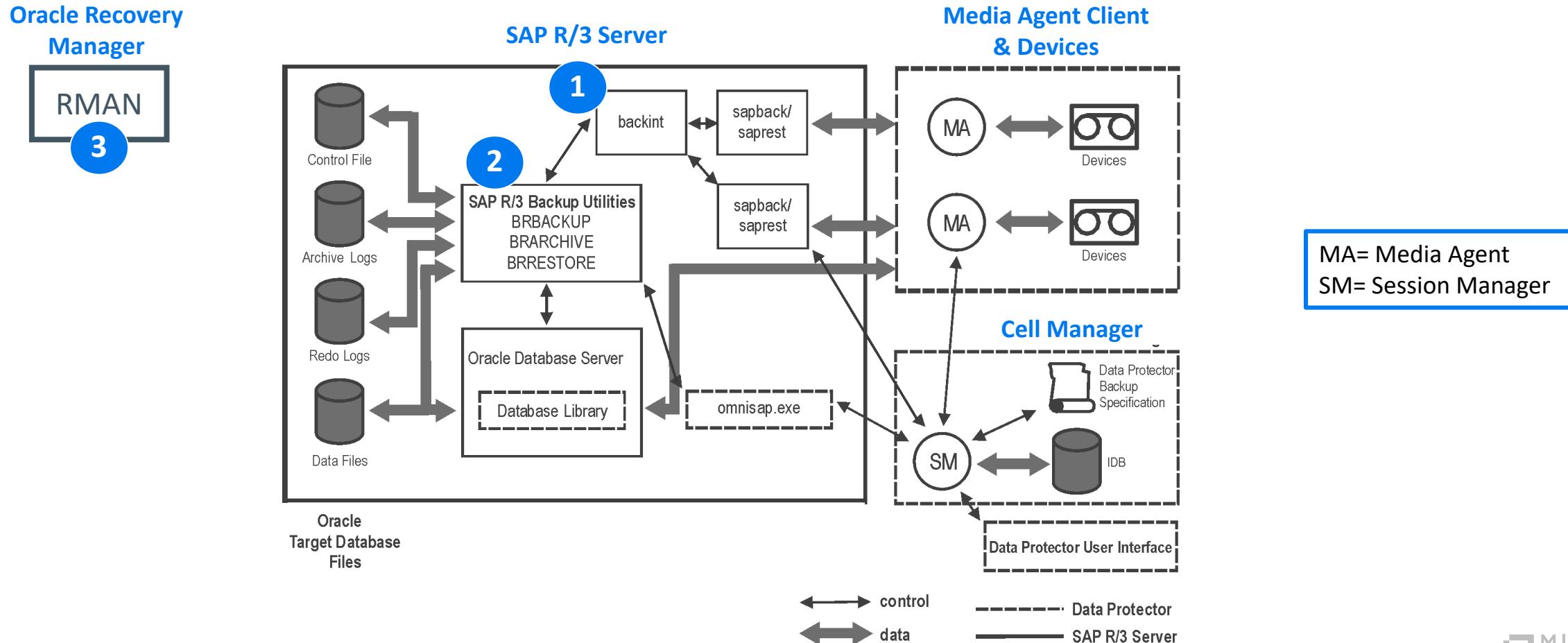


Incremental

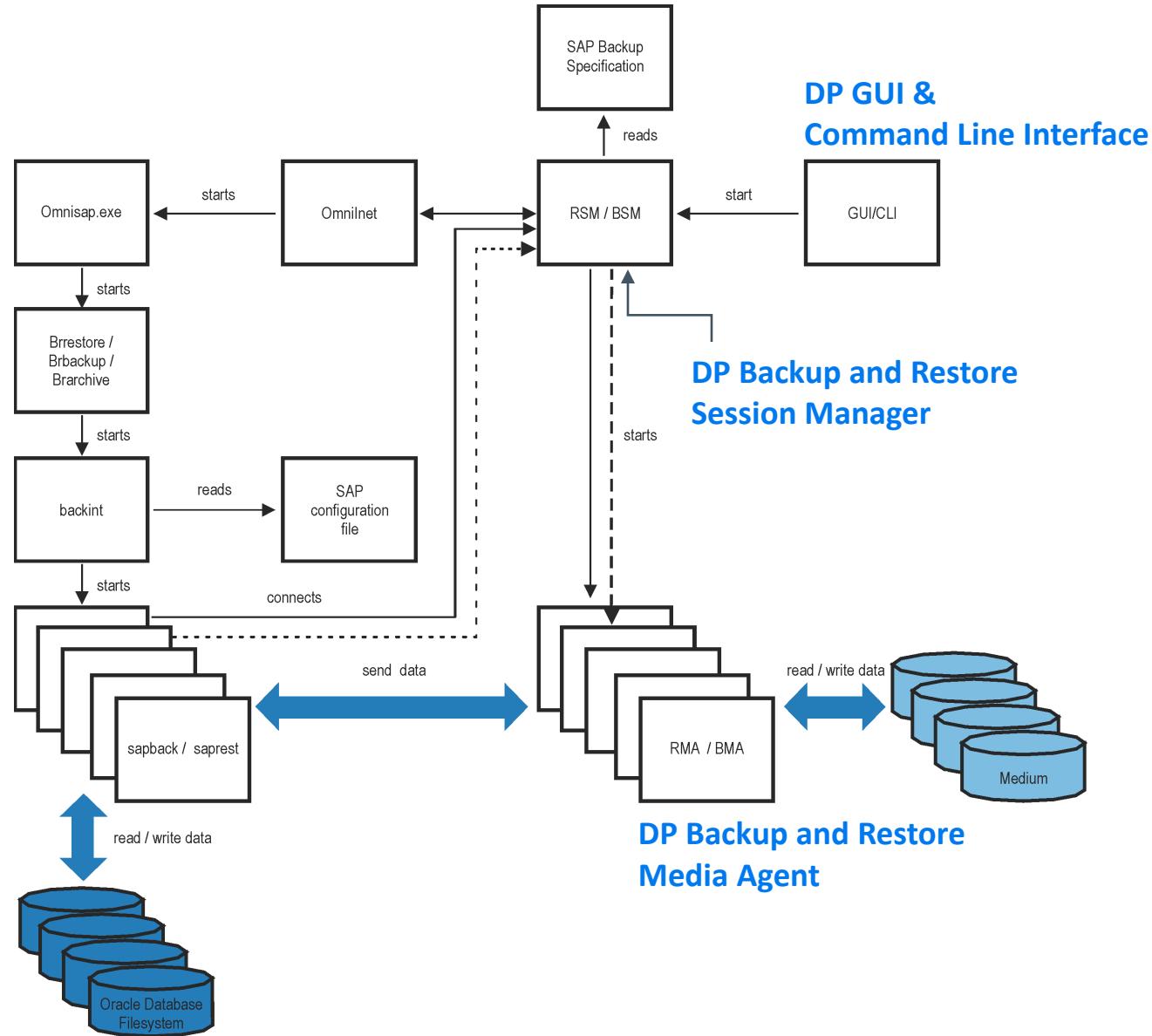
**NOTE:** During an online backup, the SAP R/3 application is actively used.

# Data Protector SAP R/3 Integration Architecture

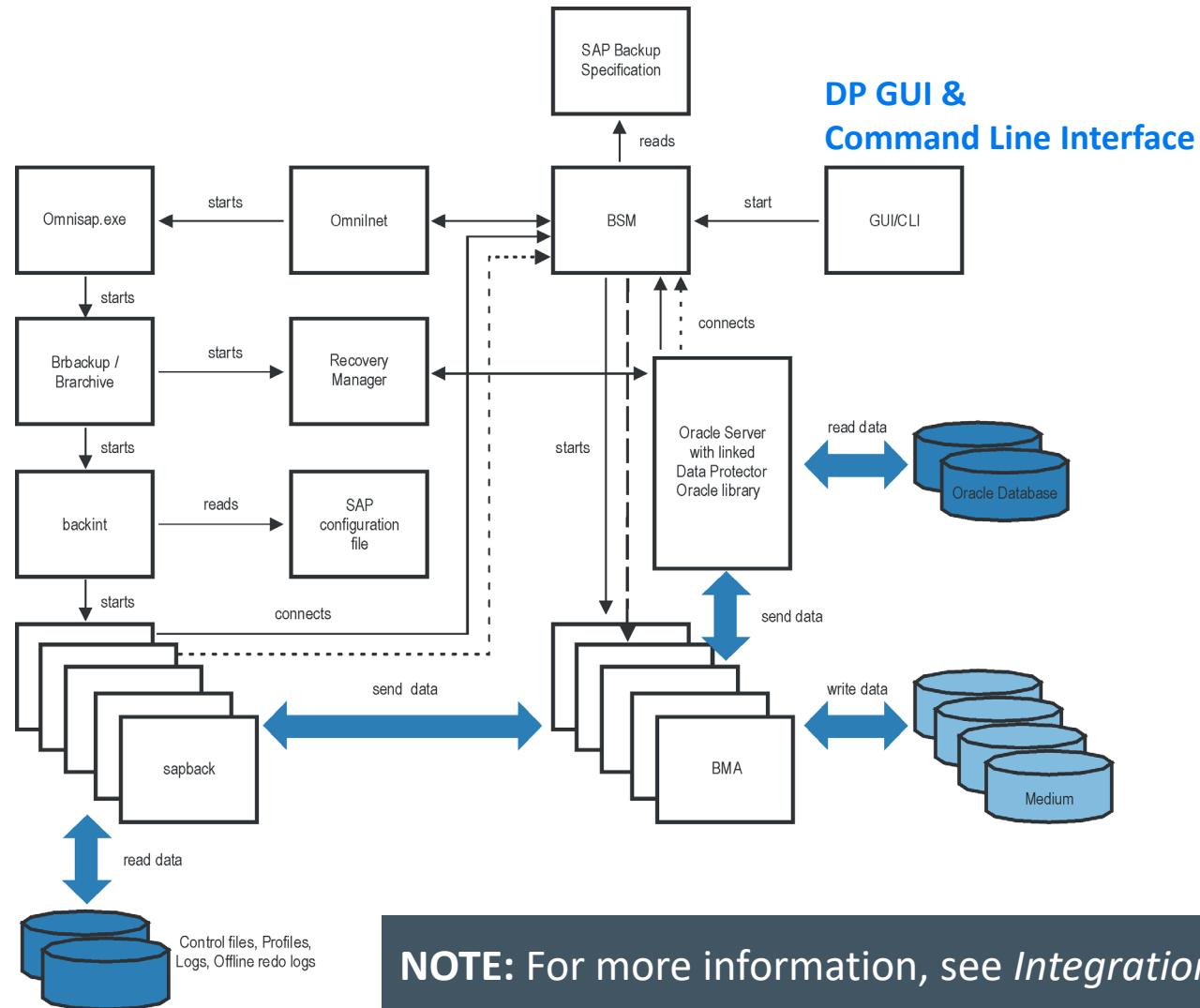
This integration links SAP backup and restore tools with Data Protector. SAP R/3 runs on top of Oracle databases; its backup utilities hide the database from Data Protector



# Backup & Restore: Backint mode- Oracle backend



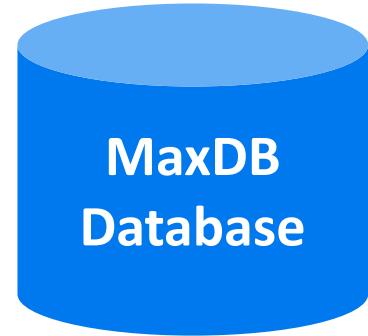
# Backup & Restore: RMAN mode



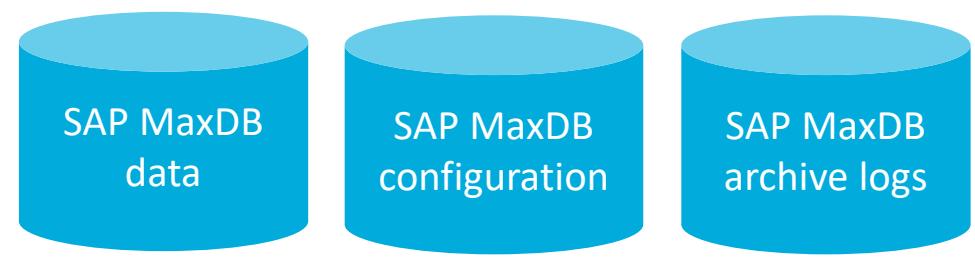
**NOTE:** For more information, see *Integration Guide, Chapter 11*.

# Data Protector SAP MaxDB integration

Data Protector integrates with SAP MaxDB Server to perform online backups of an SAP MaxDB Server instance (SAP MaxDB instance)



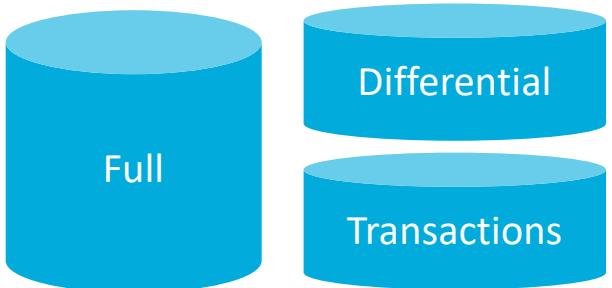
## What data can you back up?



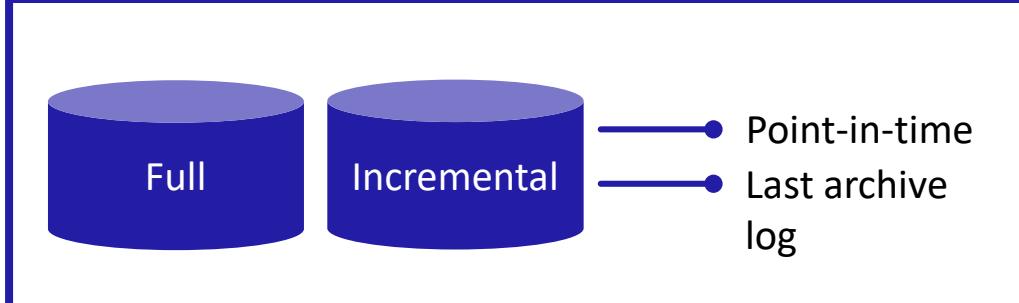
## Where can you restore?



## Backup Types



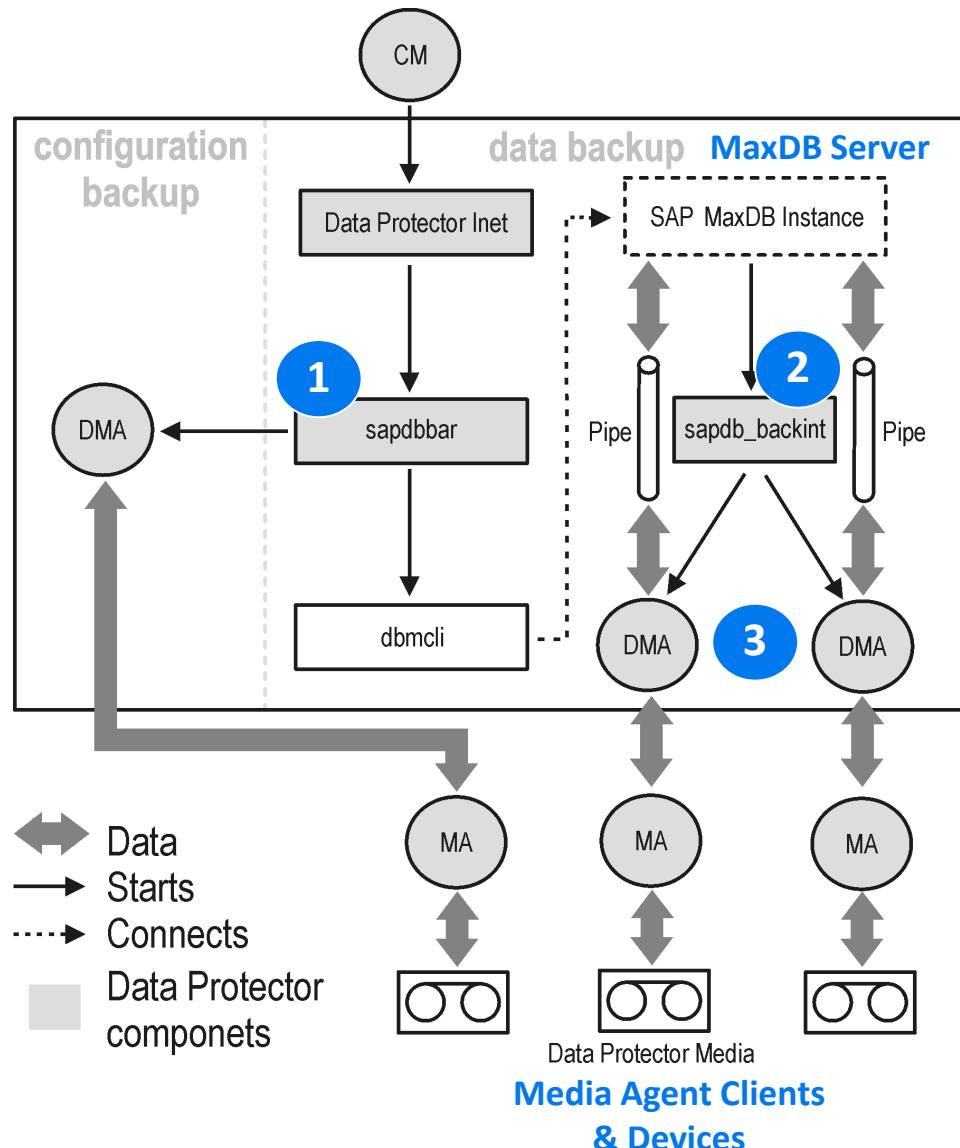
## Restore Types



**NOTE:** During backup, the database is online and actively used. It can be in the Admin or Online mode.

**NOTE:** You can also use SAP MaxDB utilities to backup and restore SAP MaxDB objects.

# Data Protector SAP MaxDB Integration Architecture



DMA = Data Mover Agent  
MA= Media Agent  
CM= Cell Manager

- MaxDB data and archive logs backed up and restored in streams
- MaxDB configuration backup and restored as ordinary files
- Archive logs can be deleted or kept on MaxDB Server
- Integration takes advantage of MaxDB media and media groups

**NOTE:** For more details, see *Integration Guide*, Chapter 12

# Data Protector SAP HANA Appliance Integration

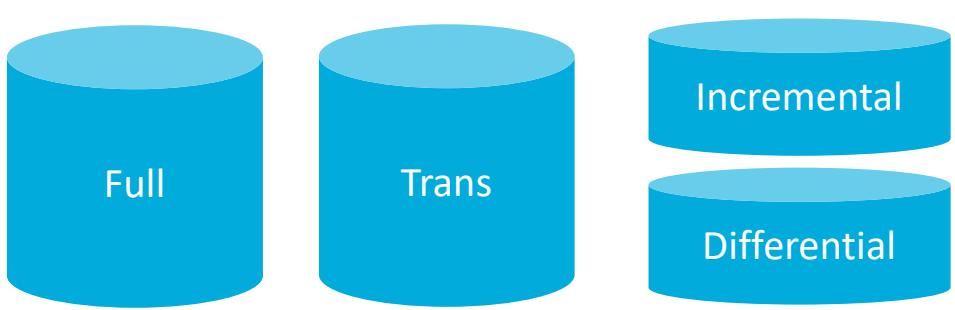
Data Protector integrates with SAP HANA Appliance to perform online backups of SAP Hana instances



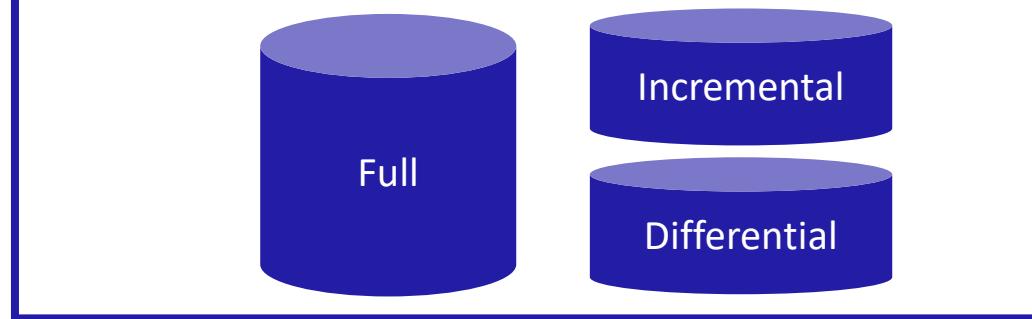
## What data can you back up?



## Backup Types



## Restore Types



**NOTE:** Database must be online during backup.

# Limitations: SAP HANA Appliance Integration

## What you CAN do:

1. Define data for backup, how it should be backed up, and where backup images should be stored
2. Monitor backup and restore progress
3. List SAP HANA objects that were backed up
4. Define timing aspects of backup and recovery



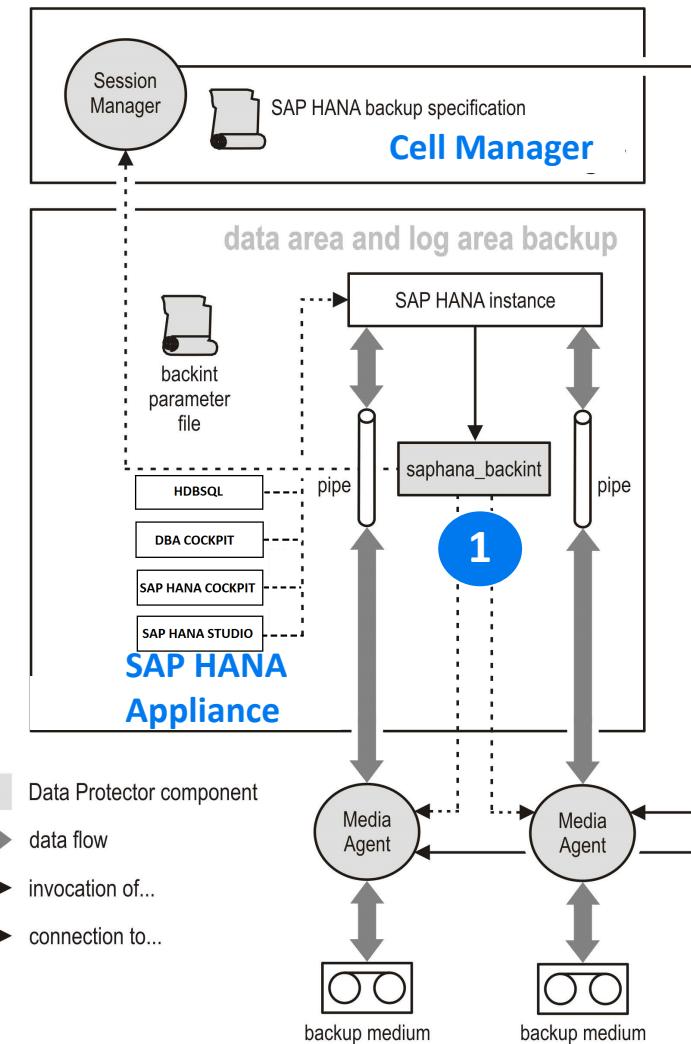
## What is NOT supported:

1. Cannot configure backup specifications for transactional backup (transactional backup performed first for full backup)
2. Cannot perform database copy for multi-tenant database
3. Cannot perform partial backup
4. Cannot start SAP HANA backup and restore session from Data Protector interface
5. Cannot view previews of SAP HANA backup and restore sessions



**NOTE:** Database recovery options are governed by SAP HANA Appliance, via: SAP HANA Studio, SAP HANA Cockpit, DBA Cockpit, or SAP HANA Command Line Interface.

