Creating HP Software-defined Networks

Exam description

This exam tests your skills and knowledge on how to architect and implement HP Software-defined Networks.

In this exam you will be tested on topics such as OpenFlow, Software-defined Network (SDN) use cases, high-availability feature for the HP SDN VAN Controller, installing and configuring the SDN controller and designing Software-defined network solutions with HP applications such as HP Network Protector SDN Application.

This certification exam is designed for candidates with “on the job” experience. The associated training course, which includes numerous design and hands on lab activities, provides a foundation, but you are expected to have real world experience as well.

Who should take this exam?

New candidates who want to acquire the HP ASE - FlexNetwork Architect V2 or the HP ASE - FlexNetwork Integrator V1 certification and who have one of the following prerequisites:

- HP ATP - FlexNetwork Solutions V2
- HP AIS - Network Infrastructure [2011]

Candidates who have one of the following certifications and want to acquire the HP ASE - FlexNetwork Architect V2 or the HP ASE - FlexNetwork Integrator V1 certification:

- HP ASE - Wireless Networks [2011]
- HP ASE - Network Infrastructure [2011]
- HP ASE - Network Architect V1
- Cisco CCNP (any), CCDP(*), Juniper JNCIP-ENT, JNCIP-WLAN, H3CSE

* This Cisco certification must have been achieved or renewed within the last three years

Exam content

This exam has 55 questions. Here are the types of questions to expect:

- Multiple choice (single response)
- Multiple choice (single response), scenario based
- Multiple choice (multiple responses)
- Multiple choice (multiple response), scenario based
- Matching

Exam ID: HP2-Z31
Exam type: Online
Exam time: 105 minutes
Exam length: 55 questions
Passing score: 65%
Delivery languages: English
Related certifications:
- HP ASE - FlexNetwork Architect V2
- HP ASE - FlexNetwork Integrator V1 (releasing in June)
Supporting courses:
These recommended courses help you prepare for the exam:
- 00851824 – Creating HP Software-defined Networks, Rev. 14.31 (ILT)
Additional study materials:
- none

Register for this exam
You will need an HP Learner ID.

During the exam, you can make specific comments about the exam and items. HP welcomes these comments as part of our continuous improvement process.
## Objectives

This exam validates that you can successfully perform the following:

<table>
<thead>
<tr>
<th>HP2-Z31</th>
<th>Sections/Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>18%</strong></td>
<td><strong>Fundamental SDN architectures and technologies</strong>&lt;br&gt; • Explain OpenFlow functionalityand components, and differentiate OpenFlow 1.0 from OpenFlow 1.3.&lt;br&gt; • Identify and describe the HP VAN SDN Controller architecture, internals, features, and functionality.</td>
</tr>
<tr>
<td><strong>10%</strong></td>
<td><strong>HP SDN solutions and offerings</strong>&lt;br&gt; • Describe what SDN is and how it addresses networking business needs&lt;br&gt; • Recognize the benefits of SDN and how it can be integrated in the FlexNetwork Architecture through use cases.</td>
</tr>
<tr>
<td><strong>19%</strong></td>
<td><strong>HP SDN solution planning and design</strong>&lt;br&gt; • Manage and architect SDN and hybrid designs.&lt;br&gt; • Describe the principles and pitfalls that must be considered when designing and developing SDN applications.&lt;br&gt; • Prepare the infrastructure for SDN.&lt;br&gt; • Plan for clustering and teaming.</td>
</tr>
<tr>
<td><strong>25%</strong></td>
<td><strong>HP SDN solution implementation</strong>&lt;br&gt; Identify and describe network, hardware, software, and license requirements for the HP VAN SDN Controller implementation.&lt;br&gt; • Install and configure the HP VAN SDN Controller with licenses on a system running Ubuntu, and then verify the installed solution.&lt;br&gt; • Install and configure Mininet and verify the network connection.&lt;br&gt; • Install, configure and set up the controller REST API.&lt;br&gt; • Implement and verify a basic and hybrid OpenFlow network, including hardware table manipulation and link aggregation.&lt;br&gt; • Implement ProVision and Comware specific features.&lt;br&gt; • Install, configure, and set up security and verify controller code signing.&lt;br&gt; • Install, configure, and set up security and verify controller code signing.&lt;br&gt; • Explain controller teaming requirements, set up and verify teaming.&lt;br&gt; • Explain, set up, and verify controller regions.</td>
</tr>
<tr>
<td><strong>14%</strong></td>
<td><strong>HP SDN solution enhancement</strong>&lt;br&gt; • Describe how SDN can enhance the network performance, security and simplification, via applications such as HP Network Protector and explain implementation strategies.&lt;br&gt; • Explain how provisioning with SDN can make the network into an agile resource via HP Virtual Cloud Network (VCN) and how it fits into OpenStack and HP Cloud solutions.&lt;br&gt; • Describe how an SDN solution can improve QoS for an application that uses dynamic ports and explain strategies for implementing it in the network.&lt;br&gt; • Recognize ways to migrate toward SDN solutions.</td>
</tr>
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</table>
HP SDN solution management

