Huawei Certificate Exam Outline
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1. Fixed Network

1.1. Datacom Network (Carrier) Exam Outline

1.1.1. Introduction of Datacom Technology Exam

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
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<th>Pass Score</th>
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<tbody>
<tr>
<td>H31-211</td>
<td>HCNA - Carrier IP</td>
<td>90 min</td>
<td>60 multiple-choice questions</td>
<td>1000</td>
<td>600</td>
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<tr>
<td>H31-124</td>
<td>HCNP - Carrier IP</td>
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<td>(single-answer and multiple-answer), true-false questions</td>
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</table>

1.1.2. HCNA - Carrier IP Exam Outline

1.1.2.1. Prerequisites

No prerequisites.

1.1.2.2. Exam Content Overview

The HCNA - HCNA for Carrier exam covers datacom basics, TCP/IP protocol stack basics, IPV6 basics, WAN protocol principles such as PPP and their implementation in Huawei routers, Ethernet technology, STP, and VLAN principles and their implementation in Huawei switches, basic principles of routing protocols such as OSPF and IS-IS and their implementation in Huawei routers, and network security technologies and their implementation in Huawei firewalls.

1.1.2.3. Exam results valid period

This exam result is valid for 3 years.

1.1.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

<table>
<thead>
<tr>
<th>Re-certification Methods</th>
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</thead>
<tbody>
<tr>
<td>To re-certify, pass ONE of the following before the certification expiration date:</td>
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<tr>
<td>• Pass the Exam again.</td>
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<td>• Pass any subject of the high-level certification in the field of the local technology</td>
</tr>
</tbody>
</table>

1.1.2.5. Key Points of Exam

IP Network Basics

1. Datacom basics
2. Basic network concepts, IP network architecture, standardization organizations and protocols
3. OSI and TCP/IP protocol models, functions at each layer, and packet encapsulation
4. ARP and RARP principles
5. TCP/UDP principles
6. IPv4 subnetting
7. Principles of common application layer protocols
8. Principles and application of common tools such as Ping, Tracert, FTP, and Telnet
9. IPV6 basics

LAN Technologies
1. Basic principles of the Ethernet technology and switches
2. Basic principles of VLAN, STP, and VRRP and their implementation in VRP
3. How a small switching network is constructed by using VLAN, STP, and VRRP technologies and Huawei switches

WAN Technologies
1. HDLC, PPP and their implementation in Huawei products

Routing Technologies
4. Static routing protocol principles, OSPF principles and IS-IS principles , and their implementation in VRP
5. How a small routing network is constructed by using routing technologies and Huawei routers

Network Security
1. Firewall functions, types, and working principles
2. ACL and NAT principles and configuration of ACL and NAT in Huawei firewalls
3. How network security is ensured by using network security technologies and firewalls

Product Knowledge
1. VRP features, operations, and maintenance
2. Features of Huawei routers and switches and their implementation in IP networks

NOTE
The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.

1.1.2.6. Participating in the Exam

The exam is delivered by Pearson VUE authorized test centers. You can register with the nearest test center to take the exam.

To find the Pearson VUE authorized test centers, please log on the homepage of the VUE:
https://home.pearsonvue.com/huawei

1.1.2.7. References

VRP Configuration Guide
Huawei product manuals
### 1.1.2.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
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<tbody>
<tr>
<td>HCNA – Carrier IP Training</td>
<td>II</td>
<td>8</td>
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</tbody>
</table>
1.1.3. HCNP - Carrier IP Exam Outline

1.1.3.1. Prerequisites

No prerequisites.

1.1.3.2. Exam Content Overview

The HCNP for Carrier exam covers the Ethernet and VLAN technology, QinQ technology, STP/RSTP/MSTP technologies, IPv4 address planning, OSPF, IS-IS, and BGP routing protocols, routing control, IPv6 basic, MPLS VPN, MPLS TE, QoS, and HA, multicast routing protocols, PPP and PPPoE access technologies, AAA technology and Bras device, Firewall basic technology.