# Data Protector SAP HANA Appliance Integration Architecture



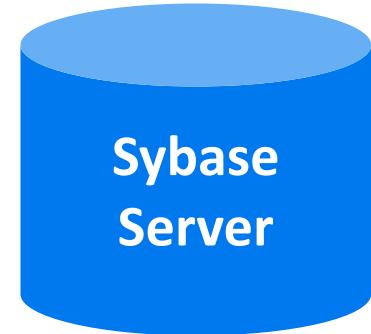
**NOTE:** For more details, see *Integration Guide*, Chapter 12

# Data Protector Integrations with Sybase and PostgreSQL

- Sybase Server integration
- Sybase IQ
- PostgreSQL

# Sybase Server integration

Data Protector integrates with Sybase Server to perform interactive and scheduled backups of the Sybase Server



## Backup Types



**NOTE:** During backup, the database is online and actively used.

## Where can you restore?

To original location

To a new database

To another Sybase instance

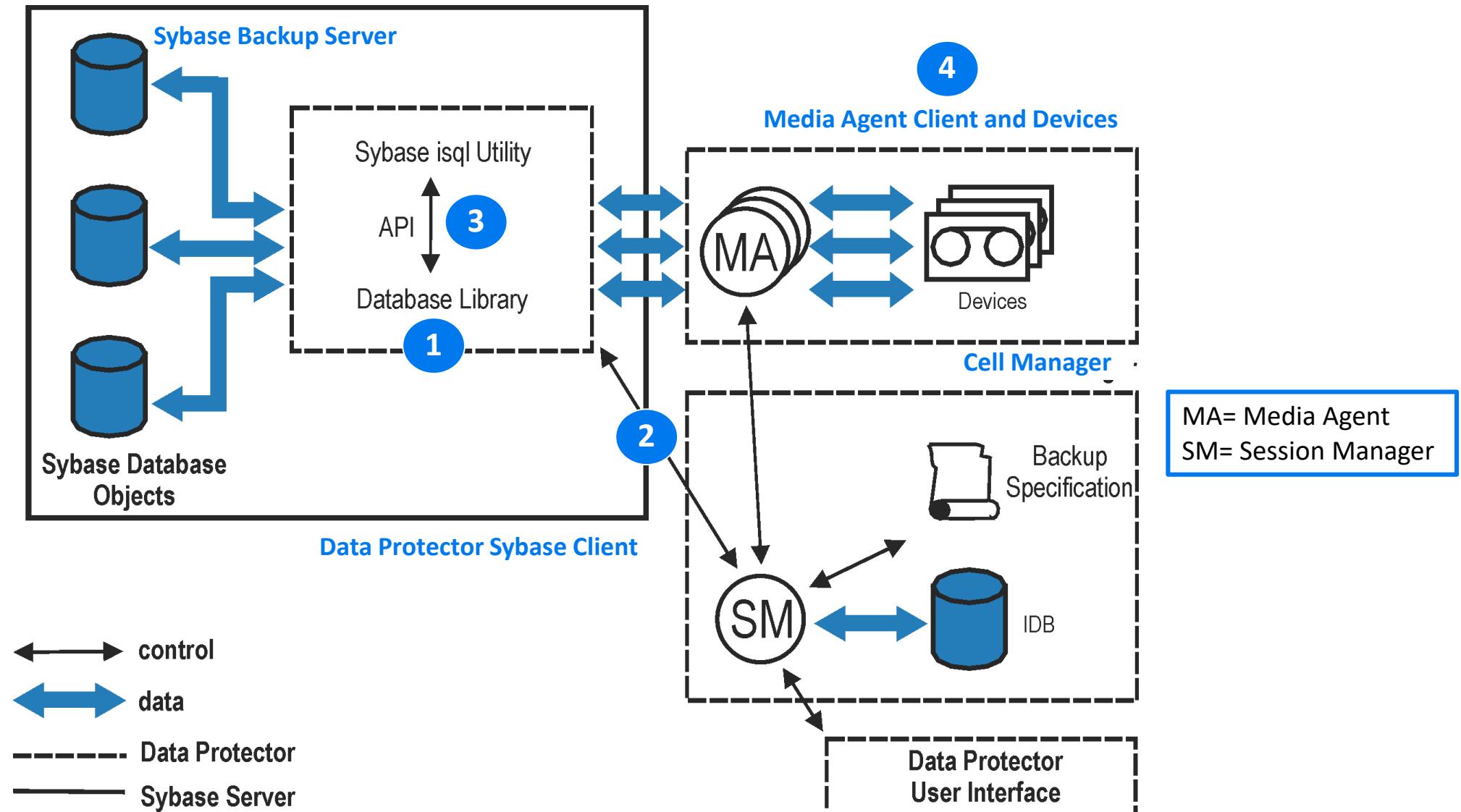
## Restore Types

Full

Transaction Logs

Point-in-time

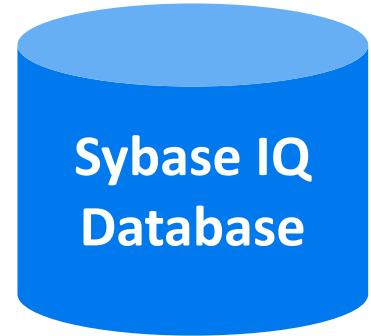
# Sybase Server Integration Architecture



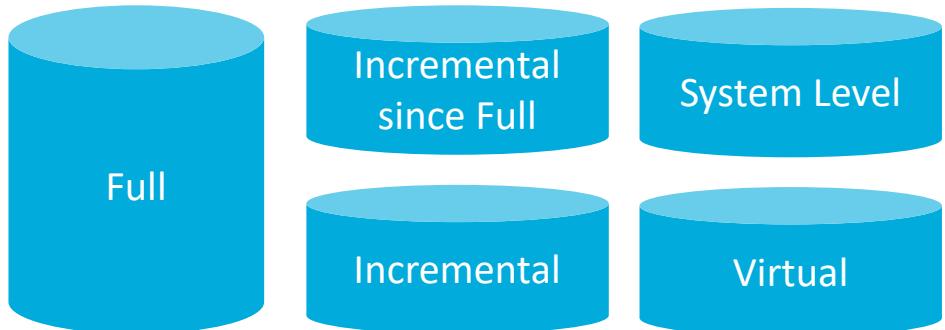
NOTE: For more information, see *Integration Guide, Chapter 14*.

# Sybase IQ integration

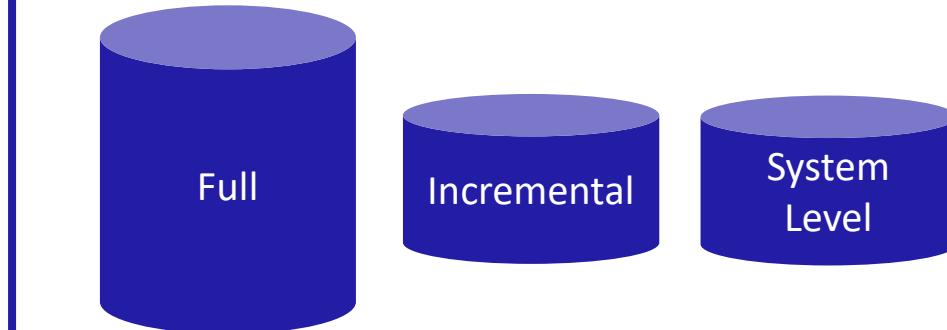
Data Protector integrates with Sybase IQ to perform interactive and scheduled backups of the Sybase IQ Database



## Backup Types



## Restore Types



**NOTE:** Always run a full backup on a new database to provide a base point, followed by full and incremental backups.

**NOTE:** Sybase IQ is supported on platforms where Data Protector File System backup and restore is supported.

# Recommendations: Sybase IQ Backups



- ✓ Validate the database before backup.
- ✓ Perform a full database backup once a week
- ✓ Perform the “incremental since full” backup as needed
- ✓ Perform the “incremental” backups every finite number of hours during the day
- ✓ After each backup, run the post-exec script to delete backup files of the dumped database used for backup
- ✓ Write the database to archive devices

**NOTE:** Always consider time and storage requirements for backups.

# PostgreSQL Integration

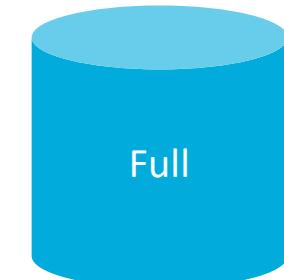


**Data Protector performs online backup of PostgreSQL instances and related write-ahead log files (WAL files). The WAL files backup ensures the PostgreSQL data integrity**

## What data can you back up?



## Backup Types



### Backing up WAL files ensures integrity

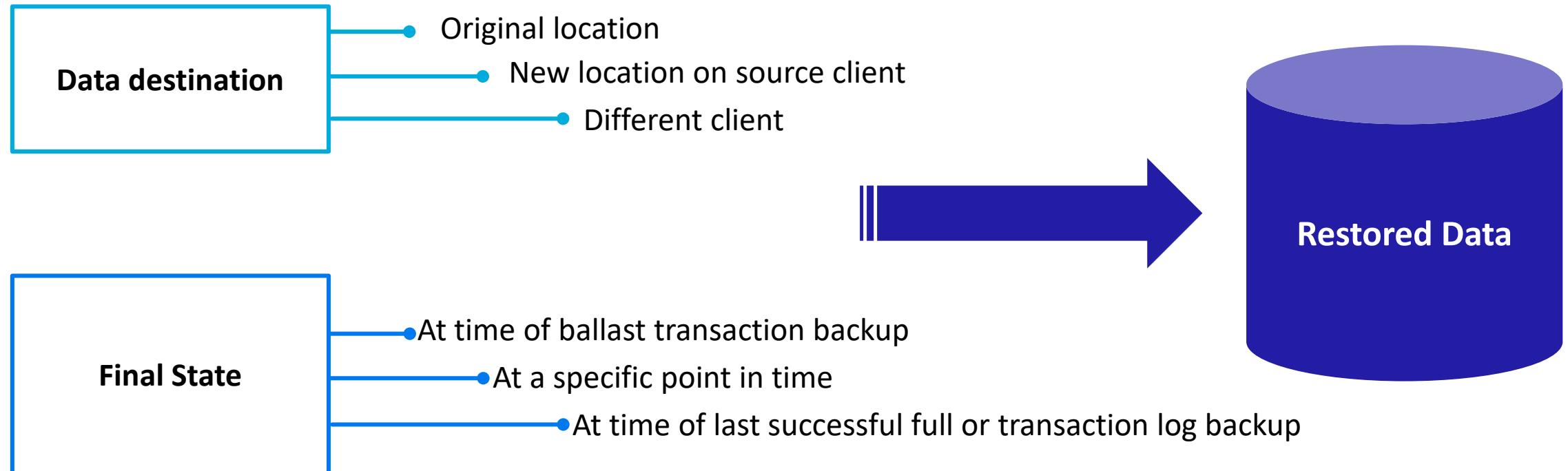
- Involved database tables can be actively used or changed during backup session.

### Transaction backup = incremental

- Smaller and faster than full backup
- Conserves storage space on backup media
- Transaction backup data is merged with previous backup

# Restore Scope

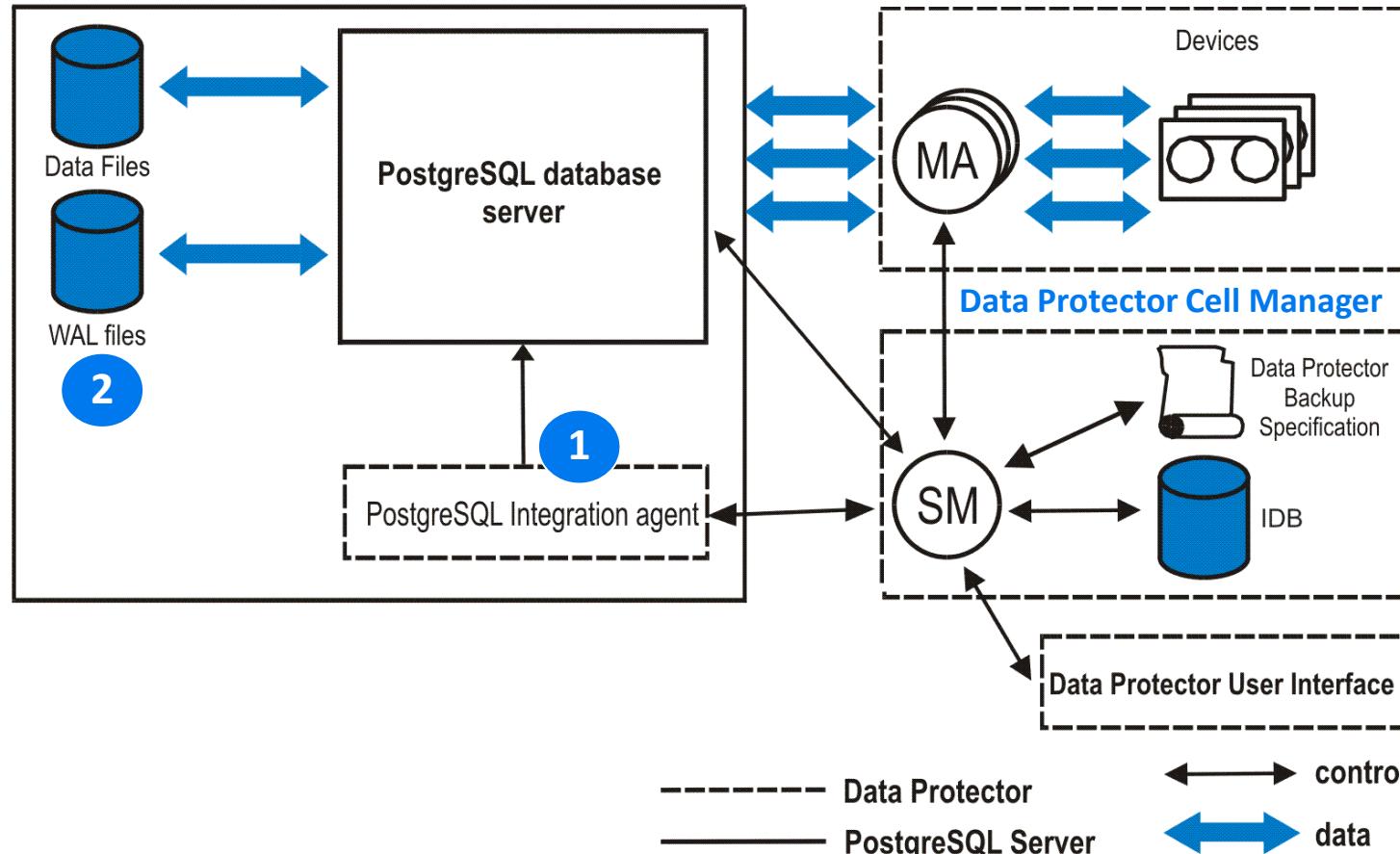
You can choose the scope of the restore



# PostgreSQL Integration Architecture

Data Protector PostgreSQL integration takes advantage of PostgreSQL write-ahead logging (WAL) method to ensure data integrity.

PostgreSQL Host



SM= Session Manager  
MA= Media Agent

**NOTE:** For more information about PostgreSQL integration:  
Refer to *Integration Guide*, Chapter 21.

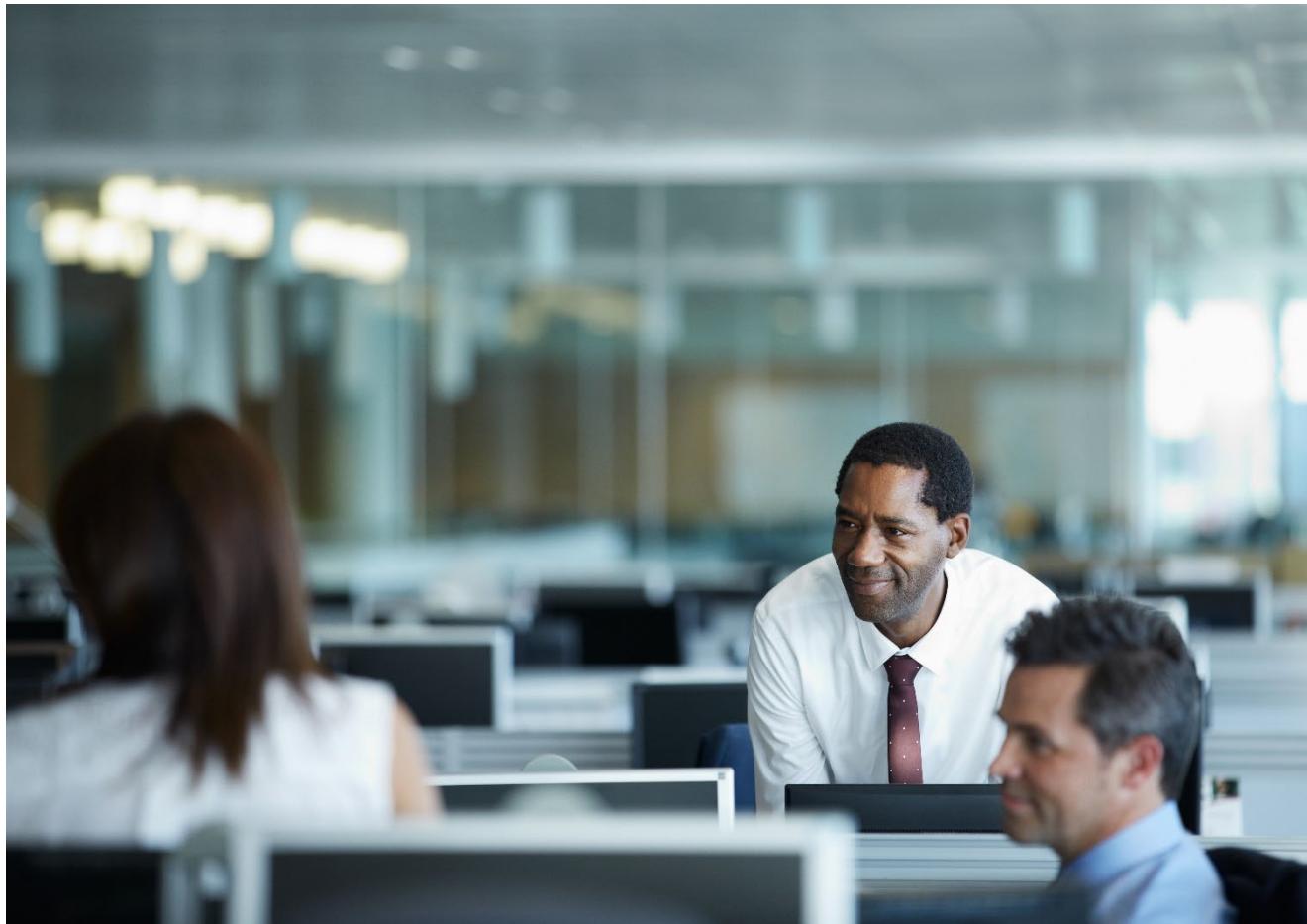


# Wrap-Up

- Summary
- Module Quiz

# Quick Summary

Here's what you learned ...



1. Informix Server integration
2. DB2 UDB integration
3. Lotus Notes/Domino Server integration
4. MS SQL Server integration
5. MS Sharepoint Server integration
6. MS Exchange Server integration
7. Oracle Server integration
8. MySQL integration
9. SAP R/2 integration
10. SAP MaxDB integration
11. SAP HANA Appliance integration
12. Sybase Server integration
13. Sybase IQ integration
14. PostgreSQL integration



## Module 7 Quiz

Pause now to take a short interactive quiz to gauge your understanding of what you learned in this module.

# Congratulations!

You completed Module 7.

Stay tuned for Module 8: Monitoring and Reporting

## What's next?

[Move on to the next module.](#)





# Data Protector 10.10

## Module 8: Reporting and Monitoring

### Technical Deep Dive Training, Level 310

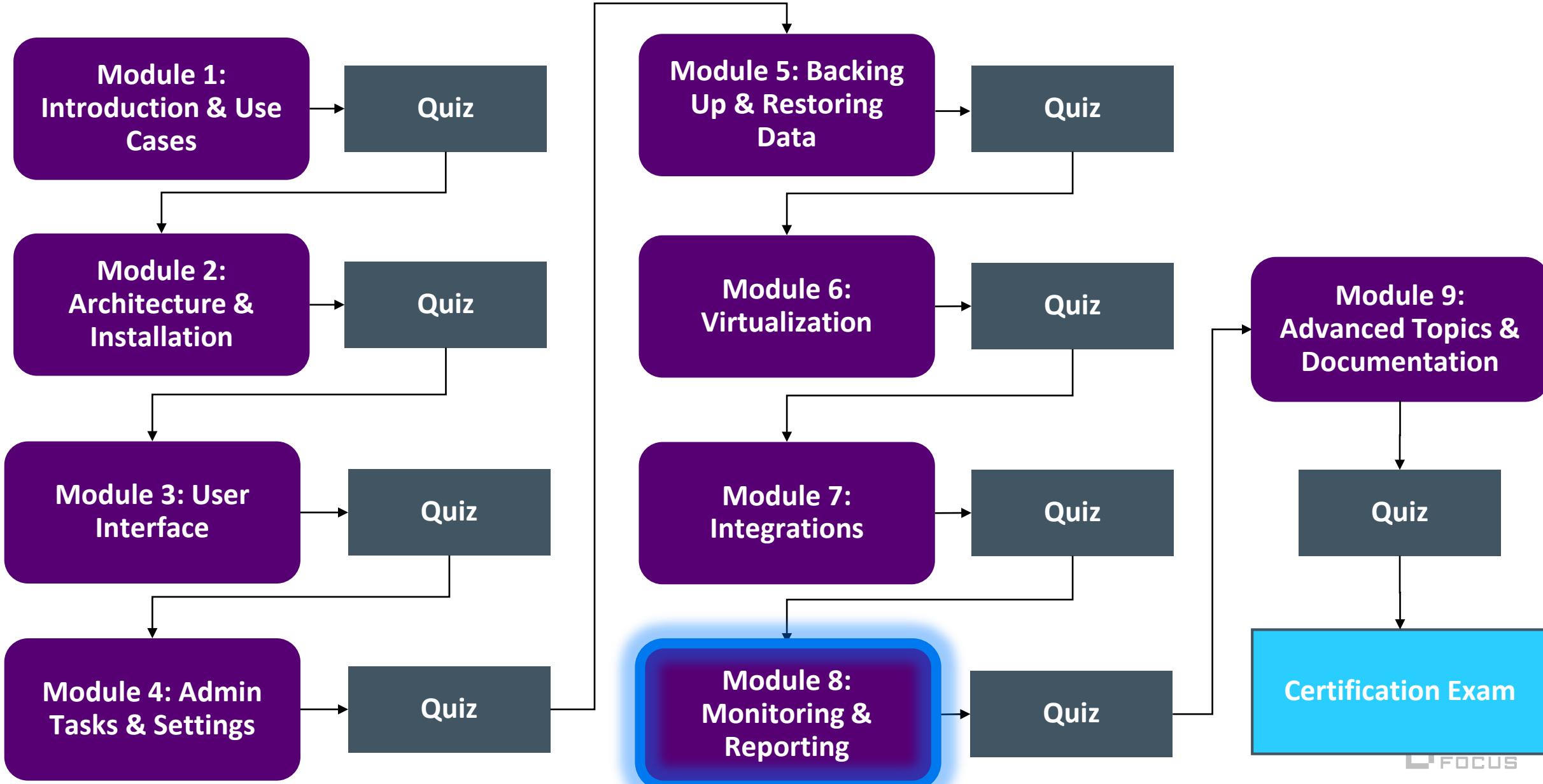
Keith Walls  
Technical Enablement

October 2018

You can:

- Download the presentation.
- Download PowerPoint slides & speaker notes.

# Level 320 Multi-Module Course



# About this Course

## Monitoring

- What can you monitor?

## Reporting



## Notification

- Notification configuration
- Triggering events
- Send methods
- Event logs
- Backup Navigator

## Module Quiz

- Take the interactive Module Quiz

# Monitoring

- What is Data Protector monitoring?
- What can be monitored?

# About Monitoring

Monitor running sessions and manage mount requests



- View:
  - session status, type, owner, ID
  - start time
  - names of the corresponding backup specifications
- Monitor window opens during interactive session
- Change level of reported messages
- Monitor several cells

# Things that can be monitored



**View currently running sessions**



**View finished sessions**



**Abort running sessions**

# Analytics

# Data Protector Native Reporting : New at 10.10

## Built into Data Protector for Extensive Reporting

- Data Protector now offers various reports that help you in managing and planning your backup environment. These reports can be accessed using the **Home** context > **Reports** option in the Data Protector GUI. The Data Protector reports are customizable and provide information on the status of the last backup, object copy, object consolidation, or object verification, consumption of media in media pools, status of devices, etc. You can download these reports in PDF, PNG, CSV, or JSON format. You can also configure to send these reports through email in the **Reports** > **Advanced Settings** option. To use the reporting capability, install the Reports component on a Linux or Windows server that is not a Data Protector Cell Manager. The Data Protector reports are available with Capacity, Trial (Express), or Trial (Premium) license only.

