HPE Digital Learner Primera Content Pack

The HPE Digital Learner Primera content pack provides an overview of the HPE Primera portfolio. The course teaches how to perform common day-to-day management tasks with hands-on labs (HOL), including creating the right data-efficient volumes on an all-flash HPE Primera array, and leveraging the power of HPE InfoSight. This course also provides knowledge of the advanced capabilities of the HPE Primera storage array, including lower level data reduction features, reporting, monitoring and alerting, and QOS, as well as local and remote replication options. You gain a practical understanding of HPE Primera array capabilities using extensive hands-on lab exercises.

This content pack is the combination of:
• HM9Q5AAE: HPE Primera I: Management and Connectivity (8 hours)

HPE Primera I: Management and Connectivity has two components:
1. Web-based training available online
2. Hands-on practice, available through HPE Virtual Labs. You have a day of access to the HPE Virtual Labs to run the labs associated with this course.

• HM9Q6AAE: HPE Primera II: Monitoring and Replication (16 hours)

HPE Primera II: Monitoring and Replication has two components:
1. Web-based training available online
2. Hands-on practice, available through HPE Virtual Labs. You have two sequential days of access to the HPE Virtual Labs to run the labs associated with this course.
**Audience**

- Customers, administrators and channel partner (sales or technical sales)
- Storage administrators who desire additional training on the advanced features of HPE Primera

**Prerequisites**

- An understanding of general storage concepts including fibre channel technology and RAID
- Operator level functionality in a Windows environment

**Content Pack objectives**

After completing this course, the student should be able to:

- Discuss Primera hardware offerings
- Describe HPE Primera family features
- List management options
- Describe the HPE Primera Storage software portfolio
- Explain provisioning terminology
- Understand the concepts of chunklets and logical disks
- Explain the HPE Primera concepts of a common provisioning group (CPG)
- Explain thin provisioned virtual volumes (VV)
- Overview Primera data reduction technologies
- Prepare a host to access an HPE Primera storage array
- Create hosts in an HPE Primera storage array
- Explain how to add fibre channel (FC) ports to a host
- Explain the advantages of HPE Smart SAN for Primera
- Export virtual volumes (VV) to a host as VLUNs unexport virtual volumes (VV) from a host
- Describe the advantages of host sets and volume sets
- Create and maintain host sets and volume sets
- Use SSMC and the CLI to create and manage host sets and volume sets
- Discuss the guidelines and rules regarding host sets and volume sets
- Describe app volume sets
- Describe the use of InfoSight to monitor Primera and its surroundings
- Describe the benefits of data reduction technologies
- Perform space reclamation
- Describe data reduction technologies: deduplication, compression, and data packing
- Perform a data reduction estimation
- Perform an online virtual volume conversion
- Describe System Reporter capabilities
- Use SSMC and the CLI to run reports
- Use the CLI stat commands to look at real time statistics
- Use HPE Primera app volume sets (AppVVset) in performance context
- Use the SSMC Workload Insights feature for performance reasons to isolate application
- Understand spikes and trends
- Understand the SSMC Workload Insights concept of a performance score
- Understand the advantages of the Topology Insights feature to pinpoint performance bottlenecks
- Describe basic Primera UI monitoring
- View, interpret, and manage system events and alerts
- Use the “checkhealth” command for troubleshooting
- Work with alert notifications for System Reporter
- Monitor and manage the event log
- Forward events to syslog server
- Explain SNMP settings and capabilities
- Describe the SMI-S standard, WBEM initiative, and Primera CIM support
- Explain REST API use
- Describe the advantages of Priority Optimization and Quality of Service (QoS)
- Discuss the performance implications of Priority Optimization
- Administer Priority Optimization
- Monitor the impact of Priority Optimization
- Create a scheduled and immediate snapshot
- Export a snapshot
- Perform a recovery using a snapshot
- Work with a clone
- Describe the key features, benefits, and advantages of Remote Copy
- Explain different types of Remote Copy implementations
- Explain the differences between synchronous and periodic asynchronous replication modes
- Discuss different failure scenarios
- Perform a failover of a Remote Copy group
- Briefly describe data migration, and high availability and disaster tolerance solutions
Module 1: Solution Overview

- Part 1—Hardware
  - Primera technical specifications
  - HPE Primera hardware building blocks
  - Data-in-place upgrade
  - Primera persistency and high availability features

- Part 2—Software and features
  - Management options overview
  - Primera and 3PAR SSMC
  - HPE Primera storage management—HPE Primera UI
  - HPE Primera command line interface (CLI)
  - HPE Primera integration portfolio overview
  - Selected data protection and security features overview
  - HPE Primera leadership—replication
  - Peer persistence
  - HPE Cluster Extension CLX
  - VMware vSphere® disaster recovery with Site Recovery Manager
  - Sources of information