1.1.3.3. Exam results valid period

This exam result is valid for 3 years.

1.1.3.4. Re-certification Methods

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</table>

1.1.3.5. Key Points of Exam

Ethernet and VLAN Technology
1. Working principles of Layer 2 switch and Layer 3 switch
2. 802.1Q encapsulation
3. Inter-VLAN route and Super VLAN
4. QinQ principles, configuration, and implementation
5. Architecture of Huawei switch

STP/RSTP/MSTP
1. STP principles and configuration
2. RSTP principles and configuration
3. MSTP principles and configuration

IP Advanced Route
1. IPv4 address planning: classless IP address planning, Classless Inter-Domain Routing (CIDR), and NAT traversal
2. IPv6 basics: IPv6 packet structure, IPv6 address, ICMPv6 principles, basic neighbor discovery principles, address autoconfiguration, PMTU auto-discovery principles, and IPv6 address basic configuration

OSPF Routing Protocols
1. Basic principles of link state routing protocols
2. OSPF principles, configuration, and implementation: neighbor and adjacency, protocol packet and LSA, database synchronization, intra-area route calculation, inter-area route calculation, and external route calculation

3. Principles and configuration of OSPF special areas: stub area, totally stub area, and not-so-stubby area (NSSA)

4. Basic methods of OSPF fault diagnosis

5. Basic principles and configuration of OSPFv3

IS-IS Routing Protocols
1. Basic principles, configuration, and implementation of IS-IS: basic protocol concepts, adjacency, database synchronization, and route calculation

2. Basic methods of IS-IS fault diagnosis

3. Basic principles and configuration of IS-ISv6

BGP Routing Protocols
1. BGP principles: AS, BGP neighbors, route distribution methods, and route advertisement rules

2. BGP path selection

3. BGP route aggregation

4. BGP routing policies: attributes and routings protocols commonly used in BGP

5. Basic principles and configuration of BGP route reflection and AS confederations for BGP

6. BGP multi-homing

7. BGP fault diagnosis methods

8. Basic principles and configuration of MP-BGP for IPv6

Routing Control and Selection
1. Route filtering by using filtering tools such as ACL, route policy, IP-prefix, and AS-Path

2. Mutual route import between IP routing protocols and advertisement of default routes

3. Policy-based route

MPLS VPN
1. MPLS principles and implementation: MPLS frame format and encapsulation, MPLS data forwarding process, LDP neighbor discovery and session establishment, LDP label management, and MPLS loop avoidance

2. Basic principles and implementation of MPLS VPN: single-domain MPLS VPN principles and implementation; application of OSPF in MPLS VPN

3. MPLS VPN fault diagnosis: troubleshooting roadmap and debugging methods of control plane faults; troubleshooting roadmap and debugging methods of data plane faults

4. MPLS TE
1. MPLS TE principles and application: structure of MPLS TE and functions of its four components, MPLS TE attributes, basic applications of MPLS TE, and basic configuration and implementation of MPLS TE
QoS
2. IP QoS model and differentiated services (DiffServ) model
3. Basic principles of classification and marking, traffic policing and shaping, congestion management, congestion avoidance, and link efficiency mechanisms and their implementation in NE products
4. Class-based QoS principles and its implementation in NE products
5. Architecture of Huawei NE routers

High Availability (HA)
1. Ethernet link aggregation
2. Smart link and monitor link
3. NSF/NSR/GR principles
4. Bidirectional Forwarding Detection (BFD) principles
5. IP FRR, LDP FRR, VPN FRR, and TE FRR
6. VRRP principles