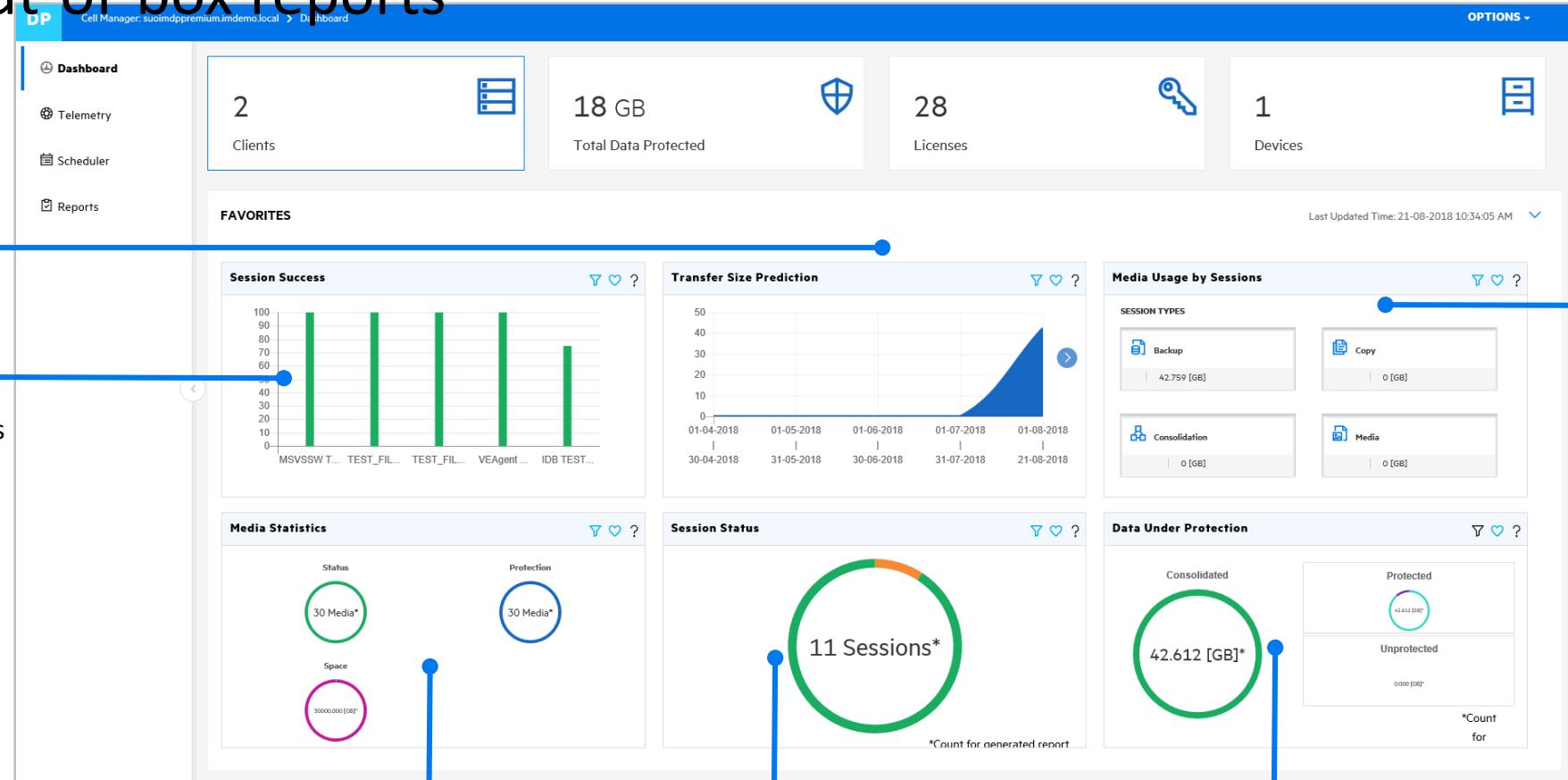


# Analyzing and Optimizing Backup and Recovery Strategy

- Once backup jobs are created and scheduled, you need to know if they were executed in an optimal way. If jobs fail to execute, they create missing links in the restore chain. Restores can't be done to that point and restoring the full backup object might become slower than expected. Both RPO and RTO are affected.
- There may also be performance or capacity issues that need to be addressed. But how big is the issue and how much effort needs to go into a solution approach?

# At-a-Glance View into SLAs, Backup Size, Sessions

- See all critical backup metrics on a single summary dashboard or on out-of-box reports



Built-in analytics shows prediction of transfer size

Percentage of successful backups is critical for mgmt. reviews

Easy tracking of RPOs and RTOs for mission critical applications

Backup session status

General stats on how much data is being protected

Clear identification of which storage media was used by session.

# Application Overview for SLAs, RPO & RTO

The screenshot shows the Micro Focus Data Protector Manager interface. The left sidebar navigation includes options like Dashboard, Telemetry, Scheduler, Reports (selected), Configuration Reports, Sessions in Timefra..., Pools And Media Re..., Compliance Reports (selected), RPO (selected), RTO, Advanced Reports, and Settings. The main content area is titled "RECOVERY POINT OBJECTIVE". It displays a table of RPO settings across three clients: suoimdppremium.imdemo.local, suoimvcsa1.imdemo.local, and suoimvcsa1.imdemo.local. The table columns are Cell Manager, Client, Application Type, Specification Name, Minimum RP, Maximum RP, Average RP, and Status. The "RPO/RTO CONFIGURATION" section at the bottom allows setting RPO and RTO values for specific clients and application types. A blue box highlights the "Client Name \_ Application Type" dropdown and the RPO input field.

Cell Manager	Client	Application Type	Specification Name	Minimum RP	Maximum RP	Average RP	Status
suoimdppremium.imdemo.local	suoimdppremium.imdemo.local	MS VSS	MSVSSW TEST_VSS	0	1	0.5	Meet
suoimdppremium.imdemo.local	suoimvcsa1.imdemo.local	VEPA	VEAgent TEST_VMWARE	2	2	2	Meet
suoimdppremium.imdemo.local	suoimvcsa1.imdemo.local	VEPA Disk	VEAgent TEST_VMWARE	2	2	2	Meet

**Effective SLAs**

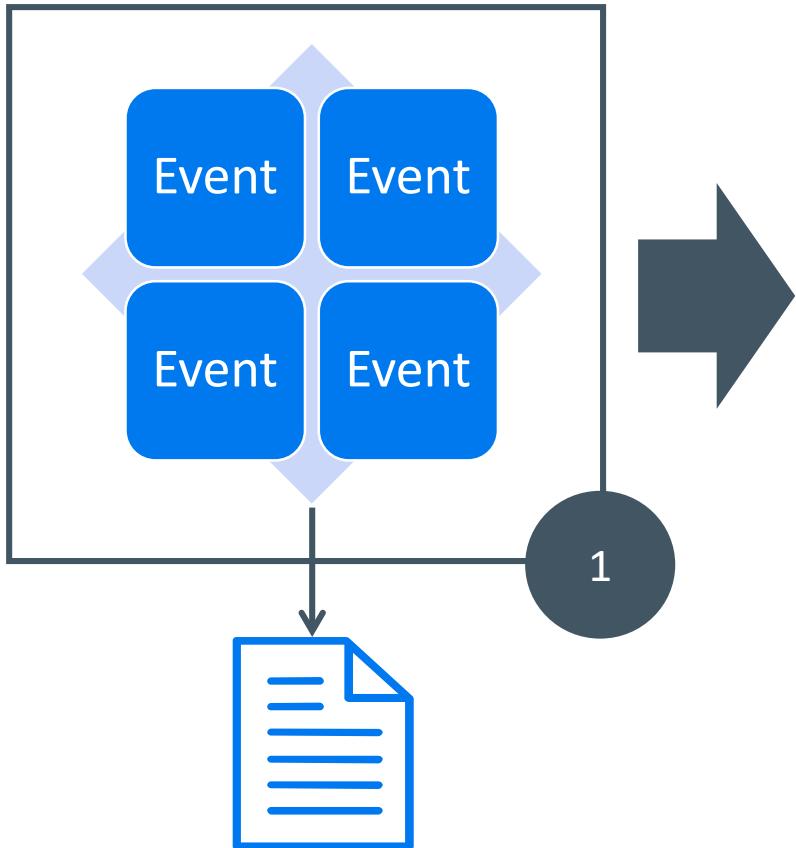
**SLA settings**

# Notification

- Notification configuration Triggering events
- Send methods
- Event logs
- Backup Navigator

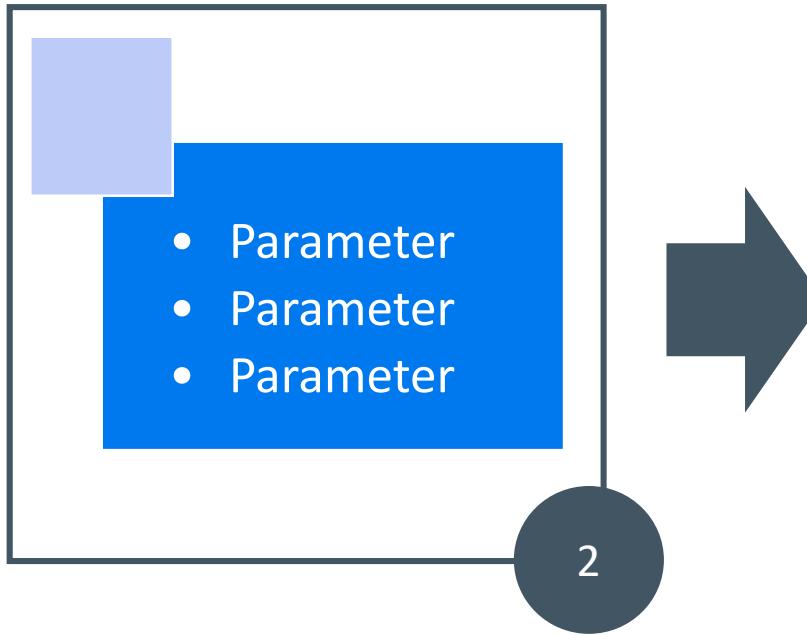
# Notification Configuration

## Event Notifications



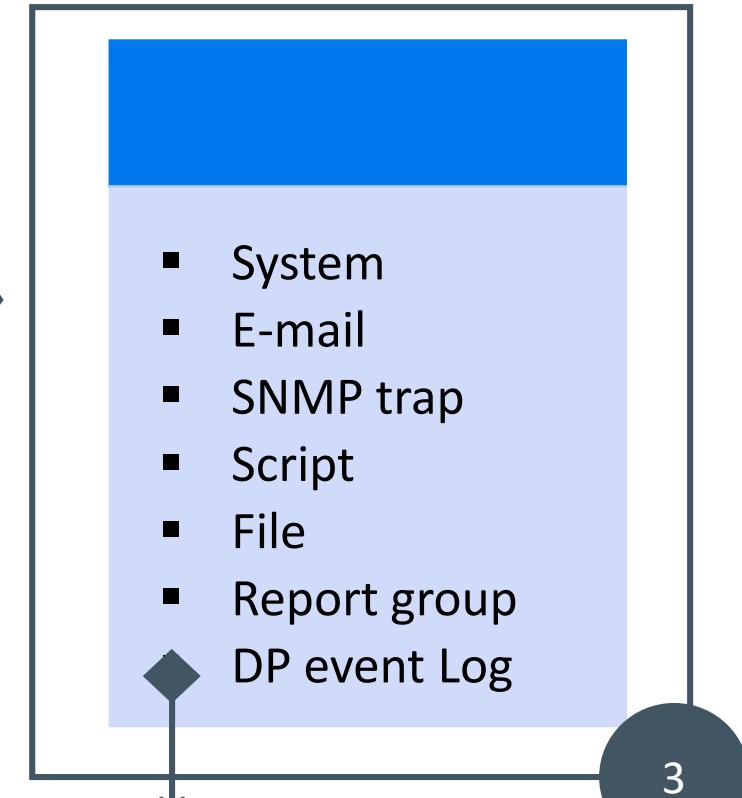
**REFERENCE:** See Slide Notes for complete list of events that trigger notifications.

## Input Parameters



**IMPORTANT!** Must be part of Admin user group or have Reporting & Notifications rights

## Recipient



3

# Notifications Send Methods

- Broadcast Message Send Method
- E-mail Send Method
- External Send Method
- Log To File Send Method
- Data Protector Log Send Method
- SNMP Send Method

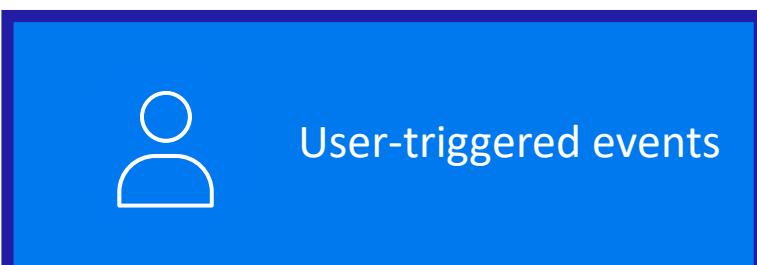
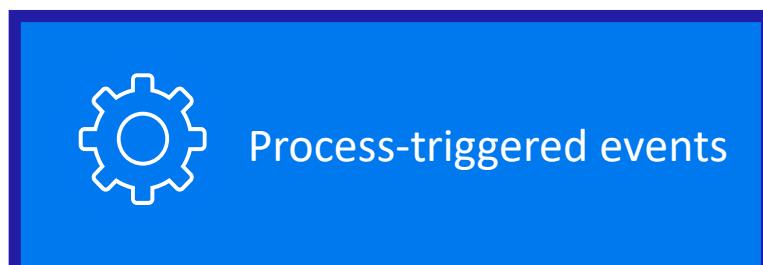


# The Data Protector Event Log

This message appears if new notifications occurred since the last time the user opened the Data Protector GUI

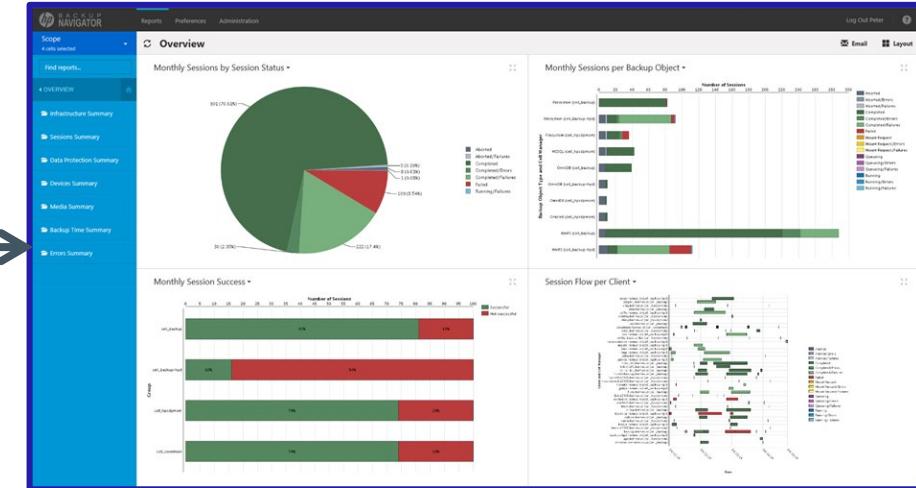
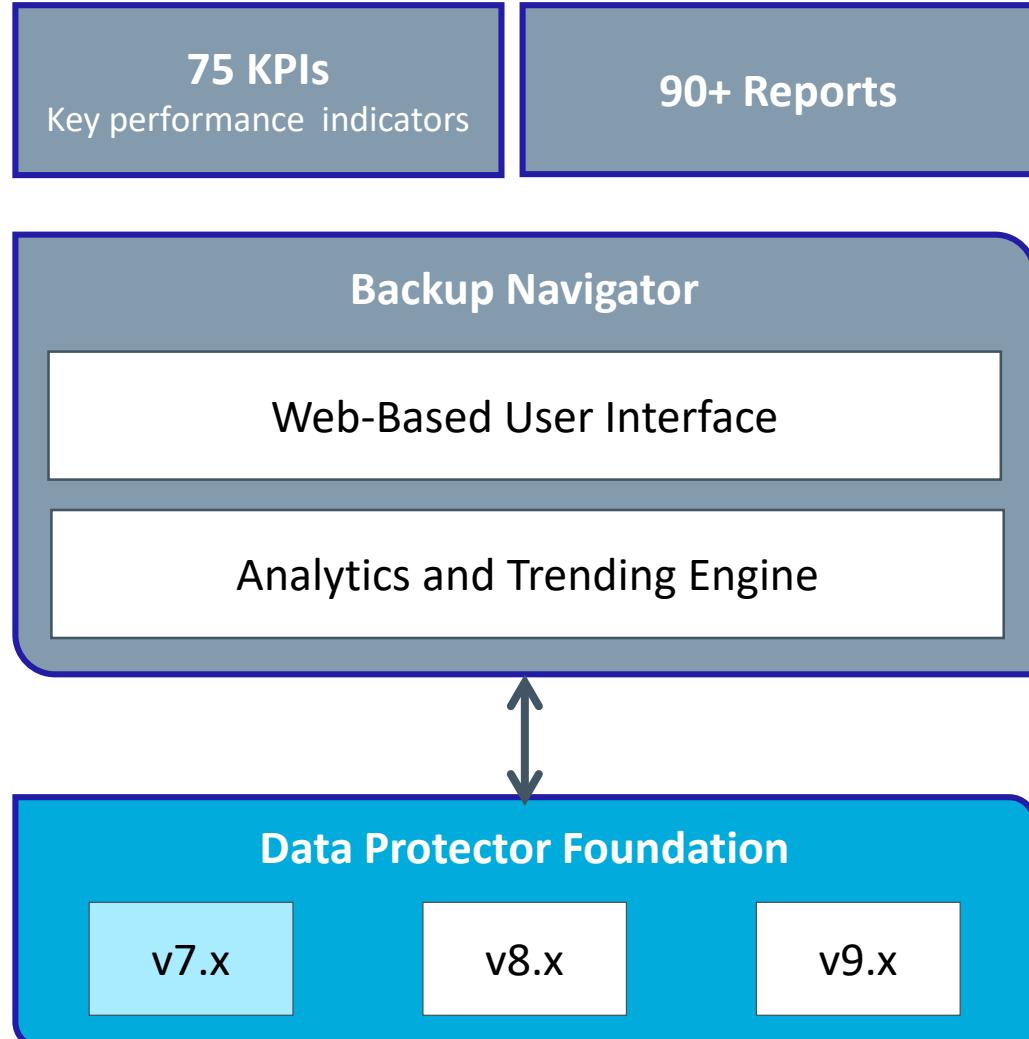


Ob2EventLog.txt



# Backup Navigator – Analytics and Advanced Reporting

Analyze Data Protector infrastructure, locate and troubleshoot problems, simplify usage in multi-cell, multi-tenant environments



- Intelligent dashboards
- Real-time predictive analytics
- Drill-down for rapid root cause analysis
- Collaboration and cross-system support
- Flexible personalized reporting



# Wrap-Up

- Summary
- Module Quiz

# Quick Summary

Here's what you learned ...



- Monitor running sessions and manage mount requests
- Abort running sessions and view finished sessions
- Basic high-level reporting
- Best for single-Cell environment
- Customize reports using parameters and generate different formats
- Work with six different report types
- Send notifications when process-triggered or user-triggered events occur
- Specify the triggering events as well as the send method
- Use Backup Navigator as an intuitive, Web-based dashboard for real-time predictive analytics



## Module 6 Quiz

Pause now to take a short interactive quiz to gauge your understanding of what you learned in this module.

# Congratulations!

You completed Module 8.

Stay tuned for Module 9: Advanced Topics and Documentation

## What's next?

[Move on to the next module.](#)





# Data Protector 10.10

## Module 9: Advanced Topics & Documentation

### Technical Deep Dive Training, Level 310

Keith Walls  
Technical Enablement

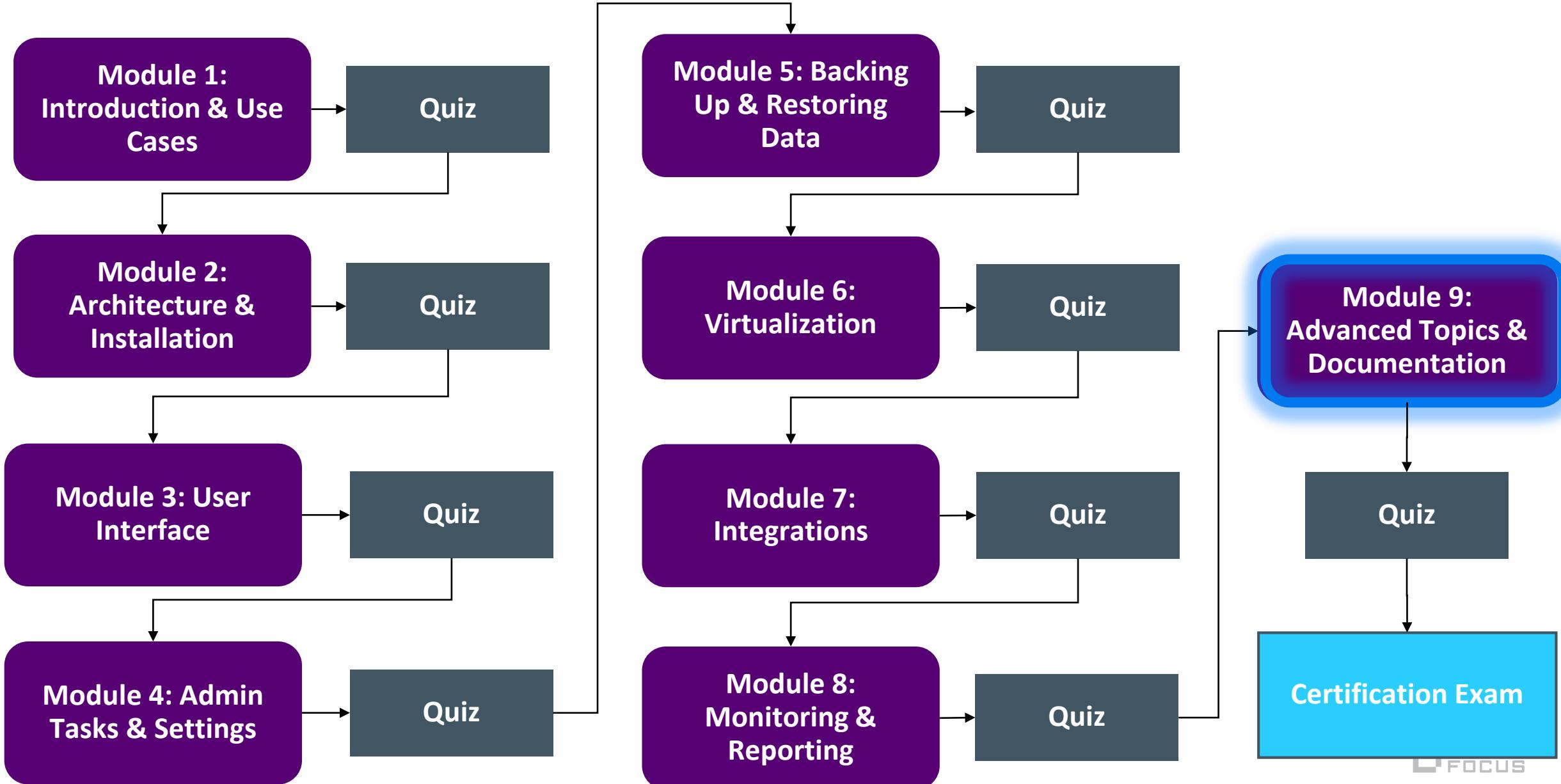
October 2018

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# Level 320 Multi-Module Course



# About this Module

## What's New

- DP Express
- DP Premium
- Features

## Application Consistent Recovery

- SAP
- Oracle
- Microsoft
- Others

## Advanced Virtual Environment Protection

- MS HyperV
- VMware

## Backup to the Cloud

- StoreOnce
- Data Domain
- Use Cases

## Storage

- HP/NetApp/
- Dell EMC
- 3Way NDMP

## Disaster Recovery/ Automation/ Scheduler

- Disaster Recovery
- Operations Orchestration
- Scheduler

## Zero Downtime Backup

- Introduction
- 

## REST APIs

- REST APIs

## Documentation

- How to access
- Documentation map

## Module Quiz

## Certification Exam

# About this Module: What's New in 10.10

## Data Protector Express

**Data Protector Express** is a virtualization only product offering based on the socket-based licensing model. Data Protector Express includes the following features:

- Introduces socket-based licensing which includes support for software encryption
- Includes support for existing virtualized environments (VMware and Hyper-V).
- Supports backup and recovery of virtual machines and Data Protector Internal Database (IDB). However, the backup of filesystem, application integration, etc. are not supported.
- Supports advanced virtualization features such as granular recovery (GRE), Power On, Live Migrate, and zero downtime (ZDB) integrations.
- Recovers current and previously backed-up data (pre-upgrade).
- Licensing details provides information on consumed sockets and free sockets available.
- Licenses for additional sockets can be added using the Data Protector GUI only. Licenses can be applied either during import or post import of vCenter/Hyper-V or ESXi server. License management, for example, adding or removing sockets, is not supported via CLIs.
- Supports upgrade from releases Data Protector 8.1x, 9.x, and 10.0x to Data Protector 10.10. Mixed mode environments with socket-based and capacity-based licensing are not supported in a standalone or Manager-of-Manager environment. If you install Data Protector Express and Data Protector Premium licenses, only the Data Protector Premium licenses are used.

