Purpose of the Exam Prep Guide

The intent of this guide is to set expectations about the content and the context of the exam and to help candidates prepare for the exam. In this guide, you will find recommended HP training courses, reference material, and sample test items to help you achieve a passing score.

Studies conducted by HP and Prometric show that a combination of course attendance and self-study maximizes the likelihood of passing the exam on the first attempt.

Audience

This exam is for candidates who run Microsoft Windows Server 2003, Enterprise Edition on HP hardware in medium to very large computing environments. Candidates should have one year of job experience administering Windows Server 2003 environments and HP hardware and options.

Certification Requirements

The intent of this section is to help you know how this exam relates to the specific certification to which it applies.

This exam is a core requirement for the HP Accredited Professional Master Accredited Systems Engineer (ASE) certification.

The Master ASE certification is centered around capacity planning, installing, configuring, optimizing, and managing Microsoft Windows and Novell NetWare-based clustering systems.
Prerequisites

HP strongly recommends that you have the following knowledge and skills:

- An understanding of the installation, setup, configuration, and general operation of networks based on Microsoft Windows Server 2003, Enterprise Edition
- Successful completion of Updating Systems Engineer Skills from Microsoft Windows 2000 to Windows Server 2003 course (MOC 2210) as offered by Microsoft, or equivalent knowledge
- Successful completion of HP StorageWorks Full Line Technical Training and Designing and Implementing StorageWorks Solutions on Windows and NetWare Platforms, or equivalent knowledge
- Completion of Implementing HP Hardware Fault Resilient Features web-based training
- An understanding of general Windows Server 2003 system administration
- A familiarity with network administration and support
- An understanding of network technologies and topologies
- HP ASE certification or equivalent knowledge of HP high-end server systems, equipment, options, software, and HP management and integration tools
Exam Details

At the beginning of the exam, you will be asked to answer several survey questions. The survey questions are designed to assist the exam development team in accurately profiling test results and to improve future exams.

The Implementing Windows Server 2003 on ProLiant Cluster Solutions exam has 69 questions randomly selected from a larger pool of questions. The following are details about the exam:

- **Number of items**: 69
- **Item types**: Multiple choice
- **Time commitment**: 105 minutes
- **Passing Score**: 72%
- **Reference material**: No online or hardcopy reference material will be allowed at the testing site.

Exam Registration

- This exam is available at [Prometric](http://www.prometric.com).

Exam Content

The following outline represents specific areas covered in the exam. Use this outline to guide your study and to check your readiness for the exam. The exam measures your understanding of these areas.

The approximate percentage of exam questions dedicated to each major content area is included in parenthesis. The higher the percentage, the more questions will be on the exam.

Implementing Windows Server 2003 on ProLiant Cluster Solutions Exam Content

1.0 Clustering Concepts (10%)

- **1.1. Discuss the need for availability and how it affects client/server applications.**
- **1.2. List the four availability levels.**
- **1.3. Define cluster.**
- **1.4. Discuss the factors involved in choosing a high-availability solution.**
2.0 ProLiant Cluster Components (18%)
   2.1. Identify the HP hardware components that support clustering.
   2.2. Identify the HP software components that support clustering.

3.0 ProLiant Cluster Solutions for Windows Server 2003 (4%)
   3.1. Identify the benefits of HP ProLiant cluster solutions.

4.0 Microsoft Clustering Technologies (16%)
   4.1. Describe the Microsoft Windows Server 2003 products and their high availability and clustering features.
   4.2. List the Microsoft clustering technologies.
   4.3. Describe resources and their attributes.

5.0 Optimizing Cluster Availability and Performance (13%)
   5.1. Identify single points of failure in a cluster and discuss methods of resolution.
   5.2. Describe how to plan network capacity to handle requests from the client machines and to handle failover and failback events gracefully.
   5.3. Explain how to configure the storage subsystem for high availability and performance.
   5.4. Describe the options available in a cross-connected UPS system.

6.0 Deploying Exchange Server 2003 on ProLiant Clusters (7%)
   6.2. Describe the considerations when installing Exchange Server 2003 on ProLiant clusters.
   6.3. Describe the considerations when configuring Exchange Server 2003 on ProLiant clusters.