Multicast Protocols
1. Basic principles and configuration of IGMPv1/v2/v3 and IGMP snooping
2. Basic principles and configuration of PIM-DM and PIM-SM
3. Access and Authentication Techniques
1. IPoE, IPoEoVLAN, IPoEoA, and static user access principles, Web authentication, fast authentication
2. PPPoE, PPPoEoVLAN access methods and their implementation in Huawei BRAS
3. RADIUS principles and its implementation in Huawei BRAS
4. Architecture of ME60-X

Firewall Basic Principles
1. Eudemon Firewall Basic Function ASPF and NAT
2. Architecture of Eudemon Firewall

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1.1.3.6. Participating in the Exam

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https://home.pearsonvue.com/huawei/
1.1.3.7. References

Huawei Certified Datacom Training Courses — HCNP-Carrier IP: Building Carrier Network
Huawei Certified Datacom Training Courses — HCNP-Carrier IP: Building Carrier Network Practice Guide

1.1.3.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
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<td>III</td>
<td>20</td>
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</table>
1.1.4. HCIE - R&S Carrier IP Exam Outline

1.1.4.1. Prerequisites

For those who are ready to get the HCIE Carrier Certification.

1.1.4.2. Exam Content Overview

HCIE Carrier certification includes Ethernet Technologies, VLAN, QinQ, STP/RSTP/MSTP, PPP and PPPoE access technologies, AAA technologies, Huawei Switch and Broadband Access Server; OSPFv2/v3, IS-ISv4/v6, BGP, MP-BGP for IPv6, IGMP, PIM-SM, PIM-DM; MPLS, BGP MPLS VPN, QoS, VRRP, MPLS TE, IPSec VPN, L2TP.

1.1.4.3. Exam results valid period

This exam result is valid for 3 years.

1.1.4.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

- To re-certify, pass ONE of the following before the certification expiration date:
  - Pass the Exam again.

1.1.4.5. Key Points of Exam

IP Bearer Network Structure
- Connection between IP Bearer Network and Core Network
- IP Bearer Network Structure and Designing
- Common Technologies in IP Bearer Network

IP Basic
- IPv4 Address planning, classless IP address planning, Classless Inter Domain Routing, NAT
- IPv6 Basic, IPv6 packet format, IPv6 addresses, ICMPv6 theory configuration and realization, Neighbor discovery, IPv6 address auto-configuration, PMTU auto discovery theory, IPv6 address basic configuration

OSPF Routing Protocol
- Link-state routing protocol algorithm
- OSPF basic principle, configuration and realization: Neighbor and Adjacency, OSPF protocol packet and LSA, Database synchronization, OSPF authentication, intra-area routing calculation, inter-area routing calculation, external route calculation
- OSPF special area principle and configuration: Stub, Totally Stub, NSSA
- OSPF troubleshooting
- OSPFv3 principle, configuration and realization

IS-IS Routing Protocol
- IS-IS basic principle, configuration and realization: ISIS basic concepts, adjacency relationship, database synchronization, route calculation, ISIS authentication
- IS-IS Troubleshooting
3. IS-ISv6 basic principle, configuration and realization

BGP Routing Protocol
1. BGP Basic principle, configuration and realization: AS, BGP neighbor, route advertisement, BGP Route Advertisement Principles
2. BGP Route selection
3. BGP Route aggregation
4. BGP route policy: BGP route attribute and route policy
5. BGP RR principle, configuration and realization
6. BGP multi-homing
7. BGP Dampening
8. 4-Byte AS Number
9. BGP troubleshooting
10. MP-BGP for IPv6 basic principle, configuration and realization

Route Control and Route Selection
1. Use ACL, route policy, IP-prefix, AS-Path, Community-list as a route selection tools
2. Route redistribution between different routing protocols, default route distribution
3. Policy-based routing, Traffic-policy principle, configuration and realization

Ethernet Technologies
1. Ethernet History, Auto-negotiation, Link Aggregation, Port Mirroring, Working principle of layer 2/3 switch
2. 802.1Q encapsulation, VLAN realization on Huawei products, Isolate-User-VLAN
3. VLAN inter-routing, Super VLAN, QinQ Theory and Configuration
4. GVRP protocol principle, Configuration and realization
5. STP/RSTP/MSTP theory and configuration