# About this Module: What's New in 10.10

## Data Protector Premium

Data Protector Premium licensing is based on the amount of capacity being protected. If you install Data Protector Express and Data Protector Premium licenses, only the Data Protector Premium license is used. The Data Protector Premium includes the following features:

- Supports software encryption.
- Supports full functionality of Data Protector.
- Supports backup of filesystem, application integration, virtualization, etc.
- Supports MoM environment with multiple Cell Managers using Data Protector Premium license.
- Supports upgrade from releases Data Protector 8.1x, 9.x, and 10.0x to Data Protector 10.10.
- Provides easy upgrade from Data Protector Express to Data Protector Premium simply by changing the license key.
- Support for the new HPE StoreOnce 4.x physical and virtual appliances

# About this Module: What's New in 10.10

## Data Protector reports

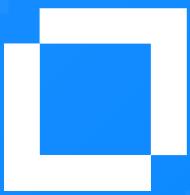
Data Protector now offers various reports that help you in managing and planning your backup environment. These reports can be accessed using the **Home** context > **Reports** option in the Data Protector GUI. The Data Protector reports are customizable and provide information on the status of the last backup, object copy, object consolidation, or object verification, consumption of media in media pools, status of devices, etc. You can download these reports in PDF, PNG, CSV, or JSON format. You can also configure to send these reports through email in the **Reports > Advanced Settings** option. To use the reporting capability, install the Reports component on a Linux or Windows server that is not a Data Protector Cell Manager. The Data Protector reports are available with Capacity, Trial (Express), or Trial (Premium) license only.

## Backup of Windows native NTFS de-duplicated volumes

A new option De-duplication volume backup is introduced in the Backup Object Summary for protecting Windows native NTFS dedupe volumes. When this option is selected, you can run incremental backup, enhanced incremental backup, or incremental backup using change log provider for Windows native dedupe volume.

## Capacity-based license improvements in Data Protector Premium

The Data Protector dashboard now displays the amount of data protected and counted for capacity-based license calculation at a host/object level. The capacity-based licensing is improved to avoid double-counting of capacity when the hostname, IP Address, or vCenter names are changed.



# Application-consistent recovery

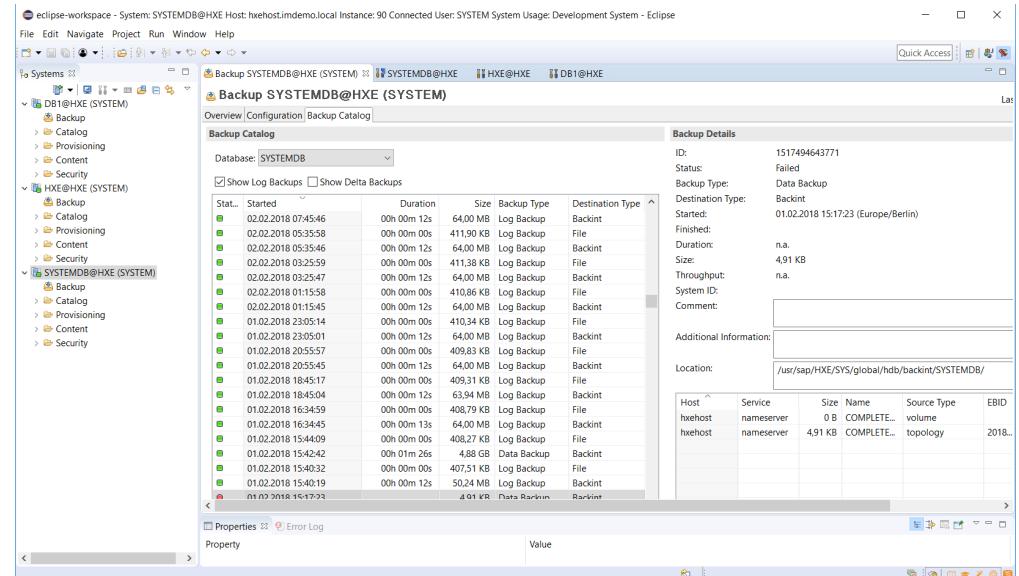
# Application Integrations – SAP

Consistent data protection and compliance



## SAP/R3 and NetWeaver SAP HANA 1.0 and 2.0

- Supports BackINT API (BRtools etc.)
- SAP/R3 with Disk Snapshot (ZDB) and Instant Recovery (IR)
- System Copy/Database Copy
- SAP/R3 with MaxDB/SAPDB/Oracle
- SAP HANA 1.0/2.0 with scripted snapshots



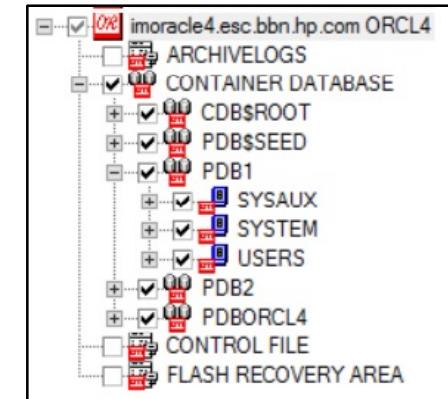
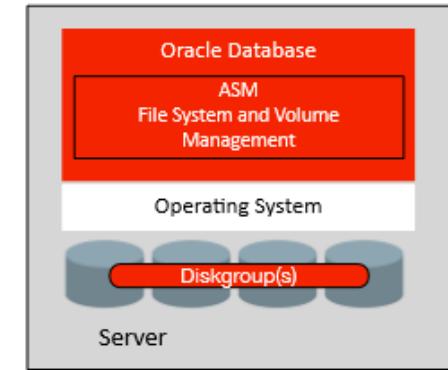
# Application Integrations – Oracle

Consistent data protection and compliance



## Oracle Database:

- Real Application Cluster (RAC)
- Container Databases (CDB)
- Automatic Storage Management (ASM)
- Restore to Point-in-Time, Transaction, Sequence
- Restore to different Oracle System
- Full Oracle RMAN compliance
- Zero DownTime Backup (ZDB) and Instant Recovery (IR)



# Application Integrations – Microsoft

Consistent data protection and compliance

MS Exchange Server

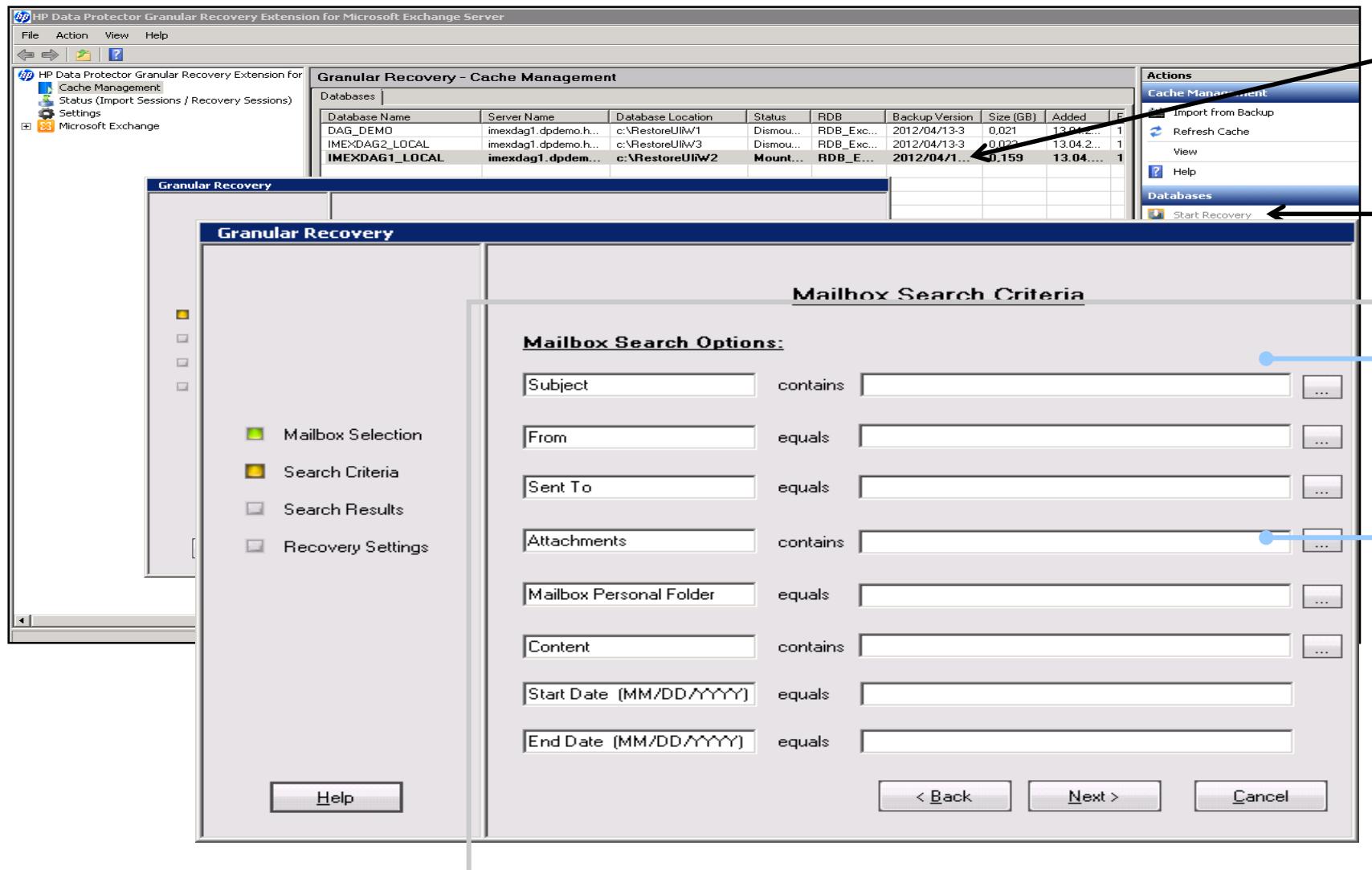
MS SQL Server

MS Sharepoint Server

- Database Availability Groups (AG/DAG)
- Standalone and Clustered
- Active/Passive Copy backup/restore
- SharePoint Farm Backup/Restore
- Granular Recovery for Exchange and SharePoint
- VSS and VDI compliant
- VSS Transportable Backup (ZDB)
- SharePoint Farm Backup



# Microsoft Exchange Granular Recovery Extension



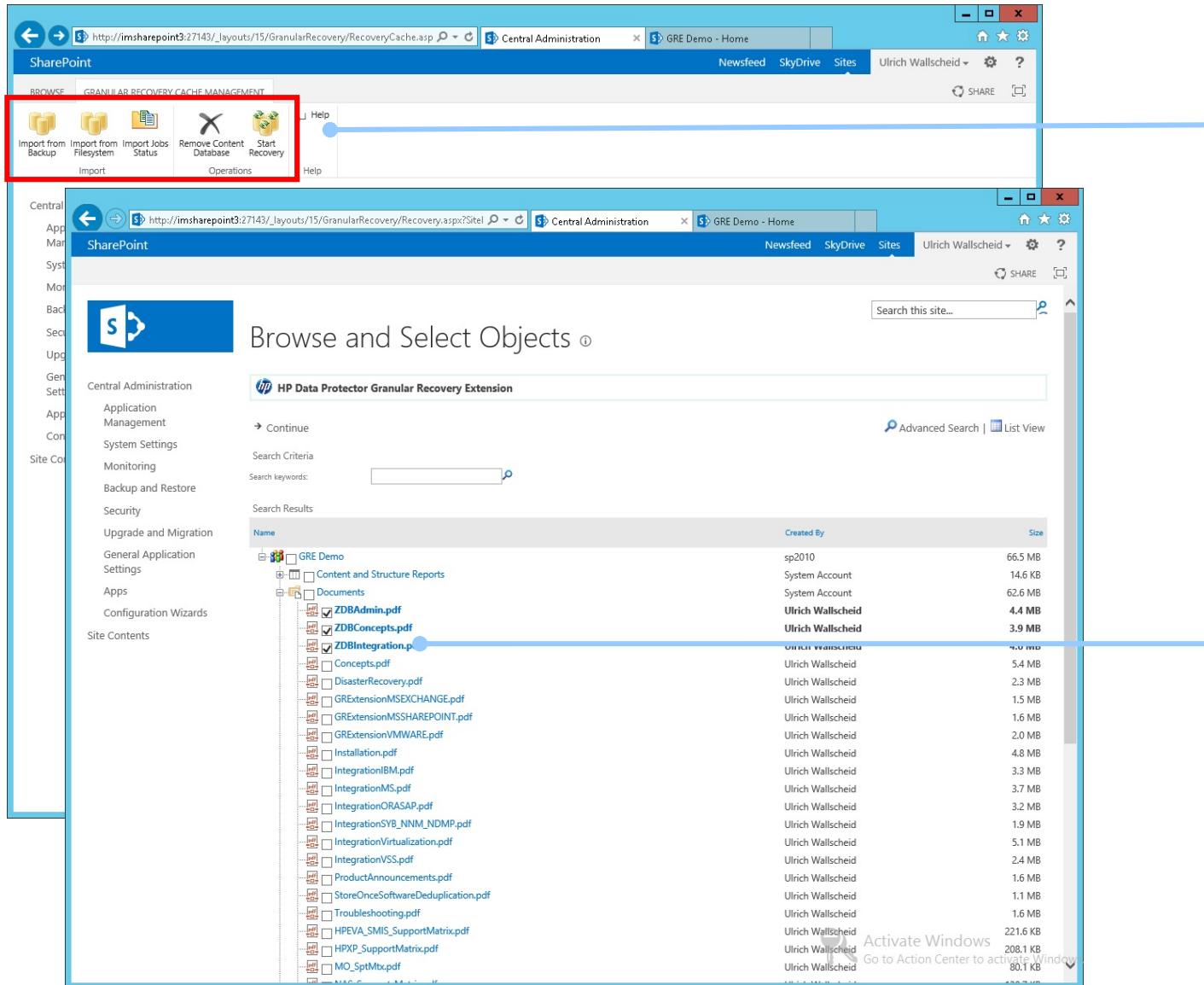
Highlight the restored DB in Cache Management

Start Recovery

Pick a Mailbox

Seach options

# Microsoft SharePoint Granular Recovery Extension



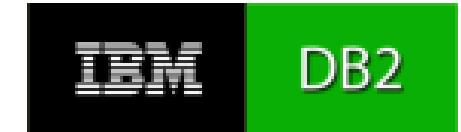
Select the Site for recovery from the sites list. Select recovery type.

Select documents or other objects To be restored from the site tree.

- Documents
- Calendar entries
- Tasks, and more

# Application Integrations – IBM, PostgreSQL, Sybase, MySQL

## Consistent data protection and compliance



SYBASE®



Configure MySQL Instance

MySQL configuration

Client: immysql esc bbn hp.com  
MySQL instance: TEST

Connection  
Username: protector  
Password: \*\*\*\*\*  
Port: 3306  
 Use parameters from custom MySQL configuration file:

MySQL Enterprise Backup  
Path to mysqlbackup command:  
/opt/mysql/meb-3.12/bin/mysqlbackup

OK Cancel Help

Select options for how you want your PostgreSQL instance restored.

Restore to client: suoimpostgres1.imdemo.local  
Restore to instance: DPDEMO

Username: SOMEBODY  
Group/domain: IMDEMO

Restore redirection  
 Use non-original target directory:

Database recovery  
 Recover to the latest state  
 Recover to: 8/21/2018 2:49:35 PM  
 Recover from backup version: 8/20/2018 7:00:49 PM trans [2018/08/20-13]

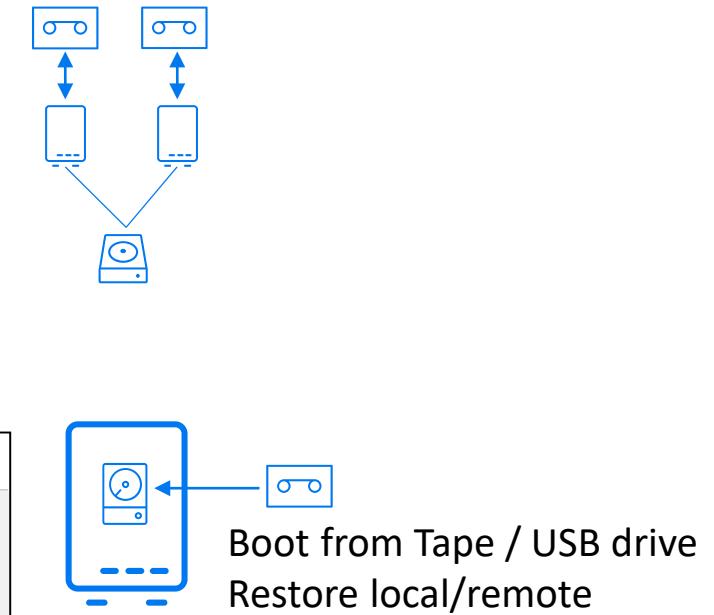
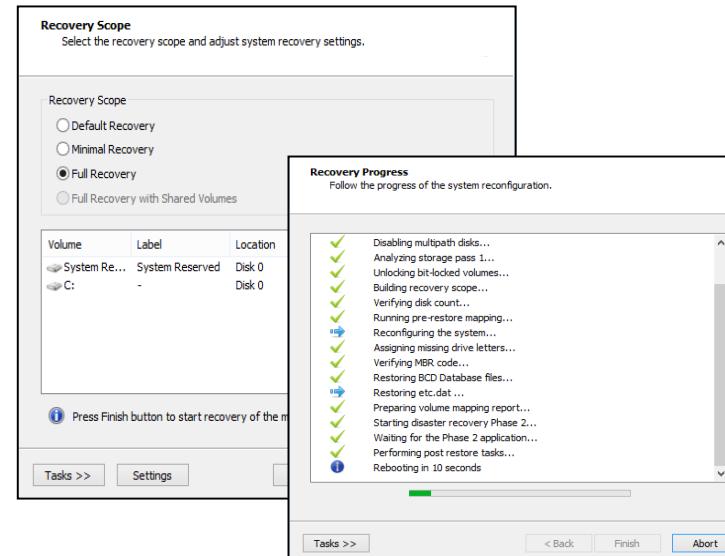
# Cluster/HA Integrations and Disaster Recovery

## High Availability:

- Windows Failover Clusters and Cluster Shared Volumes
- Linux Built-In Clusters and MC/Service Guard
- HPUX MC/Service Guard

## Bare Metal Disaster Recovery:

- Enhanced Automated Disaster Recovery (EADR)
- Manual DR
- DR to different system
- DR to Virtual Machine (P2V)



# Application Integrations Summary

- Data Protector supports **mission-critical applications** by using dedicated agents to offer application level data consistency.
- By using backup APIs for applications Data Protector is aware of the internal features such as clustering, replication, active-passive availability groups, and can react appropriately during backup and recovery.
- This approach offers independence of how and where applications are deployed such as physical, virtual or cloud deployments.
- Data Protector gathers analytical data in parallel to backup to track and manage SLAs, performance and capacity data as well as predictive information for future planning and optimization.



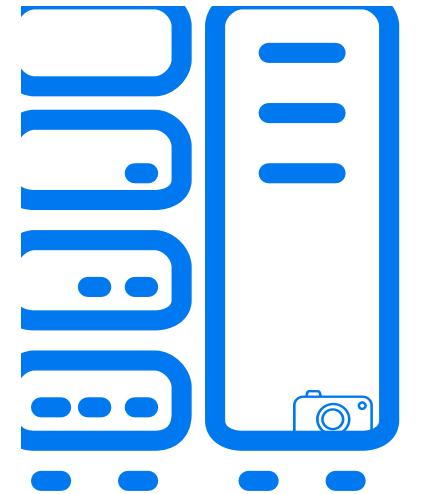
# Advanced virtual environment protection

# Hypervisor Integrations - Microsoft

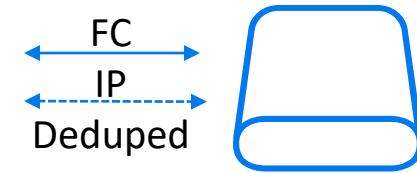


## Microsoft Hyper-V:

- Cluster Shared Volumes (CSV)
- Direct FC/SAN Backup with Snapshots
- VM Replica Backup
- Full/Incremental VM Backup
- VSS Transportable Backup (ZDB)



Snapshots

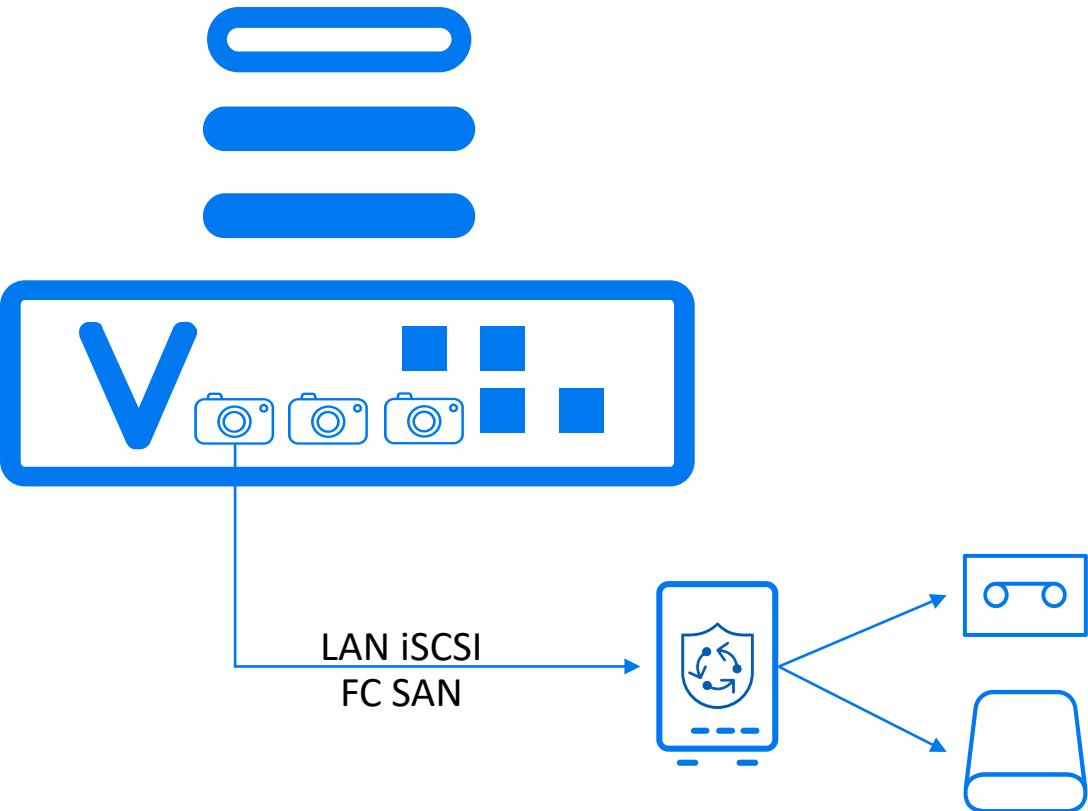


# Hypervisor Integrations - VMware



## VMware vSphere/vCenter:

- FC SAN/LAN Snapshot Backup
- VM Power On and Live Migration
- Granular File Recovery
- Change Block Tracking
- Parallel vDisk backup
- Restore VM with diff. name
- Redirected restores
- Storage System Snapshots (ZDB)



# VMware Enhanced Options

## Granular Recovery, Power-On, Live-Migration



vmware vSphere Web Client | Administrator@IMDEMODC | Help | Search

Virtual Environment [/IMDEMODC] - HPE Data Protector Manager

File Edit View Actions Help

Restore

Source Destination Options Devices Media

Select the Virtual Environment components that you would like to restore. To filter out objects, select session span and type.