7.0 Deploying SQL Server Clusters (12%)
   7.2. Discuss how SQL Server databases can be partitioned to maximize performance.
   7.3. Describe SQL Server federations and list their components.

8.0 Cluster Management (13%)
   8.1. Describe how to manage cluster performance in various situations.
   8.2. Explain how to manage and administer clusters.
9.0 Cluster Maintenance (7%)

9.1. Discuss how to plan for cluster maintenance tasks.

9.2. Discuss how to maintain and replace hardware.
Exam Objectives

The objectives tested in this exam are:

- Explain clustering concepts.
- Identify HP ProLiant cluster components, including:
  - HP ProLiant servers and Fibre Channel equipment.
  - HP StorageWorks Storage Solutions.
  - SANworks utilities.
- Describe Microsoft clustering solutions.
- Discuss how to optimize the availability and performance of a Windows Server 2003 cluster.
- Deploy Microsoft SQL Server clusters.
- Explain how to manage and administer Windows Server 2003 clusters.
- Discuss cluster maintenance procedures including backup and restore options.

Each of these objectives has associated competencies that form the basis of the individual test items in the exam. These competencies are listed in the following pages.
Discuss Clustering Concepts

- Discuss the need for availability and how it affects client/server applications.
- Define cluster.
- List the advantages of clustering.
- Discuss the factors involved in choosing a high-availability solution.
- Describe the cluster solutions available from HP.

Describe HP ProLiant Cluster Components

- Identify the hardware components that support clustering, including:
  - HP ProLiant servers.
  - Fibre Channel components.
  - HP StorageWorks storage systems.
- Describe the HP StorageWorks Storage Solutions.
- Identify the Fibre Channel Array controllers used in ProLiant cluster solutions.
- Describe how an Ethernet interconnect is used in a ProLiant cluster.
- Describe the HP utilities used to support a ProLiant cluster.
- Describe the following SANworks utilities:
  - HP StorageWorks Command Console (SWCC)
  - HP SANworks Secure Path
  - HP SANworks Virtual Replicator

Describe HP ProLiant Cluster Solutions for Windows Server 2003

- Explain the benefits of HP ProLiant clustering solutions.
- Describe the differences among the ProLiant cluster solutions for Microsoft Windows Server 2003, including:
  - ProLiant DL380 Packaged Cluster
  - ProLiant Cluster F100 for the Raid Array (RA) 4100
  - ProLiant Cluster F100 for the Modular SAN Array (MSA) 1000
  - ProLiant Cluster F200 for the RA4100
  - ProLiant Cluster F200 for the MSA1000
  - ProLiant Cluster F500
Explain Microsoft Clustering Technologies

- Identify which Microsoft Windows Server 2003 products support clustering.
- Describe the features of:
- Describe the Microsoft clustering technologies, including:
  - Network Load Balancing (NLB).
  - Component Load Balancing (CLB).
  - Cluster service.
- Describe resources and their attributes, including:
  - Types.
  - Groups.
  - Dependencies.
  - States.

Optimize Performance and Availability in a Cluster

- Identify single points of failure in a cluster and discuss methods of resolution.
- Describe how to plan network capacity to handle requests from the client machines and to handle failover and failback events gracefully.
- Explain how to configure the storage subsystem for high availability and performance.
- Describe the options available in a cross-connected UPS system.
Deploying Exchange Server 2003 on ProLiant Clusters

- Identify the HP ProLiant products on which Exchange Server 2003 is best deployed.
- Describe the considerations when installing Exchange Server 2003 on ProLiant clusters.
- Describe the considerations when deploying Exchange Server 2003 on ProLiant clusters.
- Discuss storage and recovery procedures when using Exchange Server 2003.

Deploy a SQL Server 2000 Cluster

- Describe how Microsoft SQL Server 2000 failover clustering with Microsoft Windows 2000 Cluster service helps maximize availability.
- Discuss how SQL Server databases can be partitioned to maximize performance.
- Describe SQL Server federations and list their components.
- Compare clustered database products, including the two most recent versions of SQL Server.