MPLS VPN
1. MPLS basic principle and realization: MPLS frame mode encapsulation, MPLS data forwarding, LDP neighbor discovery and session establishment, LDP label management, MPLS loop avoidance
2. MPLS VPN basic principle, configuration and realization: single area MPLS VPN basic principle and realization; Inter-AS MPLS VPN basic principle and realization; Application of Molted-instance OSPF in MPLS VPN
3. MPLS VPN troubleshooting: control plane troubleshooting process and debugging methods, data plane troubleshooting process and debugging methods

MPLS L2VPN
1. MPLS L2VPN frame mode encapsulation, MPLS L2VPN data forwarding, Remote LDP neighbor discovery and session establishment, MPLS L2VPN loop avoidance
2. MPLS L2VPN basic principle, configuration and realization: CCC principle and realization; SVC principle and realization; Martini VLL/VPLS principle and realization; Kompella VLL/VPLS principle and realization; Inter-AS MPLS L2VPN basic principle and realization;
3. MPLS L2VPN troubleshooting: control plane troubleshooting process and debugging methods, data plane troubleshooting process and debugging methods

High Availability
1. ETH-TRUNK、IP-TRUNK、E-TRUNK basic principle
2. BFD（Bidirectional Forwarding Detection）basic principle
3. NSR, GR principle, configuration and realization
4. IP Reroute, IP FRR, LDP FRR, VPN FRR, TE FRR, TE Hot-standby basic principle, configuration and realization
5. VRRP basic principle, configuration and realization

MPLS TE
1. MPLS TE basic principle, configuration and realization
2. MPLS TE four elements and function, MPLS TE attributes
3. MPLS over TE principle, configuration and realization

QoS
1. IP QoS model, differentiated service model
2. Traffic classification and Marking, Traffic policing and shaping, congestion management, congestion avoidance, Link Efficiency Mechanisms principle, configuration and realization in Huawei products
3. Class-based QoS basic principle, configuration and realization in Huawei products

Multicast
1. IGMPv1/v2/v3，IGMP Snooping basic principle, configuration and realization
2. PIM-DM，PIM-SM basic principle, configuration and realization
3. Anycast RP, MSDP, MBGP principle, configuration and realization

Basic Access and Authentication Technologies
1. IPoE/IPoEoVLAN/IPoEoA/Static user access principle and realization on Huawei BRAS products ; Web authentication, Fast authentication, Binding authentication working principle, configuration and realization on Huawei BRAS products.
2. PPPoE/PPPoEoVLAN/PPPoEoA/PPPoA access mode and realization on Huawei BRAS products
3. Radius protocol principle, configuration, realization and on Huawei BRAS products
4. DHCP protocol principle, configuration, realization and on Huawei BRAS products
5. IPTV solution based on PPPoE and IPTV solution based on IPoE principle, configuration, realization and on Huawei BRAS products

IP Bearer Network and IP MAN Network Design
1. IP bearer Network, IP MAN Network structure and characteristic
2. IP bearer Network and IP MAN Network performance requirements
3. IGP COST design, dual plane switchover and protection
4. Network Quality and Network Performance in IPTV

Firewall VPN technology
1. IPSec VPN encryption technologies, authentication methods, transport mode
2. L2TP VPN principle, configuration and realization

1.1.4.6. Referenced Documents

VRP Feature Description
VRP Configuration Guide
VRP Troubleshooting

1.1.4.7. Participating in the Written Exam

HCIE-Carrier Exam was published through the authorized exam center of Pearson VUE. You could take this Exam in any Pearson VUE center. For more information, please visit Pearson VUE official website (https://home.pearsonvue.com/huawei/) or from Pearson VUE center.