Backup method: From: To: VM Filter:

vStorage Image 17.01.2018 23:01:09 incr 15.02.2018 23:15:51 incr Apply Filter

VM Options

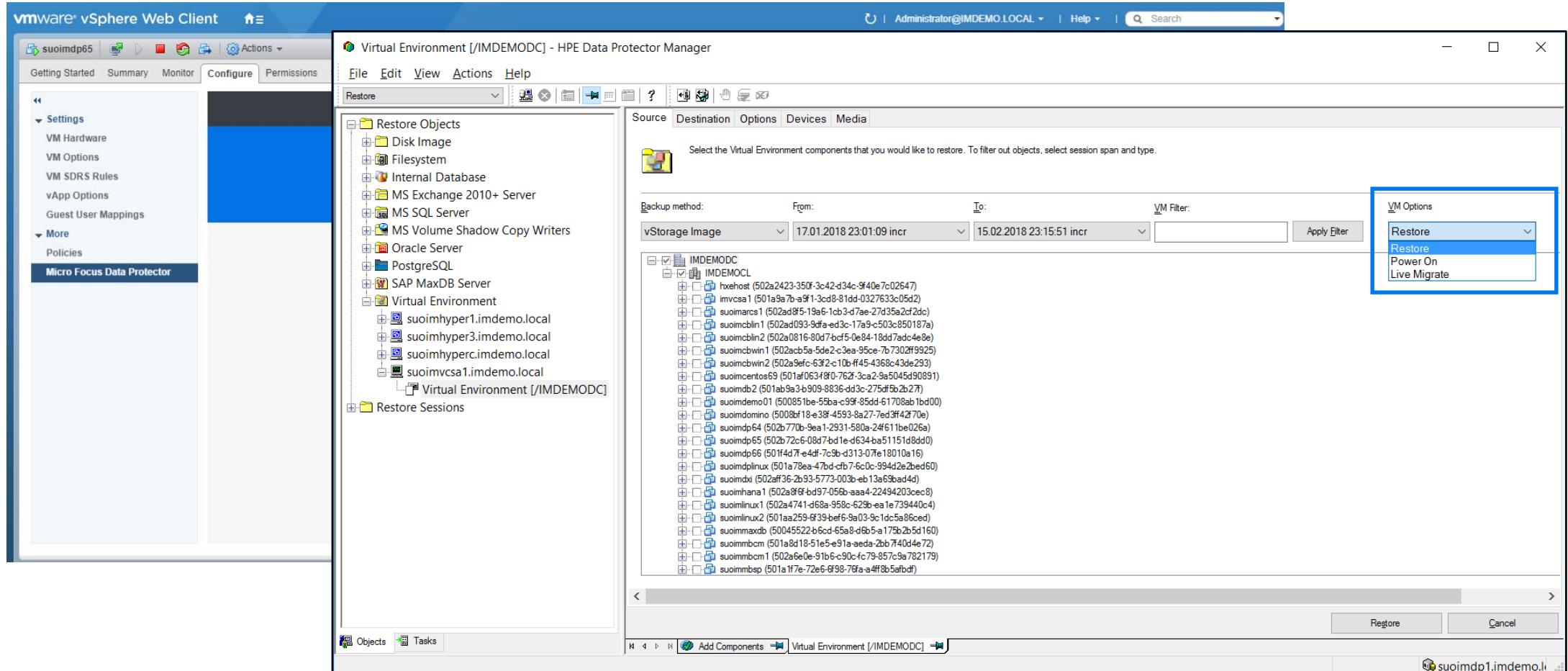
Restore  
Power On  
Live Migrate

Settings  
VM Hardware  
VM Options  
VM SDRS Rules  
vApp Options  
Guest User Mappings  
More  
Policies  
**Micro Focus Data Protector**

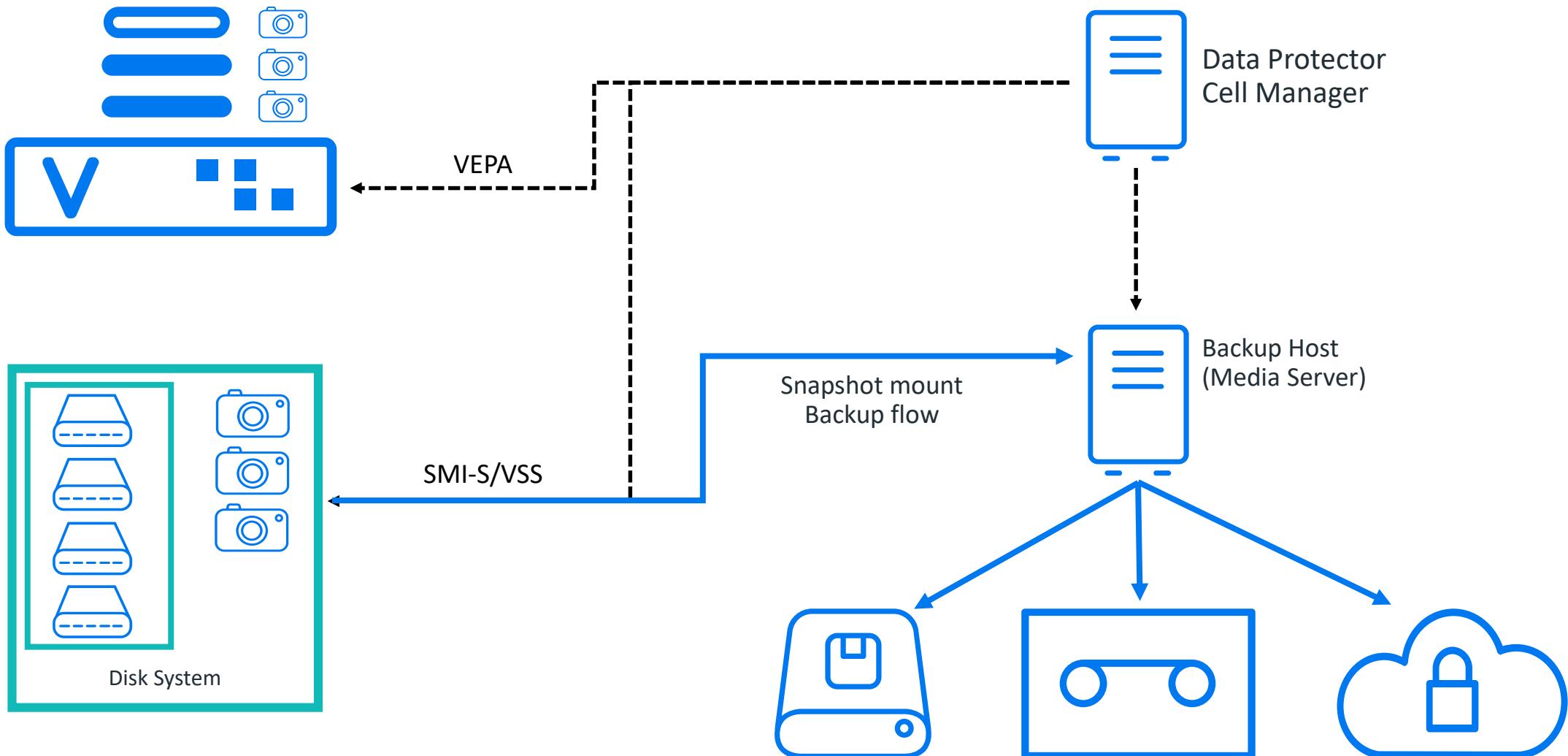
Disk Image  
Filesystem  
Internal Database  
MS Exchange 2010+ Server  
MS SQL Server  
MS Volume Shadow Copy Writers  
Oracle Server  
PostgreSQL  
SAP MaxDB Server  
Virtual Environment  
suoimhyper1.imdemo.local  
suoimhyper3.imdemo.local  
suoimhyperc.imdemo.local  
suoimvcsa1.imdemo.local  
Virtual Environment [/IMDEMODC]  
Restore Sessions

Objects Tasks

Add Components Virtual Environment [/IMDEMODC]

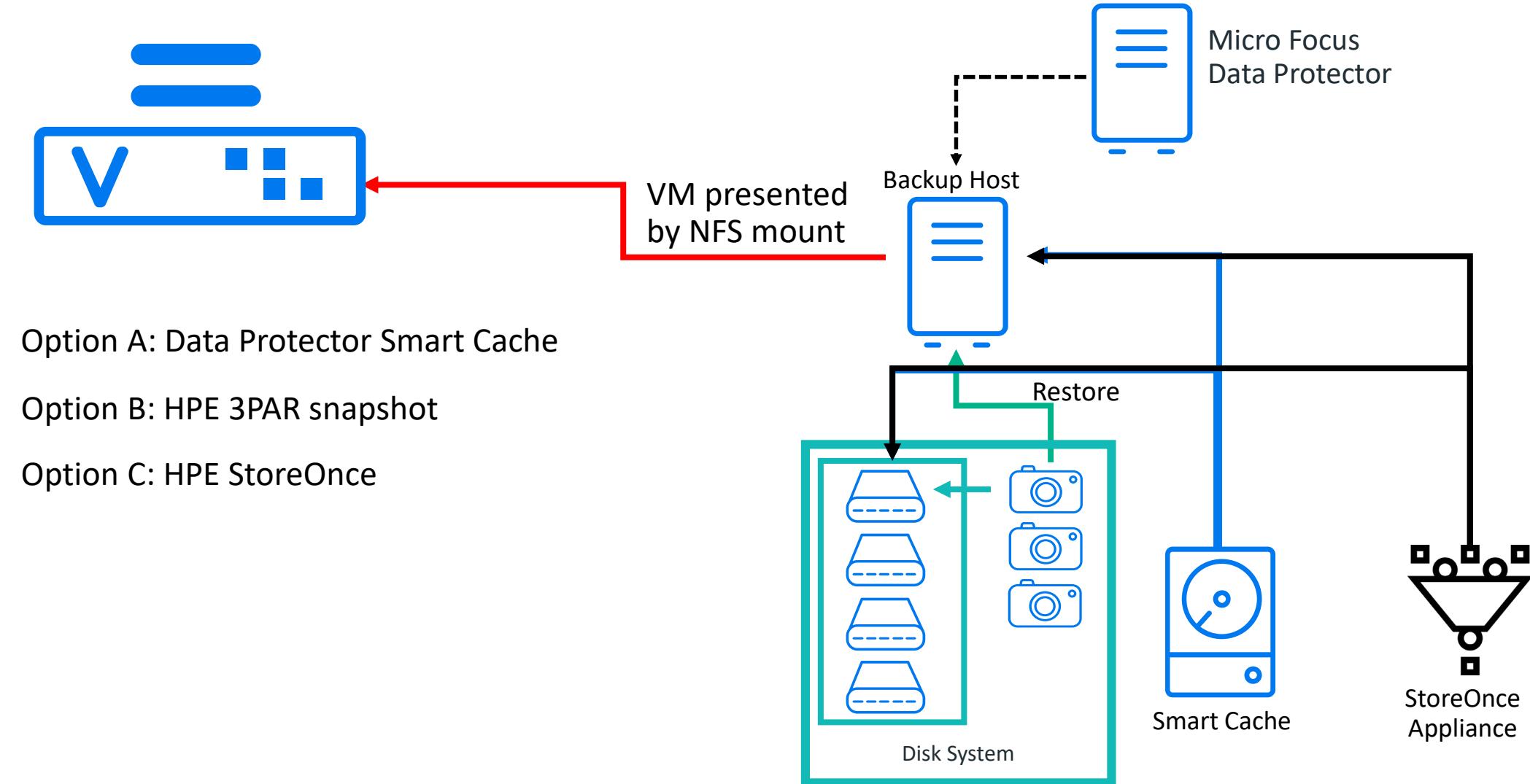


# Virtualized Environments - Hardware Assisted Backup



# Power-On and Live-Migration of VMware VMs

From HPE 3PAR snapshot, HPE StoreOnce Appliance or SmartCache



# Virtualization Integrations Summary

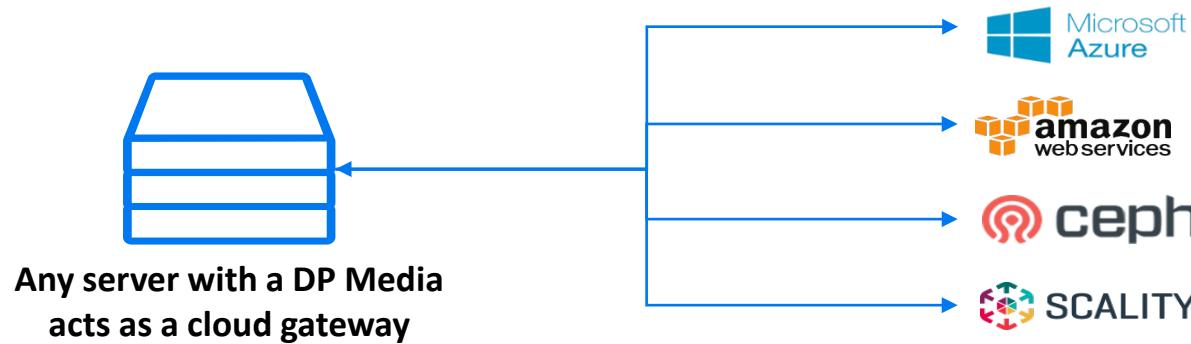
- Data Protector fully integrates with [VMware vSphere](#) and [MS Hyper-V](#) virtualization platforms supporting various approaches such as local and remote snapshot backup/recovery, Power-On and Life-Migration of VMs as well as granular recovery of VM files using the same data protection infrastructure for all clients types (physical, virtual, cloud).
- Data Protector reporting complements this functionality with virtualization reports, analytics and predictive analytics.
- Other Hypervisors can be addressed with scripts. This would benefit the automation/orchestration approach of Data Protector.



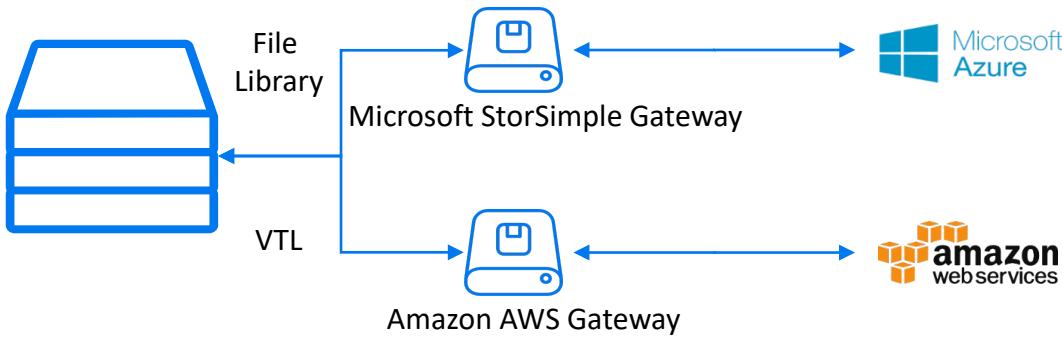
# Best-in class platform integrations: The cloud

# Cloud Integrations for Backup and Archive to Cloud

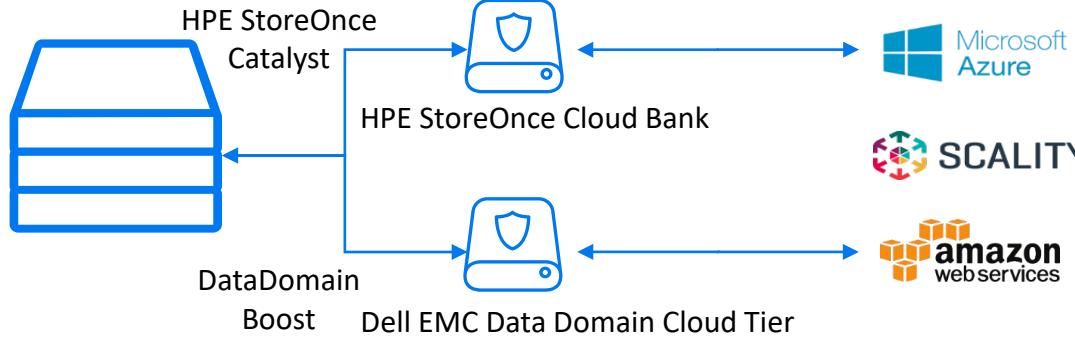
## Native Integration



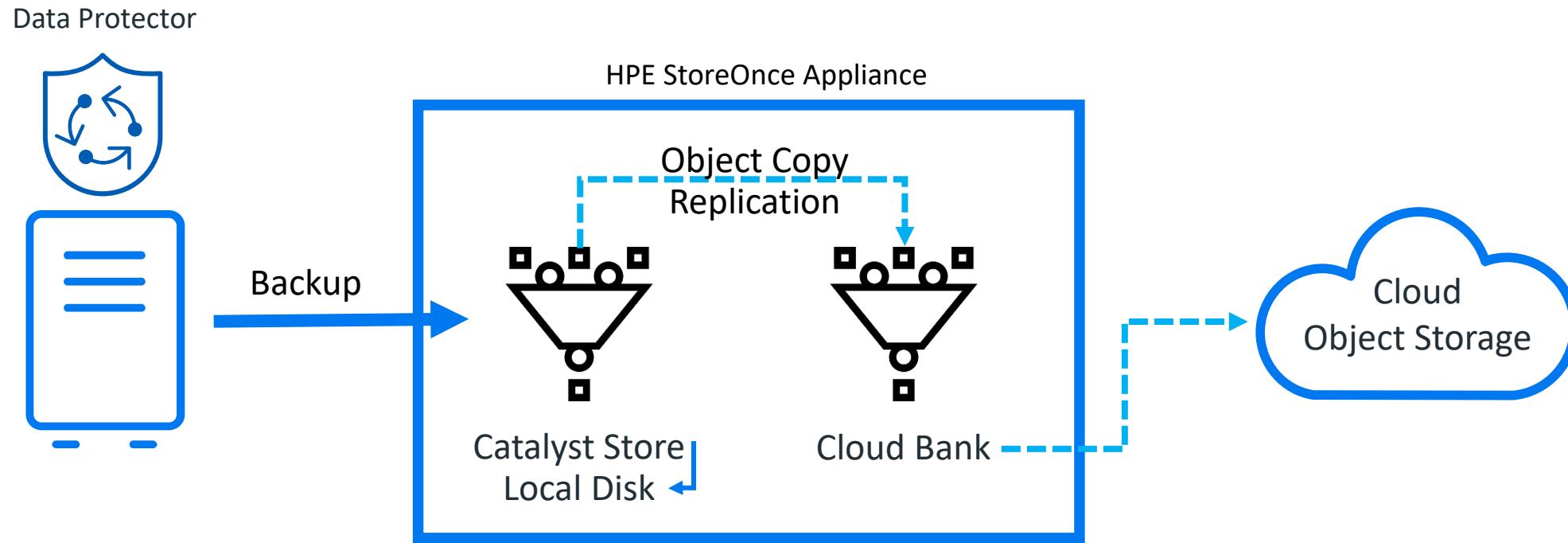
## Cloud Gateways



## Backup Appliances

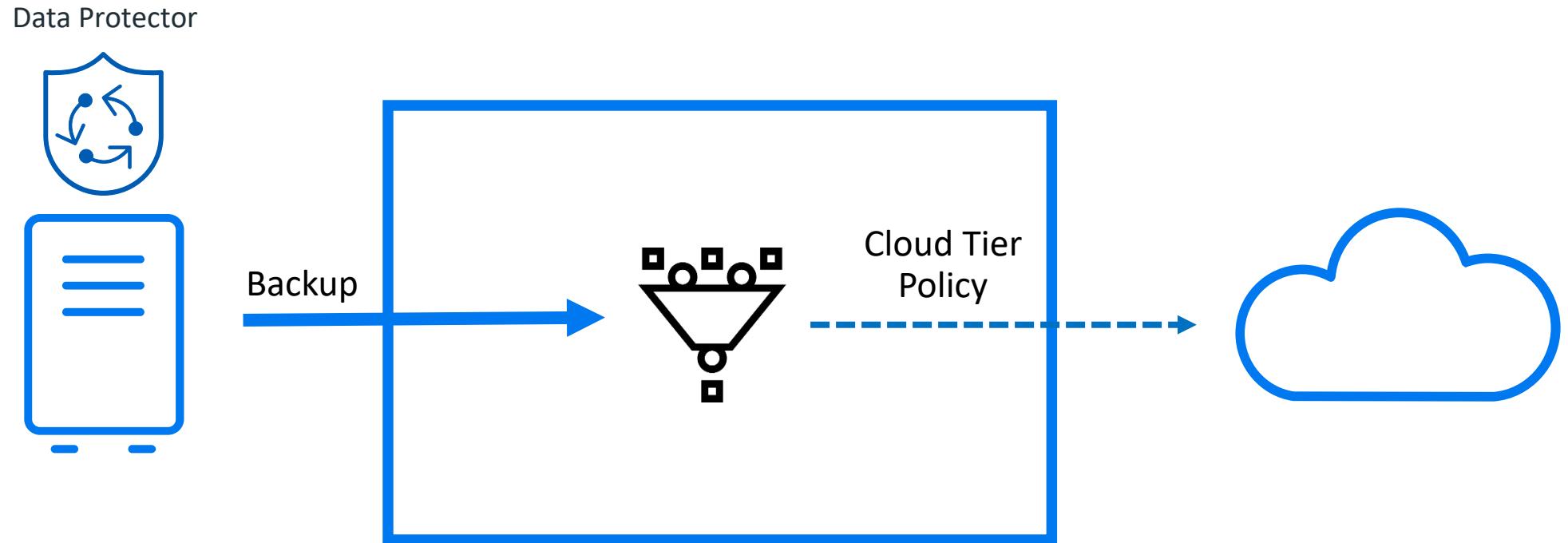


# HPE StoreOnce Cloud Bank Backup



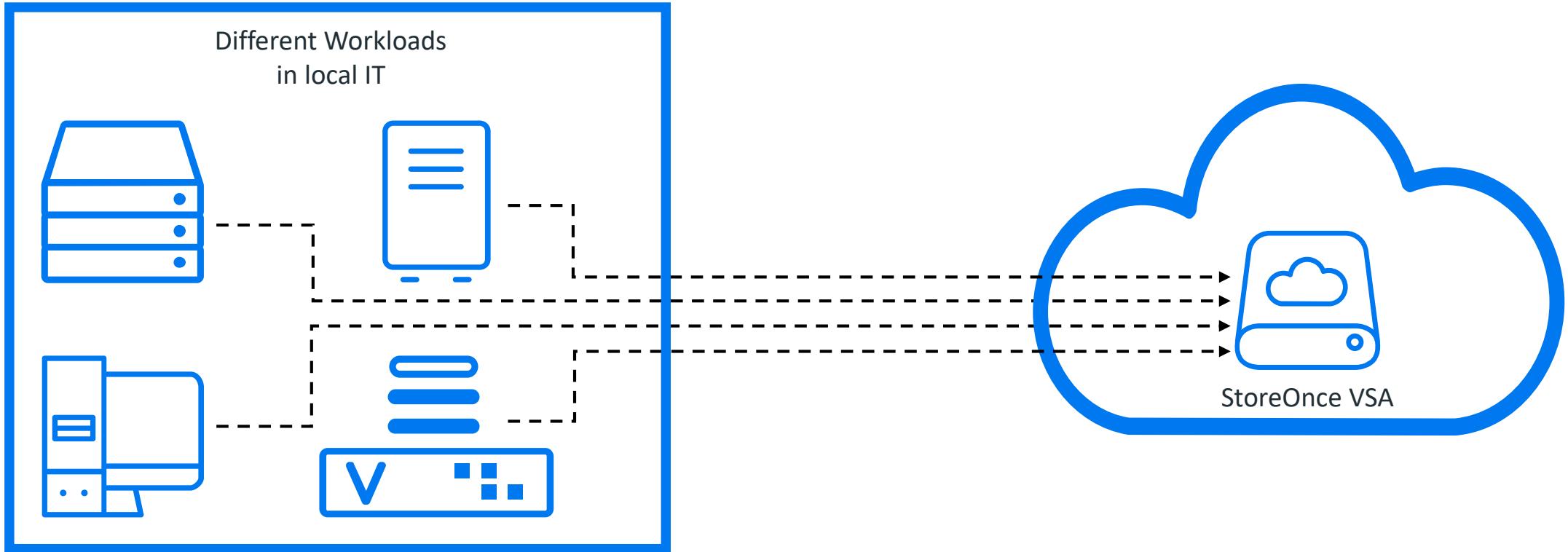
- Data Protector backs up data to the HPE StoreOnce appliance using Catalyst and block data is stored on local disk
- Next Object Copy job is executed to replicate from the primary store into the cloud gateway store
- This triggers the appliance to upload to the cloud vendor so no local disk storage is used
- Only delta-blocks are moved into or read from the cloud to optimize cost

# Dell EMC Data Domain Cloud Tier



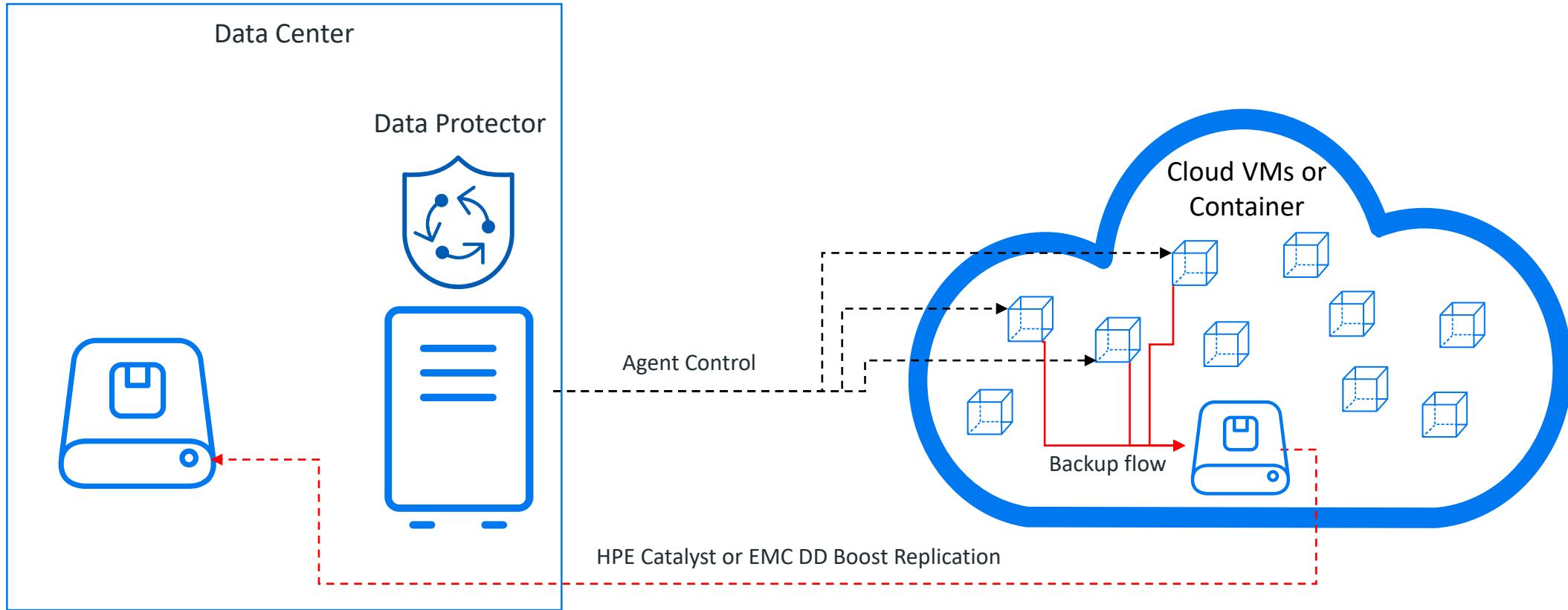
- Data Protector backs up data to the Dell EMC Data Domain appliance using DD Boost
- The appliance manages the upload and download into or from the Cloud in deduplicated format
- This process is done by internal policies not controlled and therefore transparent to Data Protector

# Backup to HPE StoreOnce VSA Cloud Instance



- Data Protector can make use of the HPE StoreOnce Cloud VSA
- In this case data is deduplicated on the source-side
- Currently the StoreOnce Cloud VSA is available on MS Azure and Amazon AWS (see HPE documentation)

# Orchestrating Backup of Resources Within the Cloud



Let's assume you have a virtual Backup Appliance in your Cloud:

- Data Protector can remote control agents in the VMs or Containers and direct backup and restore I/O to that Cloud backup appliance
- Optionally deduplicated replication to a compatible partner device in the DataCenter can be set up

# Cloud Integrations Summary

- Data Protector allows to offload or archive data into various cloud vendor offerings.
- Data Protector organizes cloud access the same way as with generic backup devices allowing for easy integration into an existing protection strategy.
- Cloud backup devices can be used from many client systems to streamline data flow and to offer load-balancing or redirection.
- By supporting advanced options such as HPE Store Once Cloud Bank and EMC Cloud Tier, enterprises can organize cloud offload and archive without making any strategy changes.