Manage a Windows Server 2003 Cluster

- Describe how to manage cluster performance in various situations, including:
  - Without interrupting Cluster services.
  - In a degraded condition.
  - When network clients are connected to a cluster.
  - Remotely.
- Explain how to manage and administer clusters using:
  - Insight Manager 7.
  - Cluster Command Line.
  - Microsoft Cluster Administrator.
  - Intelligent Cluster Administrator.
    - Policy Manager.
    - Enhanced Application Availability wizard.
Discuss Cluster Maintenance Procedures

- Describe Microsoft Windows Server 2003 Cluster service backup and restore solutions.
- Discuss how to change the cluster IP address.
- Perform regular maintenance on a Windows Server 2003 cluster.

Sample Exam Items

The sample items included in this section represent the types of questions you will encounter on the actual exam. This sample set of test items does not reflect every objective that is tested on the exam. Together with the exam objectives listed previously, these questions will help you determine your readiness to take the exam.

After answering these questions, check your responses using the answer key at the end of this section.

Important

These questions are not found in the current exam. However, if you can answer these questions, have in-depth understanding of the material covered in the Implementing Windows Server 2003 on ProLiant Cluster Solutions course, and have completed the hands-on lab exercises; you will be better prepared to achieve a passing score.

Section 1 — Clustering Concepts

1. What does availability measure?
   a. The total amount of time a computer is running minus its downtime
   b. How well a computer can deliver services to clients continually
   c. How much downtime is occurring in a cluster
   d. The amount of time required to service a cluster

2. Which item is an example of a mission-critical application?
   a. Electronic transfers in banking
   b. Airline reservation systems
   c. Air traffic control systems
   d. Company payroll systems

3. Which level of availability includes uncontrolled shutdown events?
   a. AL1
   b. AL2
   c. AL3
   d. AL4
Section 2 — HP ProLiant Cluster Components

4. To determine if a server is certified for use in a HP ProLiant cluster, you should:
   a. Refer to the certification matrix on the SmartStart CD.
   b. Check the certification matrix on the HP website.
   c. Look at the list of supported servers in the Microsoft Cluster service Help file.
   d. Look for the Cluster Certified label inside the chassis cover.

5. Which StorageWorks storage system supports 2Gb/s Fibre Channel?
   a. MSA1000
   b. RA4100
   c. EMA12000
   d. Smart Array Cluster Storage

6. Which management software can be used to configure Smart Array controllers locally?
   a. System Configuration Utility
   b. HP Array Configuration Utility (ACU)
   c. Intelligent Cluster Administrator
   d. HP StorageWorks Command Console (SWCC)

7. Which program can be used to perform software updates on remote servers?
   a. ProLiant Support Pack (PSP)
   b. Options ROMPaq
   c. Insight Manager 7 SP2
   d. Rapid Deployment Utility (RDU)
Section 3 — HP ProLiant Cluster Solutions for Windows Server 2003

8. Which ProLiant cluster solution offers a two-node entry-level packaged cluster that simplifies clustering for business-critical applications in branch office, remote locations, or departmental computing?
   a. ProLiant DL380 Packaged Cluster with MSA500
   b. ProLiant Cluster F100
   c. ProLiant Cluster F200
   d. ProLiant Cluster F500

9. Your customer wants to upgrade a ProLiant Cluster F100 using the MSA1000 to a ProLiant Cluster F200 using Windows Server 2003, Enterprise Edition. Which software component is essential for this operation?
   a. HP StorageWorks Secure Path software
   b. HP High Availability Options software
   c. Microsoft High Availability Upgrade for Windows Server 2003 software
   d. HP StorageWorks High Availability Options software

Section 4 — Microsoft Clustering Technologies

10. Which clustering enhancement feature was released with Microsoft Windows Server 2003, Enterprise Edition?
   a. Four-node clustering
   b. Eight-node clustering compared to two-node clustering
   c. Support for detecting new logical volumes without restarting the server
   d. Support for configuration changes being made and applied without restarting the server
   e. Support for dynamic disks to be used with clustering as a shared drive
11. Your customer’s business features a web hosting service. The network needs to be clustered with Network Load Balancing (NLB) on the front end, component load balancing (CLB) for the system middle-tier, and the Microsoft Cluster service for data and mail storage. The customer wants to implement all three of these clustering technologies on the same server. Can you implement this? Why or not?

a. Yes, implementing these services on one server is a good investment because they will save money in the long run.

b. No, NLB and CLB need to be on different servers but the Cluster service can be implemented with either load balancing technology on one server.

c. Yes, NLB, CLB, and the Cluster service are designed to work on the same server and is Microsoft’s recommended configuration.

d. No, installing or activating NLB, CLB, and/or the Cluster service on the same server is currently unsupported.