1.1.4.8. Participating in the Lab Exam

1) Lab exam will includes all the contents in HCIE – R&S Carrier IP
2) Lab exam will involve network model which is similar to current network operator model, such as, back bone, bearer network and also MAN network.
3) Lab exam need to involve 12 to 18 equipments, eg: NE40E、ME60、S5300、S3300、Firewall and so on
4) Lab exam is 8 hours, includes interview, network planning and configuration, troubleshooting
5) Lab exam will be focused on network operator’s network planning and roll-out. This will be a simulation towards a real live-network roll-out and implementation. Emphasis on the students’ understanding and ability to handle issues towards the real live network
6) During lab exam, students should be able to do the troubleshooting through critical thinking. During the exam process, simulation of the real live network problem will be done in the lab for the students to investigate, this is to emphasize on the students technical understanding and ability to solve a technical issue efficiently and accurately.

NOTE
The contents provided to students is a general test paper; other related contents discussed might also appear in the examinations.

1.1.4.9. Recommended Training

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
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<td>HCIE (HCIE-Improve Carrier Network Performance) Training</td>
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1.2. Access Network Exam Outline

1.2.1. Introduction of Access Network Exam

<table>
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<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
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<tr>
<td>H35-210</td>
<td>HCNA - Access Network</td>
<td>90 min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
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<td>600</td>
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<tr>
<td>H35-211</td>
<td>HCNP - Access Network</td>
<td>90 min</td>
<td>1000</td>
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</table>

1.2.2. HCNA - Access Network Exam Outline

1.2.2.1. Prerequisites

No prerequisites.

1.2.2.2. Exam Content Overview


1.2.2.3. Exam results valid period

This exam result is valid for 3 years.

1.2.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

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</tbody>
</table>

1.2.2.5. Key Points of Exam

Access network overview and traditional technologies.
1. The definition of access network, the traditional solutions of access network deployment.
2. The features of xDSL technologies.
3. The features of xPON technologies.
4. xPON solutions of the various scenario.

IP Network Technologies Fundamental
1. TCPIP Basis, including Architecture of TCP/IP, Function of TCP/IP each layer.
2. Ethernet Overview, VLAN Technology, Layer 2 and 3 switching principles.
3. Routing Protocol Basics, including the function of the router table, static routing protocol, basic knowledge of the dynamic routing protocol.

Broadband service and VoIP principles
1. PPP principles, PPPoE principles
2. DHCP principles.
3. VoIP foundation and SIP principles.

GPON principles and xDSL principles
1. GPON principles, including GPON component, GPON upstream and downstream implementation, GPON key technologies, GPON protection, etc.
2. xDSL Principles and Applications, including ADSL/ADSL2+ Technical Principles, Introduction to the VDSL/VDSL2 Technology and Ultra-Broadband Technology.

GPON/xDSL service configuration
1. Access device introduction, basic operation of the access device.
2. HSI service configuration and maintenance.
3. VoIP (SIP) service configuration and maintenance.
4. Basis knowledge of the NMS, including eSight and U2000.

ODN Basis
1. ODN Link Detection Guide, including ODN network structure, ODN typical equipment, ODN test instrument introduction.
2. The Optical Power Budget of GPON and 10G GPON.

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1.2.2.6. Participating in the Exam
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1.2.2.7. References
HCNA-Access Training Courses
Huawei Access products documents

1.2.2.8. Recommended Training Program

<table>
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<tr>
<td>HCNA - Access Network Training</td>
<td>II</td>
<td>5</td>
</tr>
</tbody>
</table>
1.2.3. HCNP - Access Network Exam Outline

1.2.3.1. Prerequisites

Passed HCNA - Access

1.2.3.2. Exam Content Overview

This test covers: Theory of xDSL/ATM/GPON/EPON/DataCom, the following abilities are required for the tester, usage of SNMP theory; knowing on troubleshooting of xDSL/ATM/GPON/EPON; knowing about usage of DC upgrade tool, batch upgrade, NMS upgrade; knowing how to do acceptance test for service of HSI、IPTV、VOIP, Familiar with the typical solutions for Access Network migration and the usage of the migration tools

1.2.3.3. Exam results valid period

This exam result is valid for 3 years.