- Explain HP Intelligent Management Center Software-Defined Networking (SDN) Manager options and how it allows you to manage and control an SDN solution.
- Explain Controller Menu Options.
- Explain Application manager states, requirements, and failure causes.
- Explain processes, steps, and requirements to backup and restore the Controller, team, and Keystone.

Tips for taking this exam

Rather than emphasize simple memorization, HP exams attempt to assess whether you have the knowledge and skills that an IT professional requires on the job. Therefore, some exam items present a scenario, which outlines a particular network environment or problem. Some exam items might also include one or more exhibits.

Exhibits can be for example:

- Network topologies
- Abstracts of switch configuration file output
- Commands and command output

This exam includes the following question (item) types:

- **Multiple choice (single response)** – Select one radio button to indicate a correct answer. If the response is correct, you will receive one point.
- **Multiple choice (multiple responses)** – Select more than checkbox to indicate a correct answers as noted in the question. If all the responses are correct, you will receive one point. There is no partial credit.
- **Matching** – Select an answer from the drop-down list to match each option. You cannot use the same answer twice. If the all the responses are correct, you will receive one point. There is no partial credit.
- **Pull-down list** – Select an answer from the drop-down list to match each option. You can use the same answer more than once. If all the responses are correct, you will receive one point. There is no partial credit.

This ExpertOne exam presents all the questions in a single block. The candidate agreement is presented first, followed by the exam introduction and instructions. Once you click the Next Question button on the instructions page, the questions will be presented one at a time. You can move from question to question, skip questions, and change your answers. However, once you submit your answers, you cannot return to review those questions or change your answers.

Here are some additional tips:

- Use the Next Question / Previous Question buttons to move forward and backward between questions. The Submit button will appear when you reach the last question.
- Use the Assessment Navigator to jump between questions in a block and to review flagged questions. To do this, click the Assessment Navigator button and select the question you want to navigate to. Flagged questions are indicated above the item number in the upper left corner. The Assessment Navigator also uses different shading to indicate answered versus unanswered items.
- Use the Assessment Navigator to launch the calculator tool by clicking the Calculator button at the bottom.

Figure 1: Assessment Navigator
When you begin the exam the total number of questions will display. To estimate how much time you should allow per question, divide the total time by the number of questions. For this exam, you will have an average of just less than two minutes per question. Some questions are more complex and will require more time. You might want to answer the questions you know first. If a question is taking too much time, flag it using the Assessment Navigator, and then return to it later.

Take the time to read the entire question and consider all of the options carefully before you answer. If the question indicates that it features an exhibit, study the exhibit and reread the question. Make sure to select the answer that correctly responds to the question that is asked, not simply an answer that includes some correct information.

If the question asks for more than one answer, remember to select each correct answer. You will not receive partial credit for a partially correct answer.
Sample questions

This section provides several sample questions. Although the samples cannot indicate all the topics covered in the exam, they give you an idea of the types of questions that you will encounter.

1. An administrator is configuring an HP 3800 series switch for DNS interception using OpenFlow and the HP Network Protector SDN Application. When viewing the HP VAN SDN Controller Device Monitor page, the switch is listed as registered. The switch is not listed on the Device Status tab page of the Network Protector application. What is a potential cause?
   a. The switch has been configured for OpenFlow 1.0.
   b. The switch is running firmware version KA.15.10.
   c. A Service Insertion Tunnel has not been established.
   d. SNMPv3 credentials are incorrect.


2. Refer to the exhibit.
Flow 5

Match
- Incoming Port : 1
- Ethernet Type : ARP
- Source MAC : 000000-111111
- Destination MAC : 000000-222222
- VLAN ID : Any
- VLAN Priority : Any
- Source Protocol Address : Any
- Target Protocol Address : Any
- ARP Opcode : Any
- IP ECN : Any
- IP DSCP : Any
- Source Port : Any
- Destination Port : Any

Attributes
- Priority : 30001
- Duration : 41257 seconds
- Hard Timeout : 0 seconds
- Idle Timeout : 60 seconds
- Byte Count : NA
- Packet Count : 1290
- Flow Table ID : 100
- Controller ID : 1
- Activity Count : NA
- Cookie : 0x2328