Module 2: Storage Concepts and Terminology

- HPE Primera OS virtualization—logical view
- HPE Primera OS virtualization concepts
- HPE Primera OS virtualization advantages
- Chunklet concepts
- System wide sparing
- Logical disk concepts
- HPE Primera high availability
- CPG concepts
- Virtual volume overview
- Thin provisioning overview
- HPE Primera data reduction overview

Module 3: Host Connectivity and Storage Allocation

- Host to HPE Primera front-end configuration—FC example
- HPE Primera block I/O connectivity
- HPE Primera persistent ports
- HPE Primera WWN format
- HPE Primera OS 4.x host OS support
- HPE Primera implementation guide
- Host HBAs and WWNs—commands/utilities
- HPE Smart SAN for Primera
- HPE Primera zoning overview
- Adding hosts in SSMC—SMART SAN enabled
- Making VLUNs visible to hosts
- HPE Host Explorer
- HPE LunInfo

Module 4: Host, Volume, and App Volume Sets

- Host sets and virtual volume sets overview and advantage
- Virtual volume set—other use cases
- Host sets and virtual volume sets—SSMC and CLI examples
- App volume sets overview
- App volume sets—SSMC examples
- SSMC dashboard—top app vol sets

Module 5: HPE InfoSight Introduction

- HPE InfoSight sees and predicts behind the scene
- Get the full picture with HPE Primera and InfoSight
- The AI process for HPE self-healing storage
- HPE Primera—dashboard
- HPE Primera—systems view
- HPE Primera—detailed systems view
- HPE Primera—system performance view
- HPE Primera—performance insights view
- HPE Primera—PDF report
- HPE InfoSight Cross-Stack Analytics for VMware environments

Appendix 1: HPE Primera On-Node Management

- Discovering the HPE Primera array
- HPE Primera initial setup
- Checking hardware
- Creating users on the array and configuring the network
- Initializing the array
- Configuring date/time, Infosight and system support contact
- InfoSight
- Enabling remote support data scrubbing
- First time login
- Primera UI dashboard—overview, alerts, and tasks
- On-node management performance dashboard
- Customer self-update option
- Customer self-repair option
## Detailed lab outline

### Lab 0: vLabs Access
- Task 1: Accessing the vLab

### Lab 1: Working with SSMC and CLI
- Exercise 1: Reviewing the SSMC GUI and online help
- Exercise 2: Reviewing the dashboard and changing output views
- Exercise 3: Accessing the SSMC settings screen
- Exercise 4: Adding a user
- Exercise 5: Working with the SSMC activity screen
- Exercise 6: SSMC hardware introduction
- Exercise 7: Launching the CLI

### Lab 2: Storage Configuration
- Exercise 1: Log in to SSMC
- Exercise 2: Working with CPGs in SSMC
- Exercise 3: Working with virtual volumes (VV) in SSMC
  - Exercise 3-1: Creating thin provisioned virtual volumes
  - Exercise 3-2: Creating thin volumes (TPVV) with data reduction enabled
- Exercise 4: Working with virtual volumes (VV) using the CLI
- Exercise 3-3: Creating multiple virtual volumes using a count
- Exercise 3-4: Displaying/editing/removing virtual volumes
- Exercise 4: Working with VVs using the CLI

### Lab 3: Host Configuration and Storage Allocation
- Exercise 1: Identify the HBA type (Windows)
- Exercise 2: Determining host port WWNs
- Exercise 3: Adding a host using HBA WWNs in SSMC
  - Exercise 3-A: Adding a host using Host Explorer in SSMC
  - Exercise 3-B: Adding a host manually using HBA WWNs in SSMC
- Exercise 4: Export/unexport VLUNs in SSMC
- Exercise 5: Windows host configuration formatting and mounting VLUNs
- Exercise 6: Online virtual volume increase
- Exercise 7: Working with default reports
- Exercise 8: Working with HPE LUNInfo for HPE Primera and HPE 3PAR
- Exercise 9: Working with hosts and storage using the CLI

### Lab 4: Host, Volume and App Volume Sets
- Exercise 1: Working with host sets and virtual volume sets
  - Exercise 1-1: Working with host sets in SSMC
  - Exercise 1-2: Working with virtual volume sets in SSMC
  - Exercise 1-3: Export virtual volume sets to hosts sets in SSMC
- Exercise 2: Working with app volume sets using SSMC
- Exercise 3: Working with host sets and volume sets using CLI
- Exercise 1-4: Unexport virtual volume sets from hosts sets in SSMC
- Exercise 1-5: Delete virtual volume sets and hosts sets in SSMC