# Best-in Class Platform Integrations: Storage

# Data Protector Disk Storage Integrations

Snapshot backup and restore, replication

HPE



NetApp



EMC



# Data Protector Backup Device Integrations

## VTL/Appliances



HPE Store Once  
Dell EMC Data Domain

## Tape Libraries



HPE StoreEver,  
Quantum/Adic,  
IBM, StorageTek,  
Overland

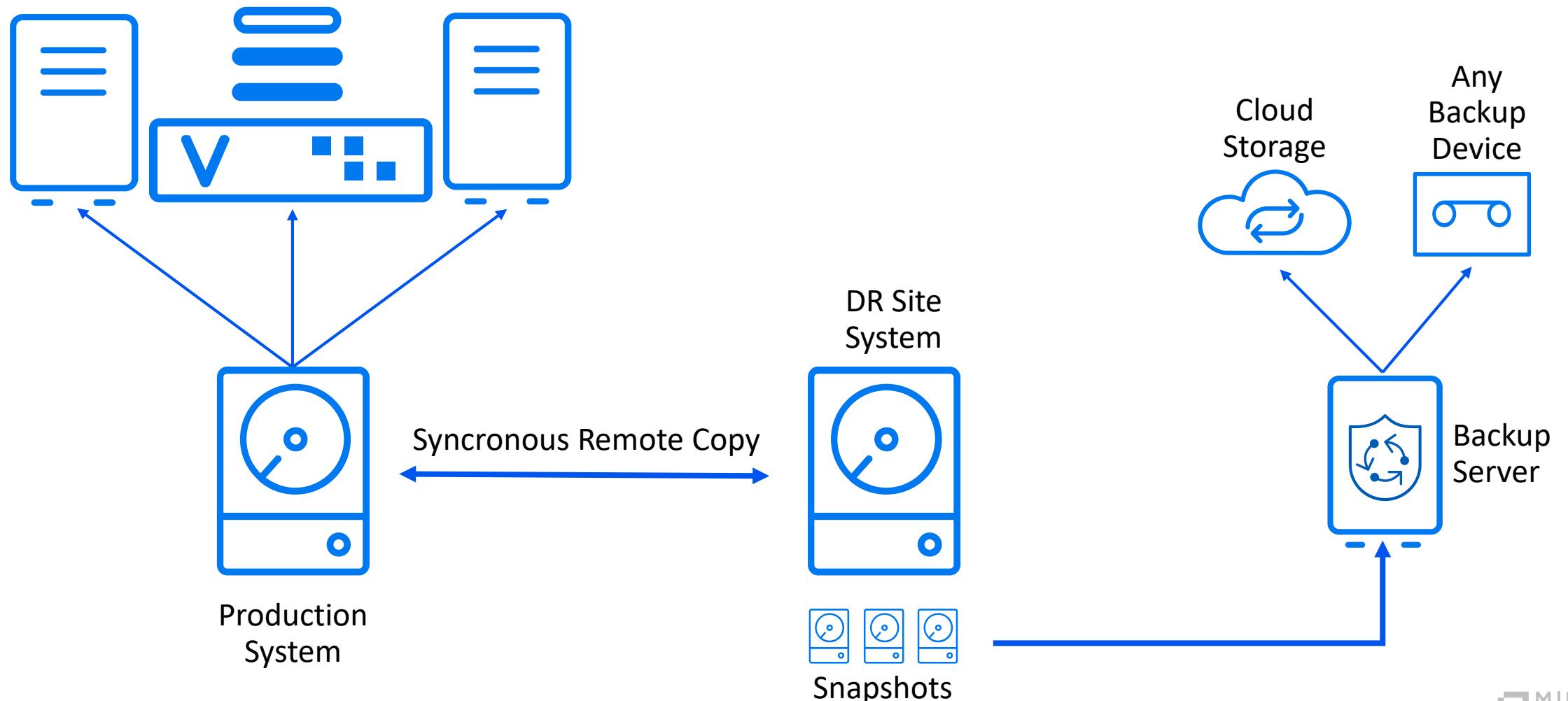
## Tape Drives



LTO, AIT, Exabyte  
STK, IBM, DAT  
DTF, Tandberg

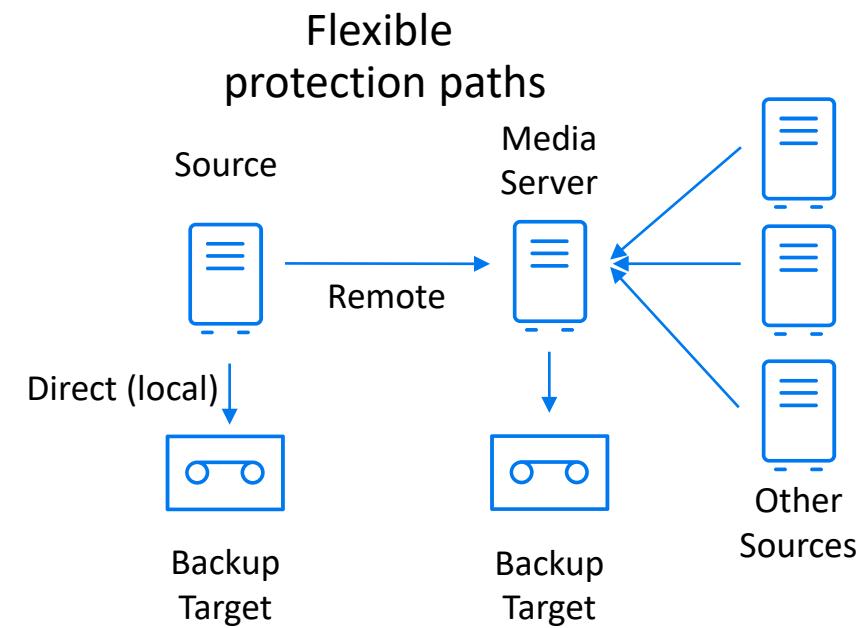
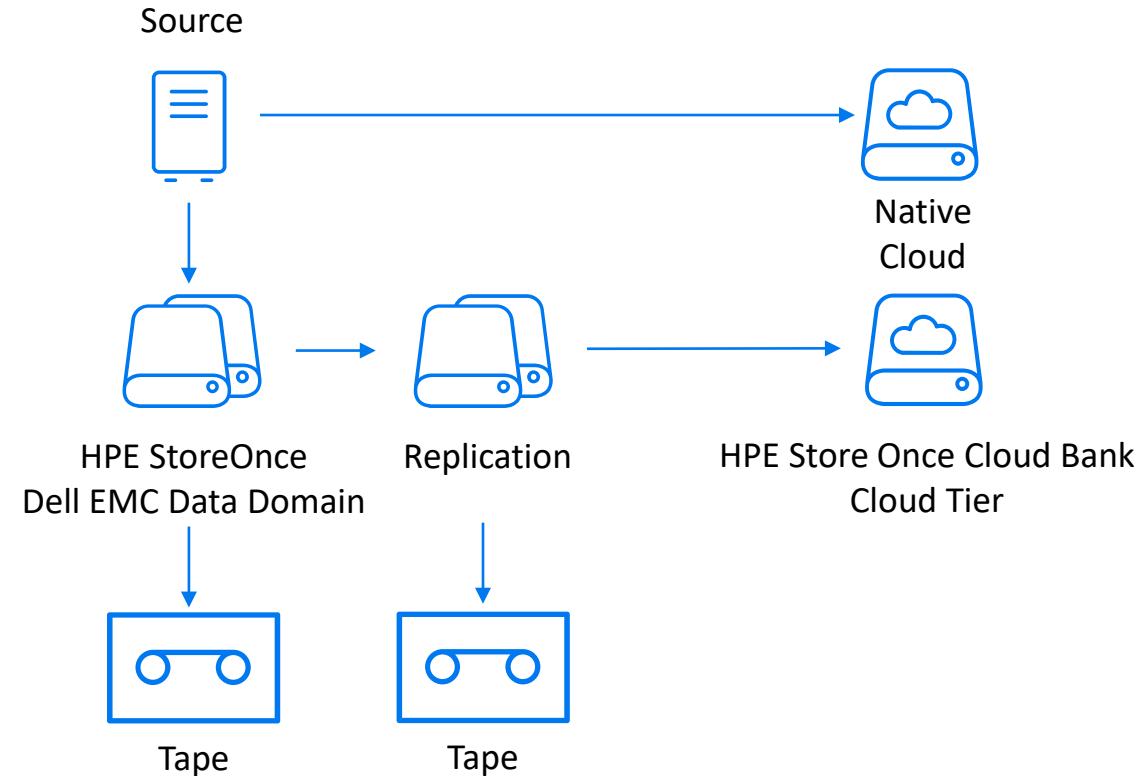
# Disk and Flash Storage Integrations

## HPE 3PAR example

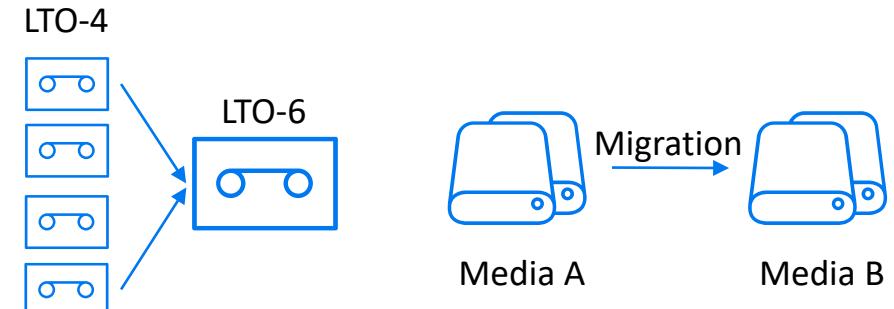


# Backup Device Management

Deduplication and more



Consolidation & Optimization



# Optimize Storage with Federated Deduplication

**Application source**



**Backup server**



**Target system**



- Software only implementation can use generic disk
- Purpose built appliance optimized for backup data
- Simplest implementation – no operational changes

**Application source**



**Backup server**



**Target system**



- Offload application source from dedupe processing
- Higher total target system throughput
- Efficient utilization of backup infrastructure

**Application source**



**(Backup server)**



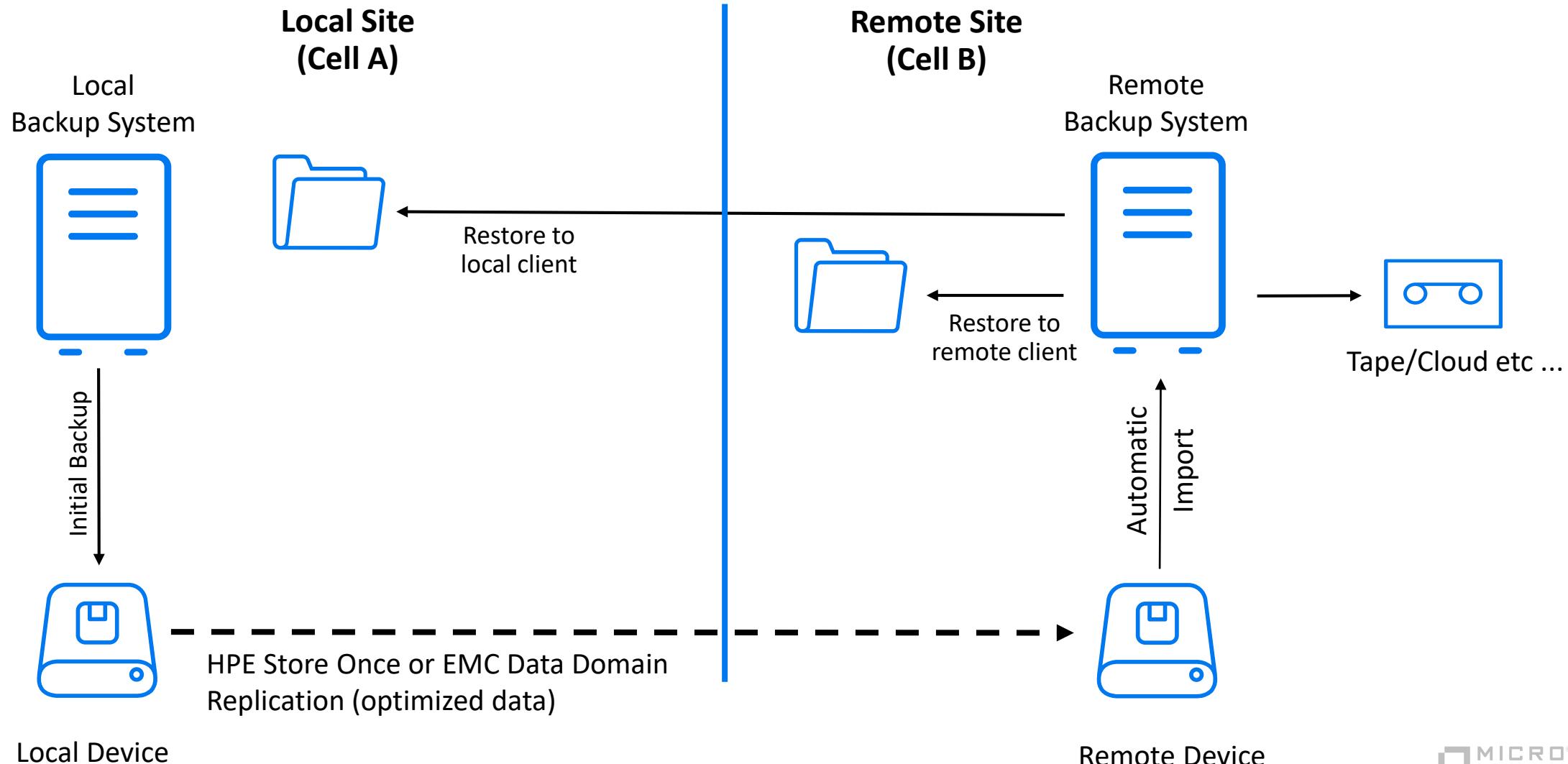
**Target system**



- Dedupe where data is created – application source
- Eliminate need for extra hardware at ROBO sites
- Reduces network bandwidth consumption
- Backup Server is optional for source side dedupe

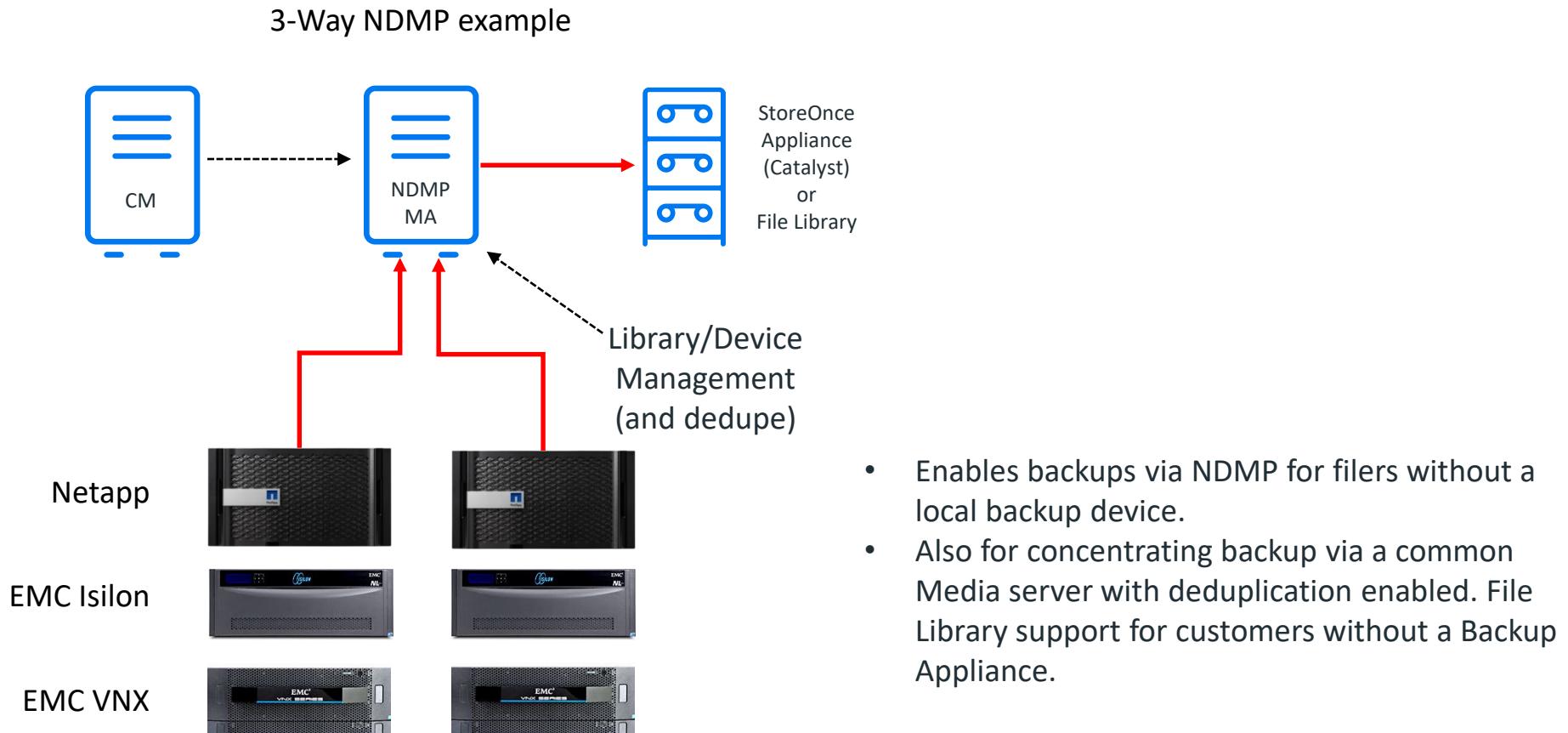
# Automated Backup Data Replication and Synchronization

Automated setup and workflow, no scripts



# NDMP 2-Way and 3-Way Backup Implementation

Enables backups to be done via a standard media/backup server to HPE StoreOnce or DP File Library



# Storage Integrations Summary

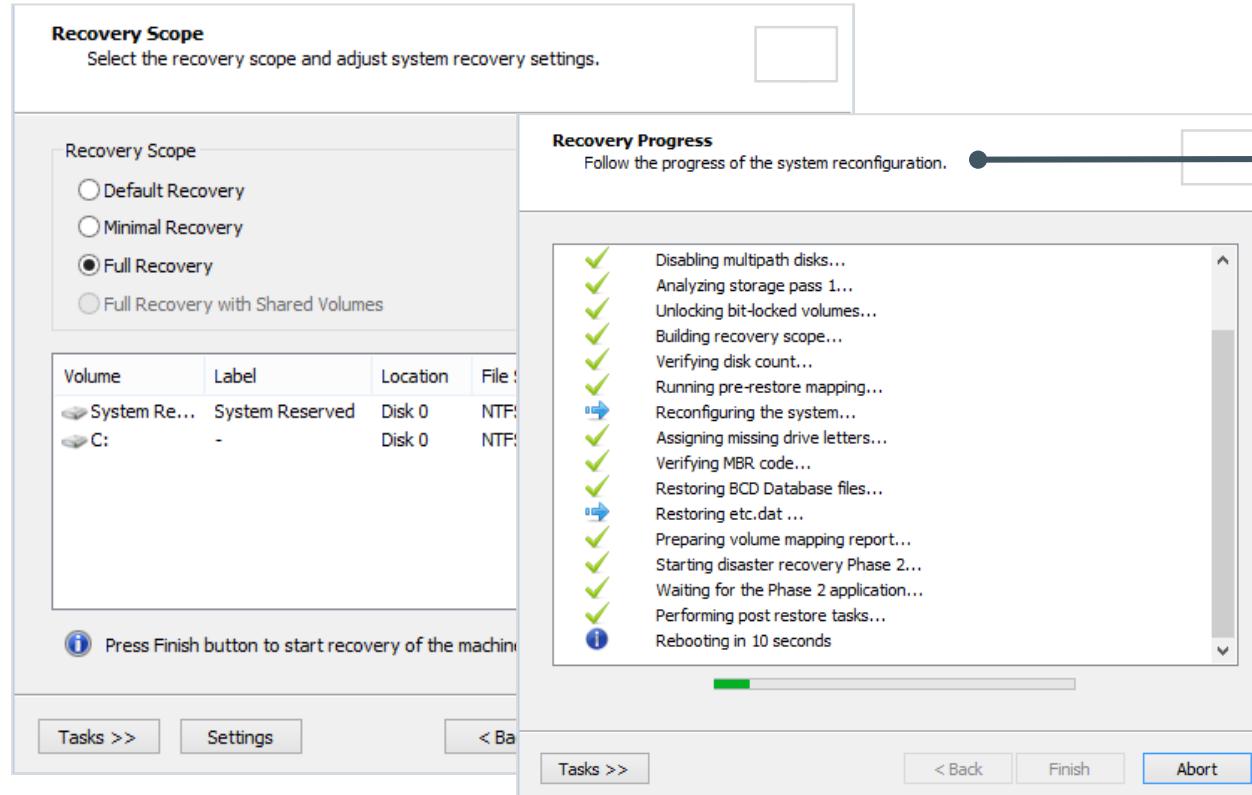
- Disk storage snapshots help to offload clients systems from backup I/O and to speed up backup and recovery processes and their SLAs.
- ZDB allows to rotate a number of snapshots and manage them from the Data Protector GUI.
- Instant recovery allows to use snapshots like virtual media to replay to the original virtual disk. The process also restores application logs to recover to any point-in-time needed. These solutions are aimed at very high SLA requirements.
- Smart integrations into backup targets allow to organize and optimize data lifecycle. Built-in features such as Object Copy makes it easy to move data around and adapt media type and retention time for instance.