12. Which clustering enhancement feature was released with Microsoft Windows Server 2003, Enterprise Edition?

a. No need to reboot after installing Cluster service

b. Six-node clustering

c. Compatibility with Dynamic Host Configuration Protocol (DHCP)

d. Support for thirty-two processor SMP

e. Support for up to 8GB RAM

Section 5 — Optimizing Availability and Performance of the Cluster

13. You must configure the disks in Windows Server 2003 to which setting in order for them to be used for shared storage in the cluster?

a. Basic

b. Clustered

c. Shared

d. Dynamic

Section 6 — Deploying Exchange Server 2003 on ProLiant Clusters
Section 7 — Deploying SQL Server Clusters

14. Which tool is **not** supported with failover clustering in SQL Server 2000 Enterprise Edition?
   a. SQL Server Enterprise Manager
   b. SQL Profiler
   c. SQL Query Analyzer
   d. SQL Internet Access Manager

15. What is the term that refers to the process of splitting a table into multiple member tables and physically storing the member tables at various locations?
   a. Horizontal partitioning
   b. Vertical partitioning
   c. Distributed partitioning
   d. Virtual partitioning

16. What term is used to refer to the SQL Server federation database component?
   a. Enterprise database
   b. Member database
   c. Communication manager database

Section 8 — Cluster Management

17. The Cluster service enables ____________ of specific resources, such as volumes or services.
   a. Automatic configuration
   b. Manual failover
   c. Automatic load balancing
   d. Manual discovery
18. Which tool enables remote management of a cluster?
   a. HP Cluster Remote Resources Utility
   b. HP Remote Lights-Out Edition (RILOE)
   c. Insight Manager 7 SP2
   d. Intelligent Cluster Monitor

19. A cluster monitor extension (CMX) is a modular snap-in designed to interface with ________.
   a. Microsoft Cluster Administrator
   b. Intelligent Cluster Administrator
   c. Rapid Deployment Pack
   d. Insight Manager 7 SP2

Section 9 — Cluster Maintenance

20. What is the tool that combines hardware and cluster-aware backup software to provide continuous cluster backup support in case of a failure in the HP ProLiant DL380 G3 Packaged Cluster?
   a. HP DL380 G3 Package Cluster Backup Kit
   b. HP Enterprise Backup Kit
   c. HP Fibre Channel Backup Solution Kit
   d. HP Cluster Backup Connectivity Kit

21. Which change will cause an uncontrolled failover?
   a. Changing the IP address for a NIC designated for external use only
   b. Changing the subnet mask for a NIC designated for external use only
   c. Changing the IP address and subnet mask for a NIC designated for internal use only
   d. Changing the HTTP address and subnet mask designated for external use only

22. Which item can change because of physical disk failures or capacity expansion of the logical drive?
   a. Disk serial number
   b. Disk signature
   c. Disk GUID
   d. Disk certificate
Answer Key

Section 1 — Clustering Concepts
1. B
2. C
3. A

Section 2 — HP ProLiant Cluster Components
4. B
5. A
6. B
7. D

Section 3 — HP ProLiant Cluster Solutions for Windows Server 2003
8. A
9. A

Section 4 — Microsoft Clustering Technologies
10. B
11. D
12. A

Section 5 — Optimizing Availability and Performance of the Cluster
13. A

Section 6 — Deploying Exchange Server 2003 on ProLiant Clusters

Section 7 — Deploying SQL Server Clusters
14. D
15. C
16. B

Section 8 — Cluster Management
17. B
18. C
19. D
Section 9 — Cluster Maintenance

20. D
21. C
22. B

Conclusion
HP wishes you success in the HP Certified Professional Program and in passing the exam for which you are preparing.