Instructions
- Apply Actions

Flow 10

Match
- Incoming Port : 1
- Ethernet Type : IP
- Source MAC : 000000-111111
- Destination MAC : 000000-222222
- VLAN ID : Any
- VLAN Priority : Any
- Source Protocol Address : Any
- Target Protocol Address : Any
- ARP Opcode : Any
- IP ECN : Any
- IP DSCP : Any
- Source Port : Any
- Destination Port : Any

Attributes
- Priority : 30000
- Duration : 40151 seconds
- Hard Timeout : 0 seconds
- Idle Timeout : 60 seconds
- Byte Count : NA
- Packet Count : 13667
- Flow Table ID : 100
- Controller ID : 1
- Activity Count : NA
- Cookie : 0x2328

Instructions
- Apply Actions

Output : 4

Output : 3
The switch in the exhibit has negotiated to use OpenFlow 1.3 with the HP VAN SDN Controller. Which port will traffic be sent out of when the PC in the exhibit pings 10.1.2.12?

a. Port 1  
b. Port 2  
c. Port 3  
d. Port 4

*Reference: Creating HP Software-defined Networks, SG, Module 14, page 46*

### 3. Which OpenFlow port represents the traditional non-OpenFlow pipeline of a switch?

a. NORMAL  
b. CONTROLLER  
c. IN_PORT  
d. TABLE

*Reference: Creating HP Software-defined Networks, SG, Module 15, page 4*

### 4. An HP ProVision switch configured for standard mode has negotiated to use OpenFlow 1.3 with the HP VAN SDN Controller. Which table will be used first for matching incoming packets using the OpenFlow pipeline?

a. Table 1  
b. Table 200  
c. Table 0  
d. Table 100

*Reference: Creating HP Software-defined Networks, SG, Module 14, page 51*

### 5. What are examples of information that the Topology Service returns for an OpenFlow switch port? (Select two.)

a. whether the port can participate in forwarding mode in a looped topology  
b. whether the port has BDDP enabled  
c. whether the port is looped  
d. whether the port has LLDP medium endpoint discovery enabled  
e. whether the port is a connection point
6. Which protocol is used to discover directly connected links between OpenFlow devices?
   a. CDP
   b. SNMP
   c. BDDP
   d. LLDP

   Reference: Creating HP Software-defined Networks, SG, Module 4, page 30

7. A customer wants to deploy a network with laptops daisy chained to physical IP phones. The customer also wants the laptop traffic to be managed by OpenFlow, while the phones use traditional QoS.

   Which OpenFlow switch instance configuration option should the customer use?
   a. Passive
   b. Aggregate
   c. Virtualization
   d. QoS passthrough
Answers

1. An administrator is configuring an HP 3800 series switch for DNS interception using OpenFlow and the HP Network Protector SDN Application. When viewing the HP VAN SDN Controller Device Monitor page, the switch is listed as registered. The switch is not listed on the Device Status tab page of the Network Protector application. What is a potential cause?
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2. Refer to the exhibit.
### Flow 5

**Match**
- Incoming Port: 1
- Source MAC: 000000-111111
- VLAN ID: Any
- Source Protocol Address: Any
- ARP Opcode: Any
- IP ECN: Any
- Source Port: Any
- Destination MAC: 000000-222222
- VLAN priority: Any
- Target Protocol Address: Any
- ARP Opcode: Any
- IP ECN: Any
- Destination Port: Any

**Attributes**
- Priority: 30000
- Duration: 41257 seconds
- Hard Timeout: 0 seconds
- Idle Timeout: 60 seconds
- Byte Count: NA
- Packet Count: 1290
- Flow Table ID: 100
- Controller ID: 1
- Activity Count: NA
- Hardware Index: 1
- Cookie: 0x2328

**Instructions**
- Apply Actions
  - Output: 4

### Flow 10

**Match**
- Incoming Port: 1
- Source MAC: 000000-111111
- VLAN ID: Any
- Source Protocol Address: Any
- ARP Opcode: Any
- IP ECN: Any
- Source Port: Any
- Destination MAC: 000000-222222
- VLAN priority: Any
- Target Protocol Address: Any
- ARP Opcode: Any
- IP ECN: Any
- Destination Port: Any

**Attributes**
- Priority: 30000
- Duration: 40151 seconds
- Hard Timeout: 0 seconds
- Idle Timeout: 60 seconds
- Byte Count: NA
- Packet Count: 13667
- Flow Table ID: 100
- Controller ID: 1
- Activity Count: NA
- Hardware Index: 1
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**Instructions**
- Apply Actions
  - Output: 3
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- Port 3
- Port 4

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For more information

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