# Integrated disaster recovery

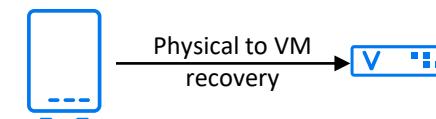
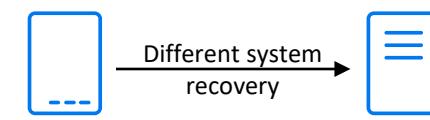
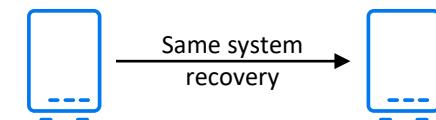
# Integrated Disaster Recovery

Built-in, no additional cost recovery with a single click



A wizard-driven bare metal recovery process

- Single click recovery
- No additional cost
- ISO image created on tape, disk or USB drive
- Flexible recovery from or to any physical or virtual system from any backup

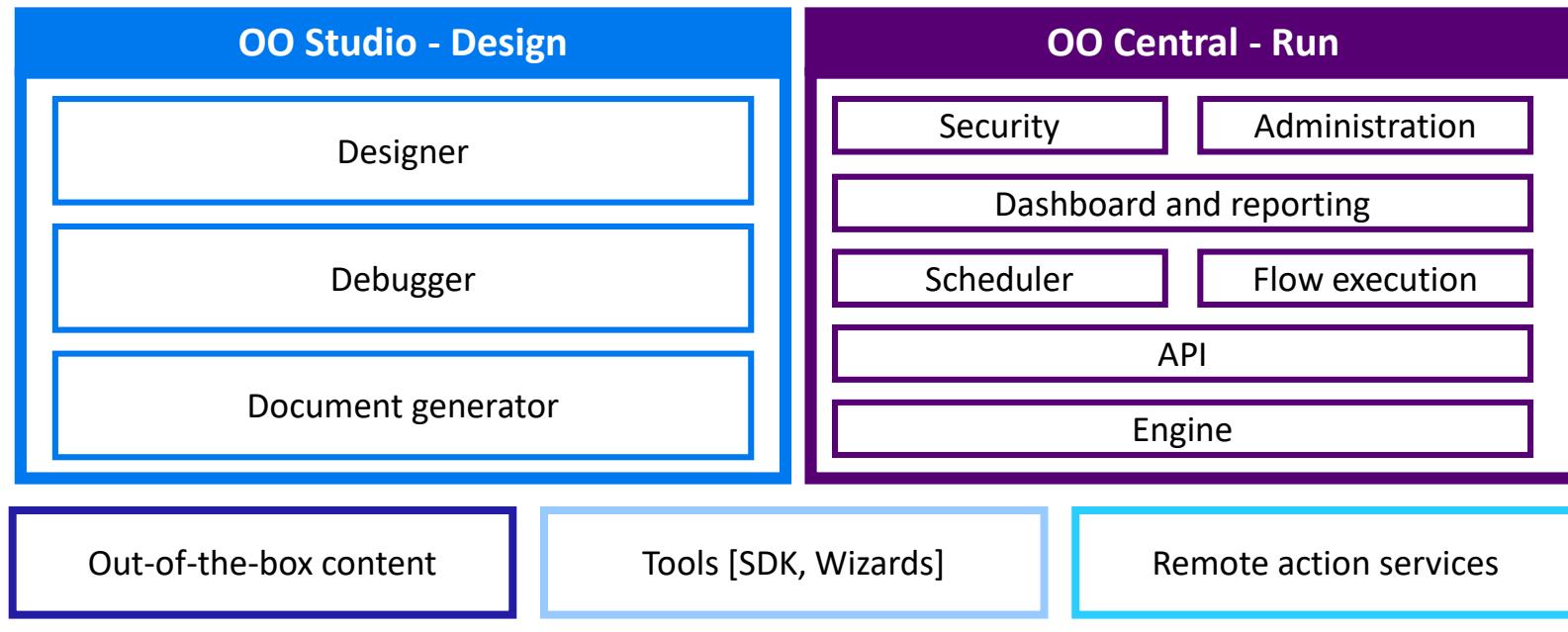




# Automation

# Introducing Micro Focus Operations Orchestration

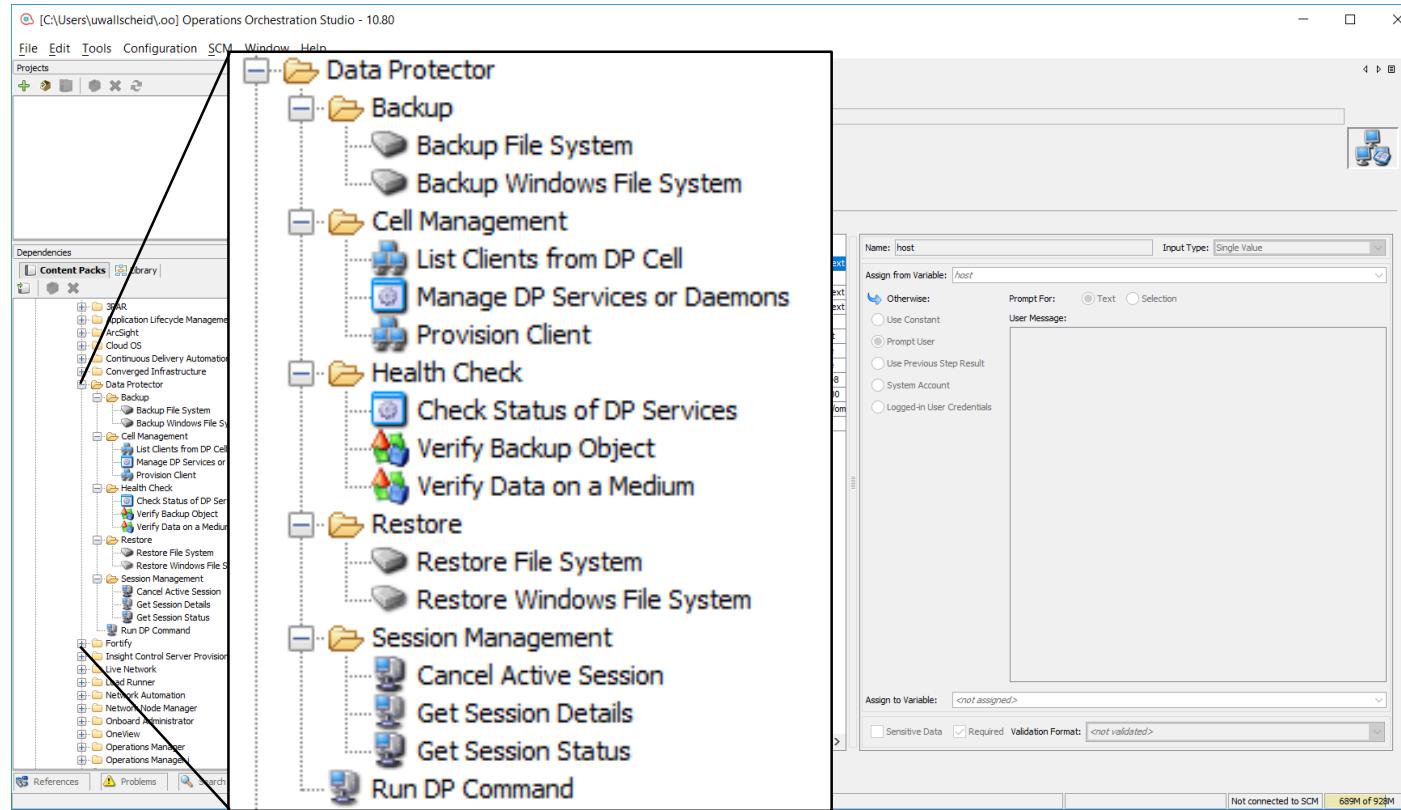
Enterprise-scale IT process automation



Invoke from any place. Integrate with anything.

# OO Content Pack for Data Protector

On top of the basic OO framework several "Content Packs" are installed adding workflows to be used. One of them is the "Micro Focus Content Pack" including basic Data Protector workflows.



- Operations Orchestration is not bundled with Data Protector and has to be purchased separately.
- The Content Packs and incorporated workflows are for free and to be considered like starting points.
- Further customization may need additional expertise at a cost.

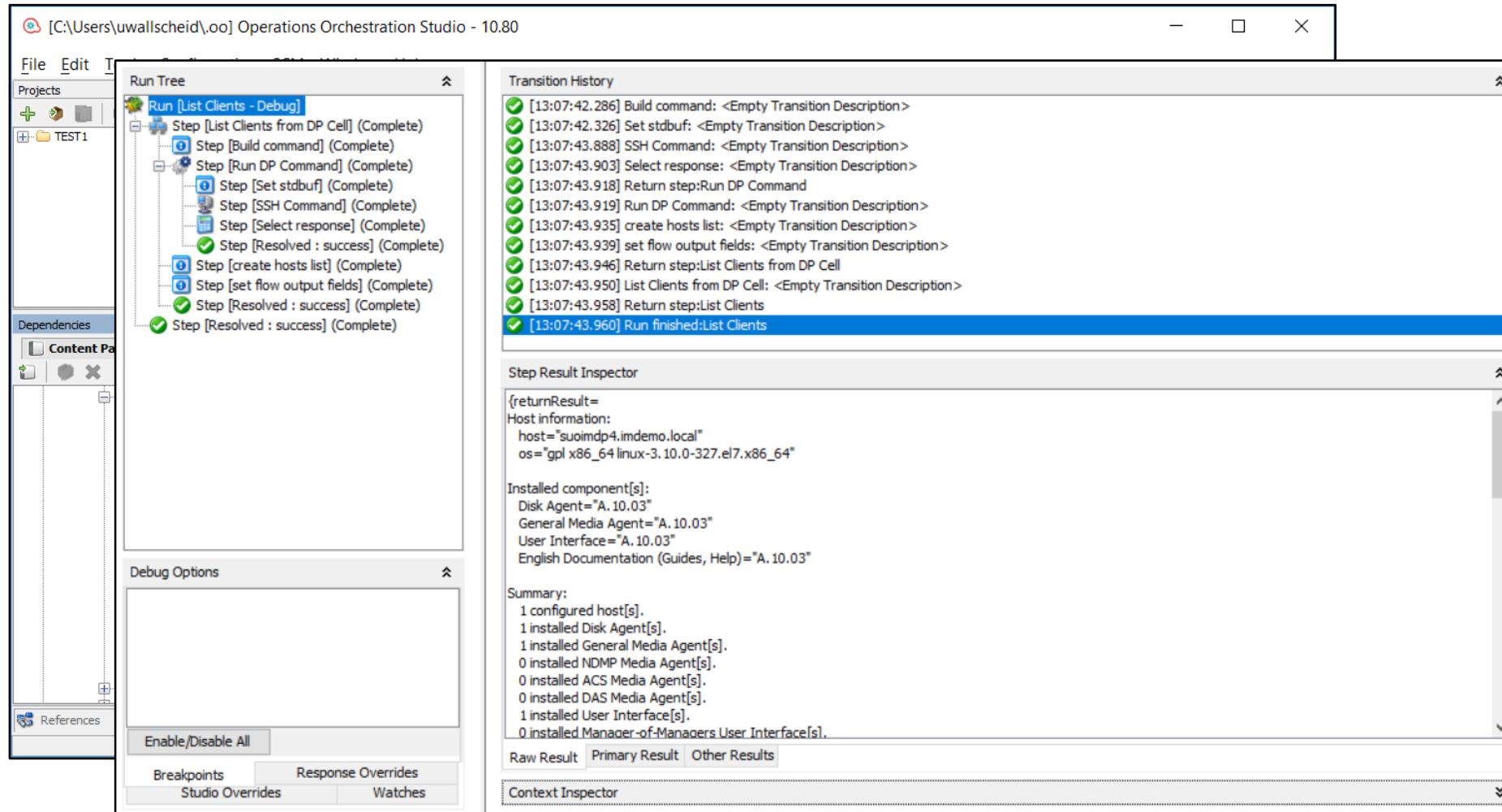
All OO Content Packs can be downloaded from:

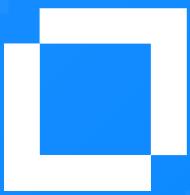
<https://marketplace.microfocus.com/item/category/all?product=Operations%20Orchestration&version=All%20versions&company=All%20companies>

Search for "OO Micro Focus Solutions Content". You may filter for "Operations Orchestration" and Vendor "Micro Focus".

# Operations Orchestration Workflows for Data Protector

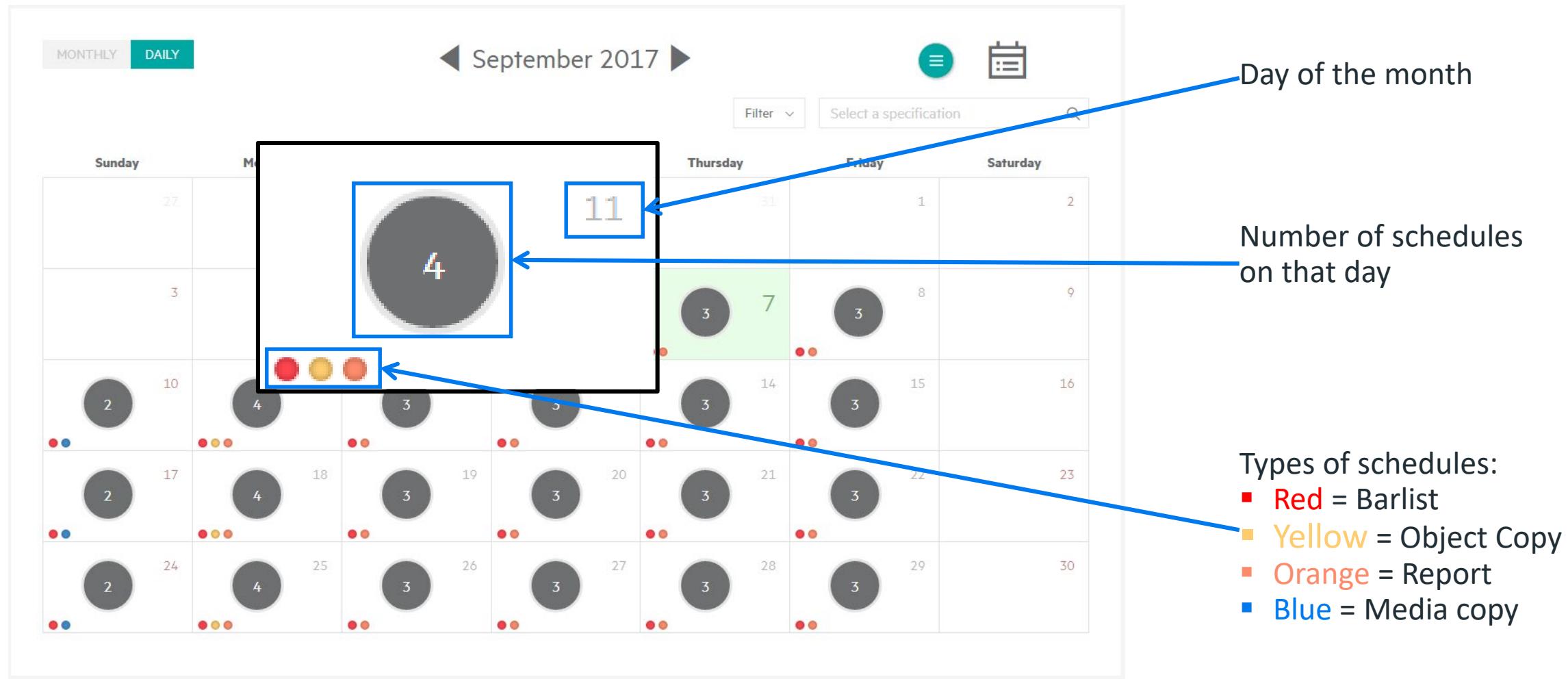
Some default workflows are available today. Over time more sophisticated workflows will be provided. From here flows can be customized for certain needs.





# Consolidated Scheduler

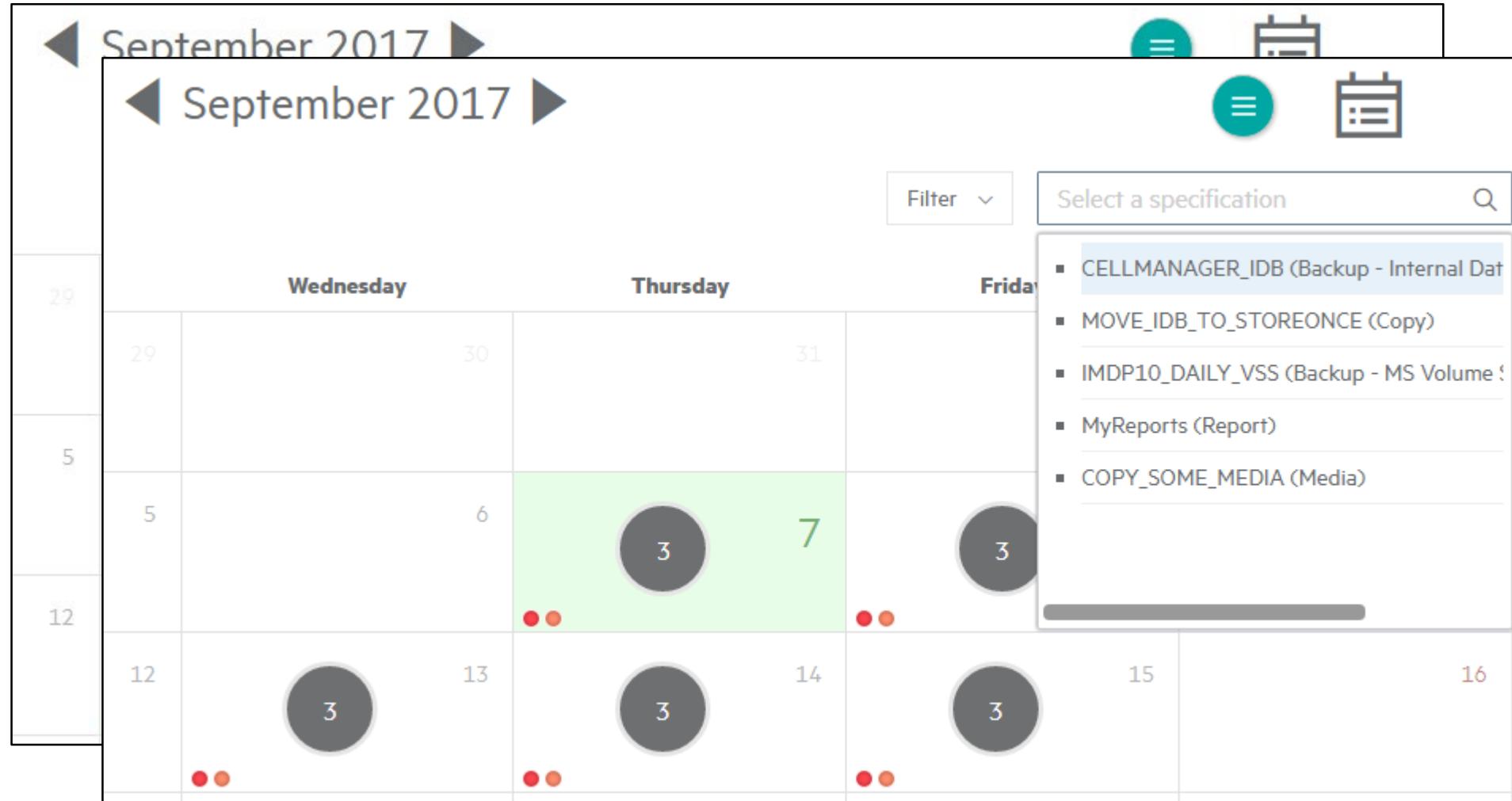
# New daily/monthly schedule overview



NOTE: Overview will be refreshed and changed once you use filtering or searching

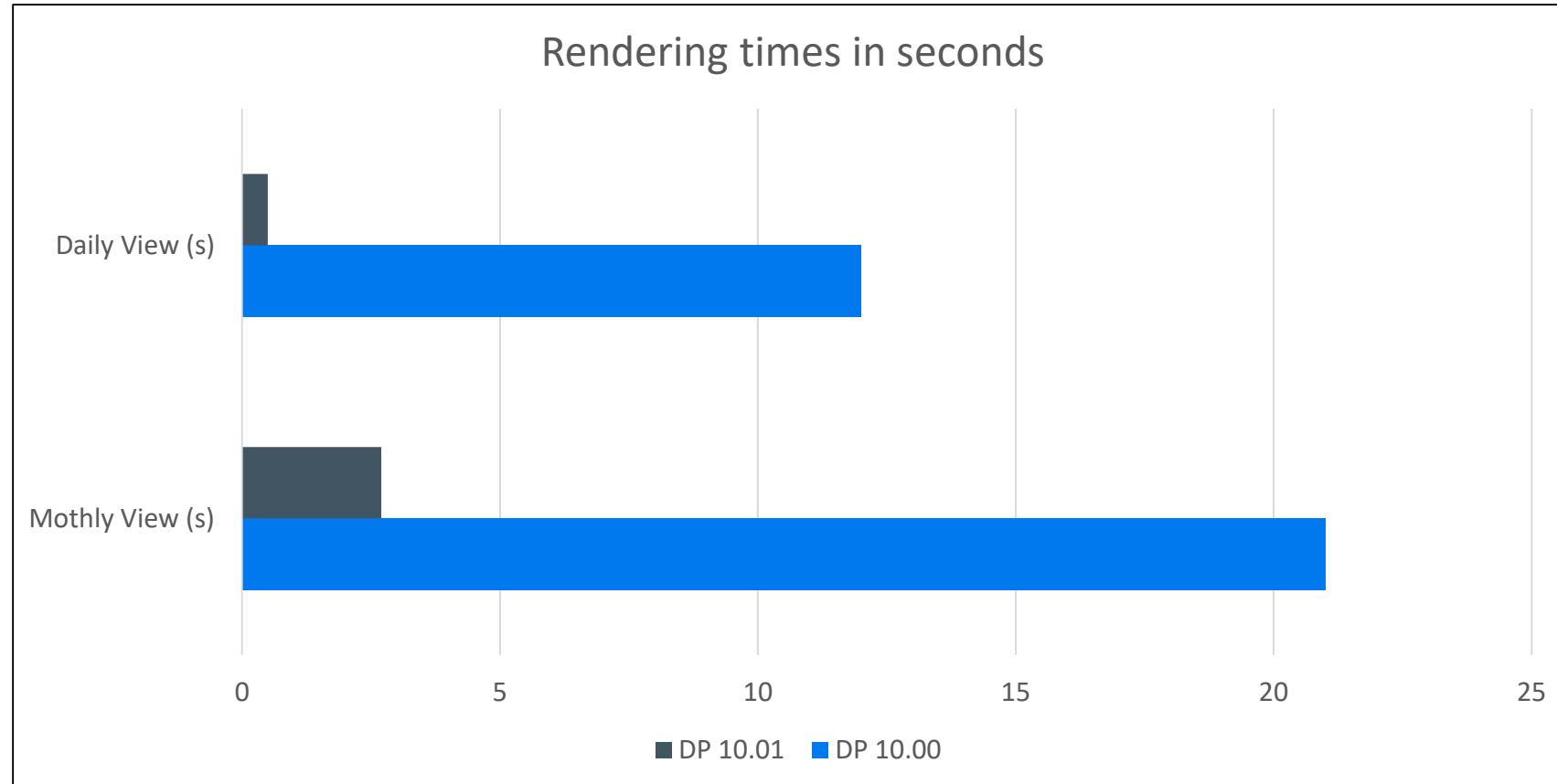
# Searching and filtering

Filtering and Searching is available in Daily and Monthly view



# Consolidated Scheduler has Performance Enhancements

Reduced rendering time!