### Lab 5: Using InfoSight
- Exercise 1: Logging in and dashboard
- Exercise 2: Access InfoSight support
- Exercise 3: Array overview
- Exercise 4: Physical disk details
- Exercise 5: Reports
- Exercise 6: InfoSight scenarios (optional)
  - Exercise 6-1: Health check
  - Exercise 6-2: Planning for growth
  - Exercise 6-3: Using InfoSight to troubleshoot
## HM9Q6AAE: HPE Primera II: Monitoring and Replication Self-Paced Training, Rev. 20.31

### Detailed course outline

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### Detailed lab outline

**Lab 0: vLabs Access and Initial Set up**
- **Task 1:** Accessing the vLabs
- **Task 2:** Initial setup
  - Exercise 1: Log in to the StoreServ management console
- **Exercise 2:** Configuring hosts
  - Exercise 2a: Adding a host manually using the HBA WWPNs with SSMC
  - Exercise 2b: Adding a host using Host Explorer with SSMC
- **Exercise 3:** Install iometer
- **Exercise 4:** Enabling advanced system performance analytics

**Lab 1: Online Virtual Volume Conversion and Data Reduction Estimates**
- Exercise 1: Lab set up
- Exercise 2: Data reduction savings estimate using CLI
  - Estimation analysis results
- **Exercise 3:** Online conversion using SSMC

**Lab 2: Monitoring and Reporting**
- Exercise 1: Initial lab set up
- Exercise 2: SSMC default reports
- Exercise 3: Custom reports using SSMC
  - Physical drives—performance statistic report
  - CPGs—capacity report
  - System capacity report
- **Exercise 4:** Real time information reports
- **Exercise 5:** Monitoring app virtual volume sets using dashboard
- **Exercise 6:** Using CLI to view real time performance

**Lab 3: Events and Alerts**
- Exercise 1: Viewing alerts (SSMC GUI)
- Exercise 2: Viewing alerts (CLI)
- Exercise 3: Viewing tasks (SSMC GUI)
- Exercise 4: Viewing events (CLI)
- Exercise 5: Syslog
- Exercise 6: System Reporter alerts (SSMC GUI)
- **Exercise 7:** SNMP traps
- **Exercise 8:** Using REST API
  - Part 1—Primera REST preparation and login
  - Part 2—Using the Postman client to create a resource
  - Part 3—Using the Postman client to delete a resource
  - Part 4—Using cURL to manage resources
- **Exercise 9:** Exercise clean-up

**Lab 4: Priority Optimization (QoS)**
- Exercise 1: Initial lab set up
- Exercise 2: Configuring Priority Optimization using SSMC
- Exercise 3: Monitoring and managing Priority Optimization using SSMC
- **Exercise 4:** Monitoring and managing Priority Optimization using CLI
  - QoS analysis results
  - Additional commands to manage QoS rules

**Lab 5: Snapshots and Clones**
- Exercise 1: Initial lab set up
- Exercise 2: Snapshot file recovery
- Exercise 3: Snapshot full volume data recovery
- Exercise 4: Restore data between two snapshots
- Exercise 5: Schedule snapshots and snapshot expiration policies
  - Create a snapshot policy
- **Exercise 6:** Create a clone
- **Exercise 7:** Create a clone with resynchronization capability
- **Exercise 8:** Working with snapshots and clones using CLI
  - Create scheduled snapshots using a snapshot policy
  - Exploring scheduled snapshots over time
  - Create a clone
  - Create a clone with resynchronization capability
  - Working with snapshots and clones using CLI

**Lab 6: Remote Replication**
- Planning and initial set up of Remote Copy
  - Exercise 1: Lab set up
  - Exercise 2: Verify RCIP ports and configuration set up using SSMC
    - Verifying the RCIP port configuration
    - Remote Copy configuration
  - Exercise 3: Creating and managing Remote Copy groups
  - Exercise 4: Add a volume pair to an existing Remote Copy group
  - Exercise 5: Planned failover to the remote site
  - Outage scenarios: Failover to the remote site and failback
  - Exercise 6: Recovery of a Remote Copy group after the source system is back online
  - Exercise 7: Restore a Remote Copy group
  - Failover to the remote site for testing or off-site backup
  - Exercise 8: Stop and failover a Remote Copy group
  - Exercise 9: Revert a Remote Copy group and failover again
    - Revert
    - Failover again
  - Exercise 10: Revert the Remote Copy group and replicate in the original direction
  - Exercise 11: Delete a Remote Copy group
  - Exercise 12: Lab clean up
  - Exercise 13: Configuring Remote Copy using CLI
### Lab A: Working with VMware
- Exercise 1: Switch between client VMs
- Exercise 2: Adding the ESXi host and exporting a volume in SSMC
- Exercise 3: Working with storage using VMware vCenter®

### Lab B: Working with Linux
- Exercise 1: Switch between client VMs
- Exercise 2: Adding the RHEL Linux host and export a volume using SSMC

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