**NOTE:** Results may vary based on infrastructure used.



# Zero Downtime Backup

# Zero Downtime Backup (ZDB)

- Introduction to ZDB
- Disk Array Support
- 3PAR Remote Copy for VMware
- 3PAR Remote Copy configuration

# Introduction to Zero Downtime Backup (ZDB)

Frequent online backups limit downtime and minimize recovery time

- Frequent online backups use system resources more intensively
- ZBD offers online backup with minimal performance degradation
- Uses built-in snapshot/snapclone functionality
- ZBD is available for these applications:
  - Oracle
  - SAP R/3
  - Microsoft SQL Server
  - Microsoft Exchange
  - VMware Virtual Environment



# Disk Array Support

- HPE P4000 SAN Solutions
- HPE P6000 EVA Disk Array Family
- HPE 3PAR StoreServ Storage
- Dell/EMC Symmetrix
- NetApp Storage
- Dell/EMC VNX Family
- Dell/EMC VMAX Family



## DOCUMENTATION:

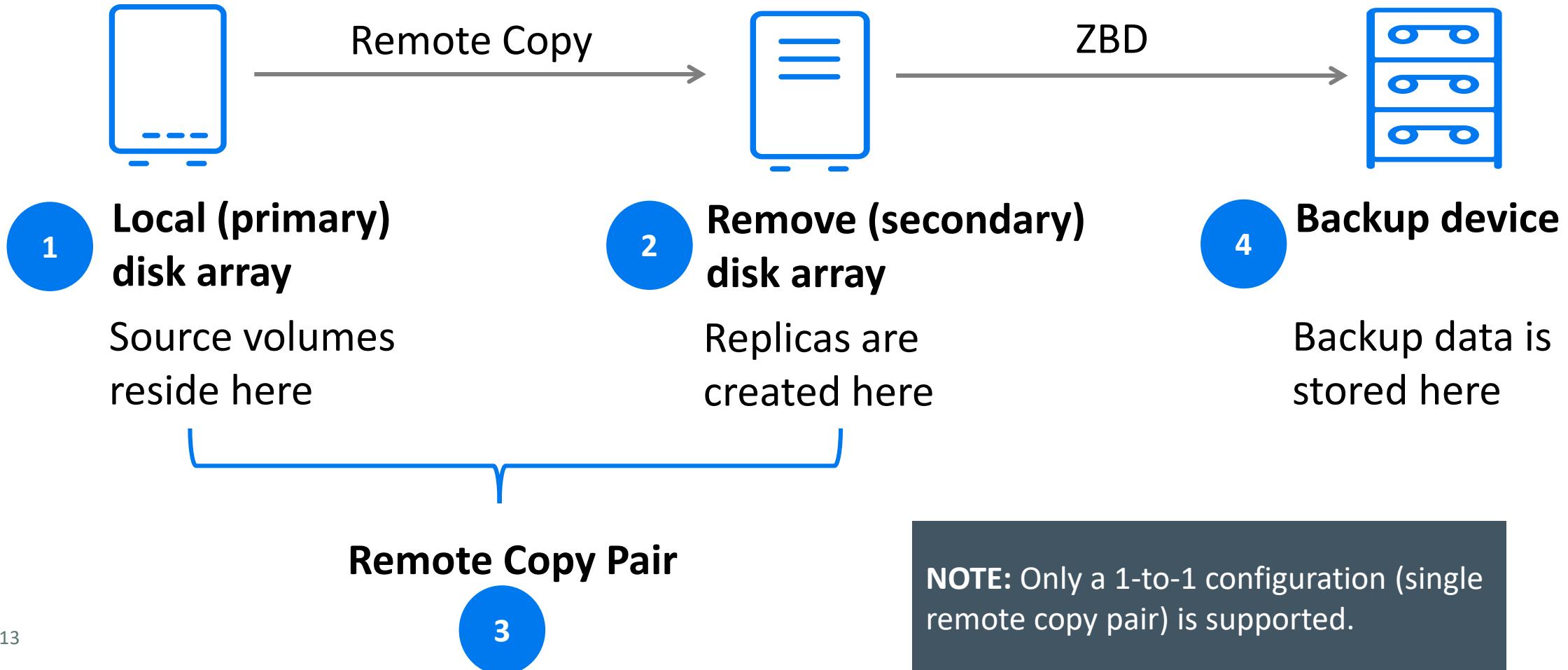
- Zero Downtime Administrator's Guide
- Zero Downtime Integration Guide

# 3PAR Remote Copy ZDB with VMware

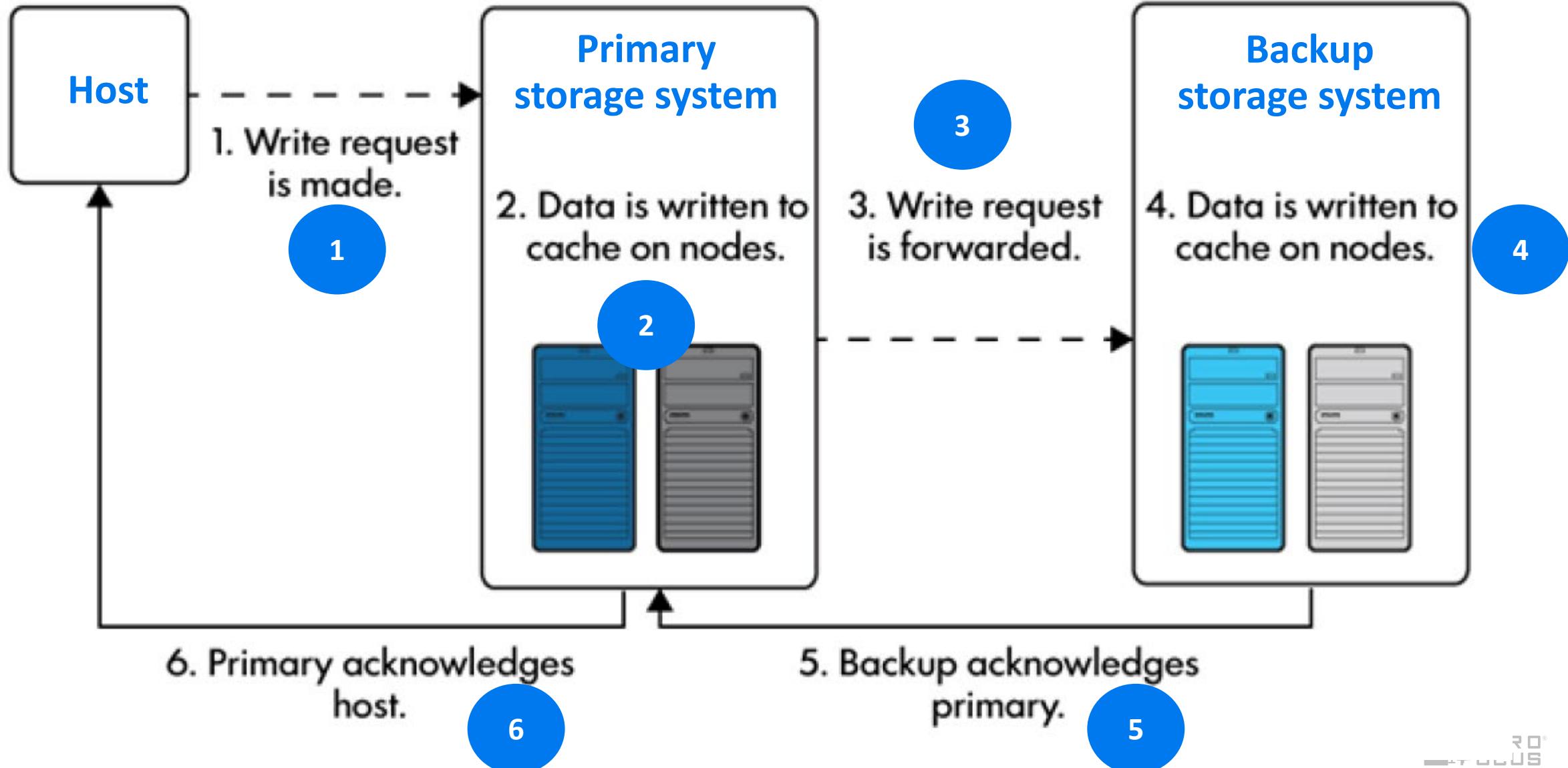
**“A snapshot is NOT a backup!”**

# Remote Copy Environment: Overview

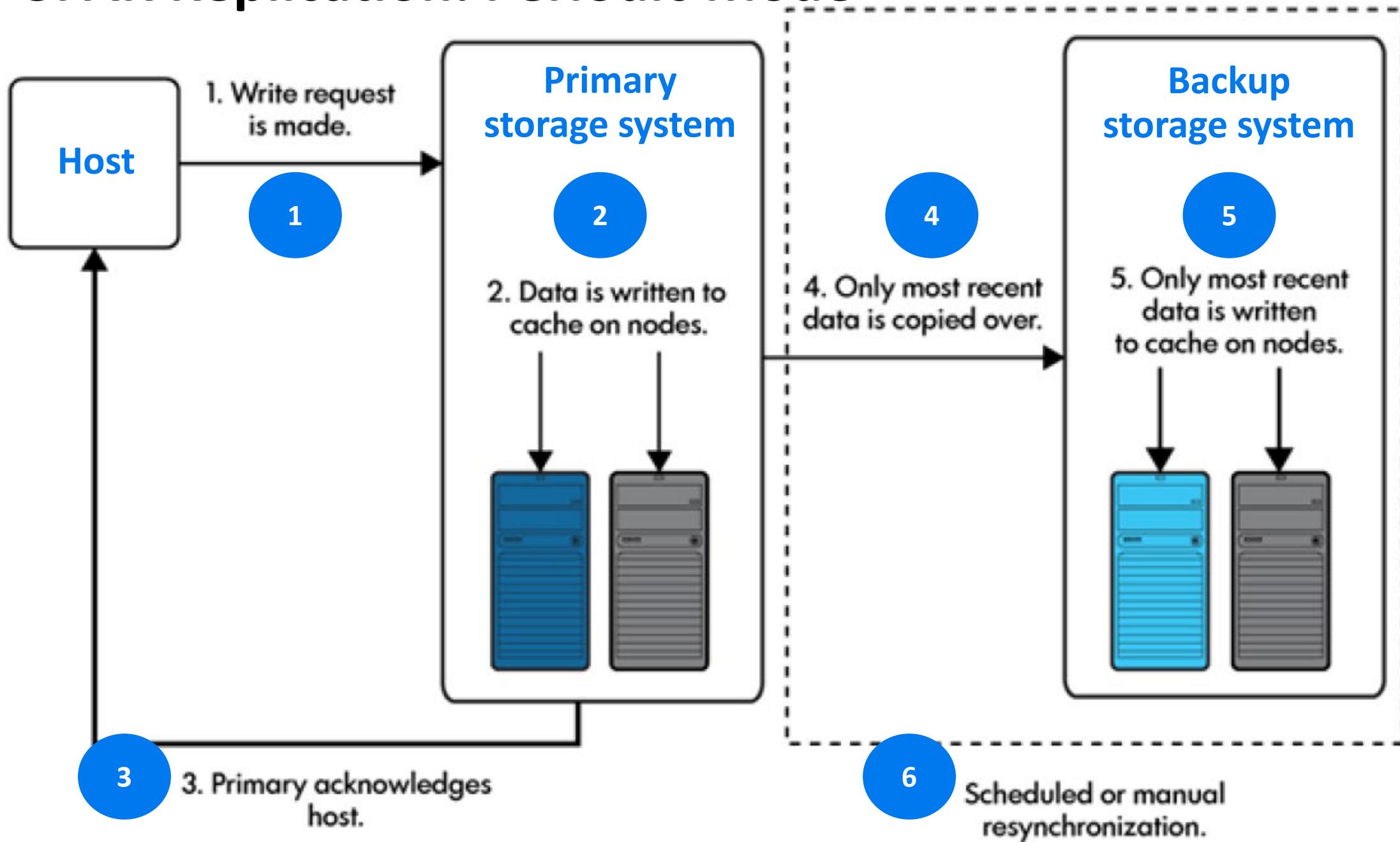
Autonomic replication and disaster recovery



# 3PAR Replication: Synchronous Mode



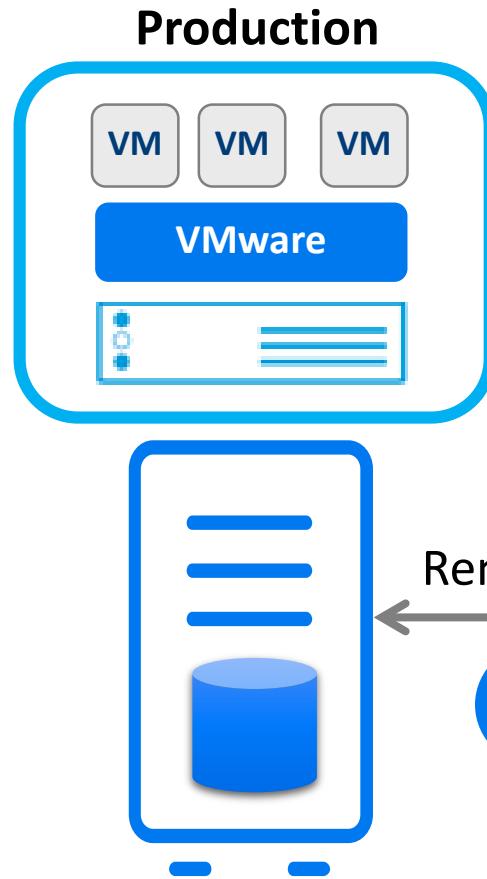
# 3PAR Replication: Periodic Mode



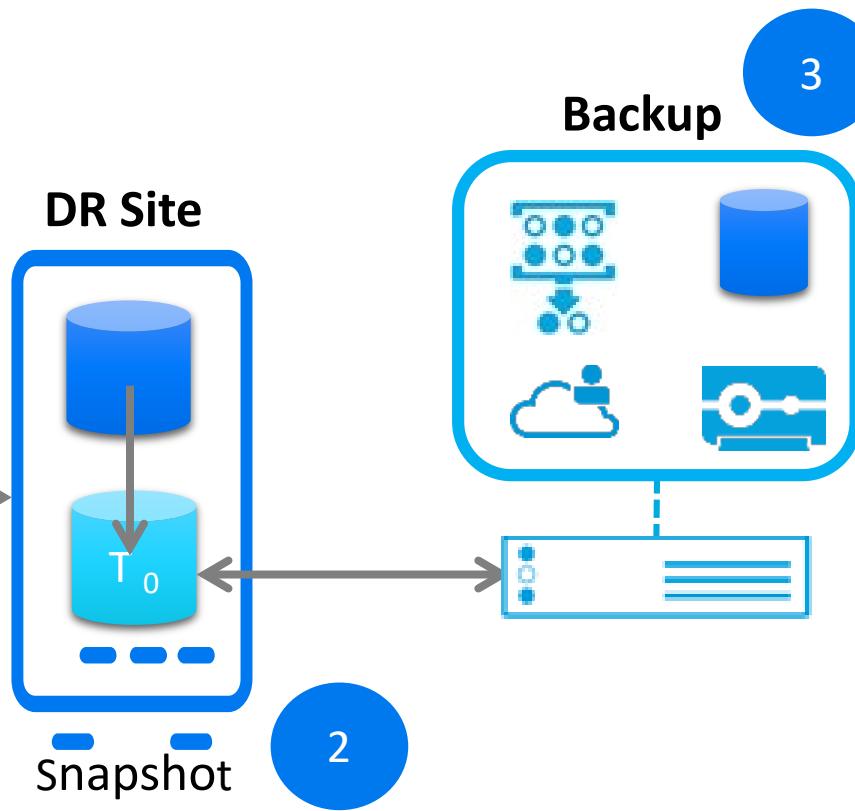
# Why Use a Snapshot-based Backup?



Snapshot-based backup helps offload the Hypervisor from backup I/O



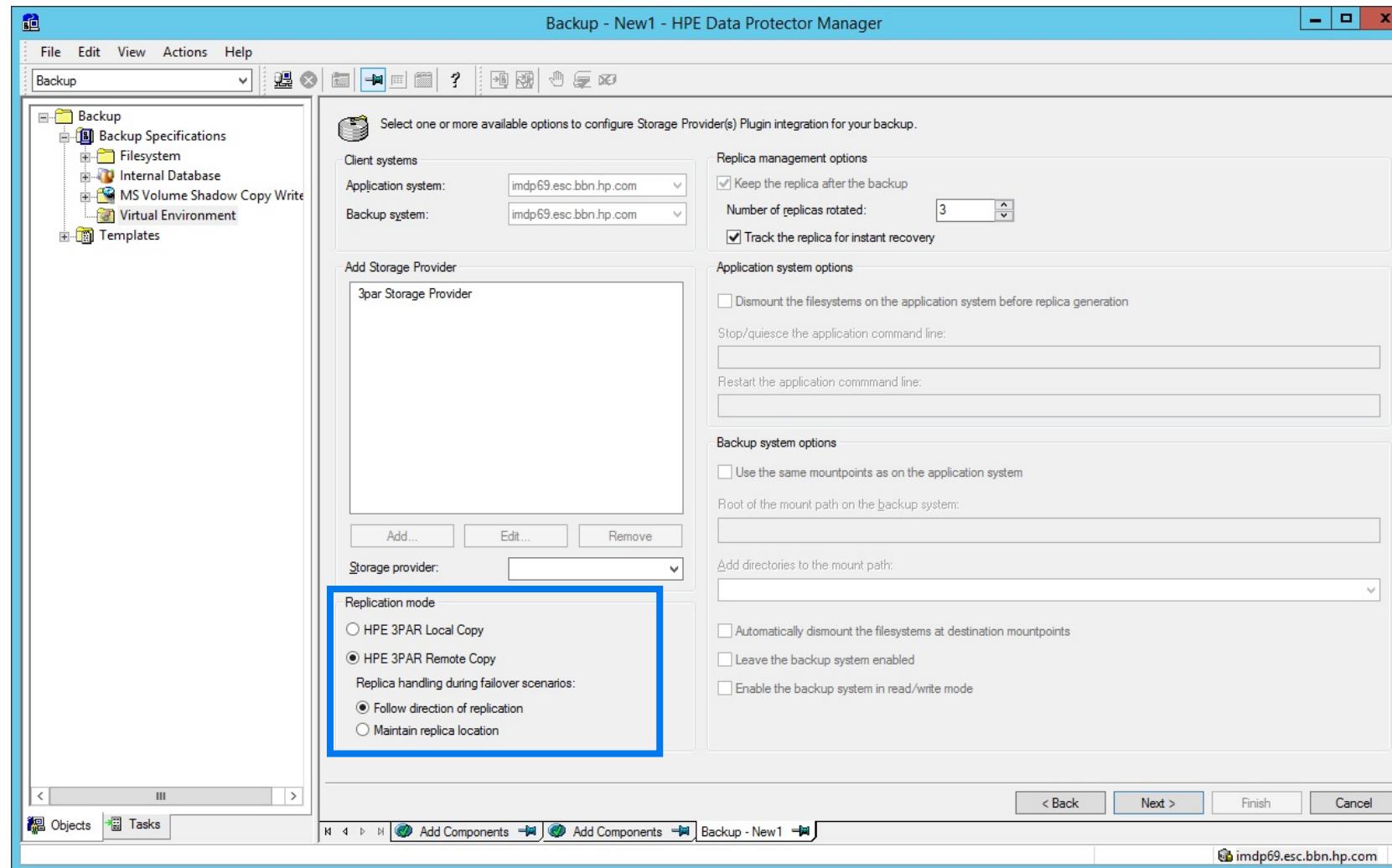
**Solution:** Incorporate Remote Copy handling for VMware Snapshot backups



## DBD/IR SUPPORT FOR 3PAR FEATURES:

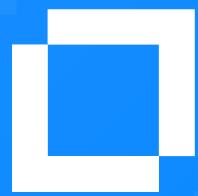
- ZBD/IR remote copy for virtual environment
- Host set and Port present presentation types
- Volume set storage volumes
- Remote copy snapshots for Advanced GRE, Power On, and Live Migrate

# 3PAR Remote Copy ZDB with VMware



# **3PAR Remote 3PAR Remote Copy configuration for VEPA (Virtual Environment Protection Agent)**

1. Use two 3PAR arrays for 3PAR remote copy configuration.
2. Use two ESX Servers and one backup host to create a 3PAR Remote copy configuration setup.
3. Present the LUN from the primary array to ESX host.
4. Use Data Protector ZDB 3PAR SMISA agent to select the VM for which backup should occur. This LUN should be part of 3PAR Remote Copy group.
5. By default, the replica is always created on the “secondary array.”
6. The replica on the “secondary array” is mounted to another ESX host. The VM is backed up from this replica to tape.



# REST APIs

# REST APIs

Secure method of exposing REST API endpoints so REST can operate Data Protector elements

**APIs let you integrate Data Protector workflows with your own solutions ...**



**Authentication APIs for the Java 'thick client' and Web browser:**

Allow inbound REST API queries.



**Browse and Restore APIs:**

Enable partners and customers to automate the Data Protector restore operations.



**Scheduler APIs:**

Manage all scheduling tasks in Data Protector.



# Documentation

# Documentation

Access the Data Protector documentation set from the following locations:

- [https://docs.microfocus.com/itom/Data\\_Protector:2018.09/Home](https://docs.microfocus.com/itom/Data_Protector:2018.09/Home)

The screenshot shows the ITOM Practitioner Portal documentation page for Data Protector 2018.09. The top navigation bar includes links for Products, Docs A-Z, Discussions, Blogs, Ideas, Marketplace, and Support. The main content area features a search bar and a dropdown menu for 'Data Protector 2018.09' with a 'Download PDF' option. On the left, a sidebar lists categories: Home (selected), Release Notes, Get started, Install, Upgrade, Integrate, Administer, Use, Troubleshoot, Develop, and Practitioner notes. The main content is organized into a grid of ten cards:

- Release notes**: Get an insight of the latest features and everything that is new in this version.
- Get started**: Initiate your understanding of the key concepts and architecture of DP.
- Install**: Use these procedures to install, set up, deploy, and maintain DP.
- Upgrade**: Use these procedures to upgrade from previous versions to current version.
- Integrate**: View information about integration of other standalone products with DP.
- Administer**: Utilize the procedures within this section to configure and administer DP.
- Use**: Utilize the procedures in this section to optimize the potential use of DP.
- Troubleshoot**: Resolve problems that you might encounter while installing and using DP.
- Develop**: Use these resources to develop solutions and maximize the utility of DP APIs.
- Video library**: Watch the videos listed in this section for a short introduction to DP.



# Documentation Map

## Home



### Release notes

Get an insight of the latest features and everything that is new in this version.



### Get started

Initiate your understanding of the key concepts and architecture of DP.



### Install

Use these procedures to install, set up, deploy, and maintain DP.



### Upgrade

Use these procedures to upgrade from previous versions to current version.



### Integrate

View information about integration of other standalone products with DP.



### Administer

Utilize the procedures within this section to configure and administer DP.



### Use

Utilize the procedures in this section to optimize the potential use of DP.



### Troubleshoot

Resolve problems that you might encounter while installing and using DP.



### Develop

Use these resources to develop solutions and maximize the utility of DP APIs.



### Video library

Watch the videos listed in this section for a short introduction to DP.

# Support Matrices

[https://docs.microfocus.com/itom/Data\\_Protector:2018.09/Install/system\\_requirements](https://docs.microfocus.com/itom/Data_Protector:2018.09/Install/system_requirements)

The screenshot shows the ITOM Practitioner Portal interface. At the top, there's a navigation bar with the Micro Focus logo, the portal name, and links for Products, Docs A-Z, Discussions, Blogs, Ideas, Marketplace, and Support. A search bar and user profile icon are also at the top right. Below the navigation, the URL indicates the page is for Data Protector 2018.09 under the Install section. The main content area has a title 'Support Matrix' and a note that it's available in Express and Premium editions. It contains two main sections: 'Data Protector Express' and 'Data Protector Premium', each listing various support matrices. At the bottom, there's a 'Feedback' section with a button to send mail.

**Support Matrix**

This feature is available in the Express and Premium Editions

This section provides links to the Data Protector support matrices that include detailed information about the supported platforms, devices, and integrations.

### Data Protector Express

The following support matrix is available:

- [Data Protector Express 10.10 Support Matrix](#)

### Data Protector Premium

The following support matrices are available:

- [Data Protector 10.10 3PAR Support Matrix](#)
- [Data Protector 10.10 Device Support Matrix](#)
- [Data Protector 10.10 Disaster Recovery Support Matrix](#)
- [Data Protector 10.10 Network Attached Storage \(NAS\) Support Matrix](#)
- [Data Protector 10.10 Platform and Integration Support Matrix](#)
- [Data Protector 10.10 Virtualization Support Matrix](#)
- [Data Protector 10.10 VSS Integration Support Matrix](#)
- [Data Protector 10.10 Zero Downtime Backup and Instant Recovery Support Matrix for P6000 EVA Disk Array Family Using SMI-S Agent](#)
- [Data Protector 10.10 Zero Downtime Backup and Instant Recovery Support Matrix for P9000 XP Disk Array Family](#)
- [Data Protector 10.10 Zero Downtime \(Split-Mirror\) Backup Support Matrix for EMC Arrays](#)
- [Data Protector 10.10 Zero Downtime Backup Support Matrix for other Storage Arrays](#)

### Feedback

[Send us feedback via mail](#)



# Wrap-Up

- Summary
- Module Quiz

# Quick Summary

Here's what you learned ...



1. Consolidated Scheduler.
2. Performance enhancements for Direct I/O for Linux and AIX.
3. Storage enhancements.
4. Platform enhancements supporting Sharepoint, Oracle, NIC, and VMWare.
5. StoreOnce Cloud Bank Storage – coming soon!
6. Zero Downtime Backup and 3PAR remote site replication for VMware.
7. HPE Recovery Management Central (RMC) and Data Protector – comparison, integration, and use cases.
8. Newly released REST APIs.
9. Available documentation.



## Module 9 Quiz

Pause now to take a short interactive quiz to gauge your understanding of what you learned in this module.

# Congratulations!

You completed the course.  
But this is not the end ...

Click the link below to go to the Sales Portal and register for the exam:

[https://swsalesportal.hpe.com/group/  
software-sales/certifications](https://swsalesportal.hpe.com/group/software-sales/certifications)

## What's next?

**Take the Certification Exam!**



**Pass with a score of 80% or better!**

# Thank you.

[www.microfocus.com](http://www.microfocus.com)

For more information, visit the  
Sales or Partner Portal.

**Make sure to fill out your  
survey after the course!**