1.2.3.4. Re-certification Methods

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</table>

1.2.3.5. Key Points of Exam

Theory
1. Be familiar with xDSL/ATM/GPON/EPON /DATACOM; know theory of SNMP.

Product knowledge
1. Know hardware structure, features, standards, board type, function and interface.

Data configuration
1. Understand network solution and basic configuration: VLAN/IP configuration, and can use NMS for equipment commissioning.
2. Know how to configure services on HSI、IPTV、VOIP.
3. Know how to add and monitor equipments on NMS.
4. NMS single-server system installation.
5. Function well on data plan and network design for FTTx
6. Function well on the typical solutions for Access Network migration and the usage of the migration tools.

Acceptance test
1. Service acceptance testing on HSI、IPTV、VOIP
2. Usage of optical power meter.
3. Usage of network migration tools.

Software upgrading
1. Usage of DC tool, batch upgrade and NMS upgrade.
Maintenance and troubleshooting

1. Know NMS alarms, problem information collection on NMS, basic troubleshooting. Know NMS operating system and basic operation of database.

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1.2.3.7. References

HCAN-A (Huawei Certified Access Network-Associate)
HCAN-P (Huawei Certified Access Network-Professional)
Huawei product manuals

1.2.3.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
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<tr>
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<td>13</td>
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</table>
1.3. Transmission Network Exam Outline

1.3.1. Introduction of Transmission Certification

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<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
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<tr>
<td>H31-311</td>
<td>HCNA Exam - Transmission</td>
<td>90 min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
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<td>600</td>
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<td>HCNP Exam - Transmission</td>
<td>90 min</td>
<td></td>
<td>1000</td>
<td>600</td>
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</tbody>
</table>

1.3.2. HCNA - Transmission Exam Outline

1.3.2.1. Prerequisites

No prerequisites.

1.3.2.2. Exam Content Overview

The HCNA - Transmission exam covers basic optical communications technology, SDH principles, WDM principles, OTN principles, Ethernet technologies, packet switch principles, OptiX SDH equipment hardware, SDH networking and self-Healing protection, iManager NMS system, PDH service configuration, Ethernet services and networking applications.

1.3.2.3. Exam results valid period

This exam result is valid for 3 years.

1.3.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

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</tr>
</tbody>
</table>

1.3.2.5. Key Points of Exam

- Basic Optical Communications Technology
  1. Preparatory Knowledge
  2. Optical Fiber
  3. Passive components
- SDH Principle
  1. SDH Overview
  2. SDH Frame Structure and Multiplexing
  3. SDH Overhead and Pointers
  4. Logical Function Modules
  5. Networking and Protection WDM Principles
WDM Principles
1. Overview of WDM
2. Key WDM Technologies
3. ITU-T Compliance

OTN Principles
1. Overview of OTN
2. OTN Interface Structure
3. Mapping and Multiplexing of OTN
4. OTN Overhead
5. OTN Trail Layers and Maintenance Signals
6. Common OTN Alarms

Ethernet Technologies
1. Overview of LAN
2. Ethernet Principles
3. About Ethernet QoS
4. Overview of EoS
5. Overview of VLAN

Packet Switch Principles
1. Telecommunications Network Overview
2. IP Addressing
3. QinQ Technologies
4. MPLS Technologies
5. PWE3 Technologies

OptiX SDH Equipment Hardware
1. System Overview
2. Cabinets and Subracks
3. Boards
4. Hardware Configurations
5. Functions and Features

SDH Networking and Self-Healing Protection
1. Linear MSP
2. Two-Fiber MSP Rings
3. Four-Fiber MSP Rings
4. SNCP
Huawei Exam Outline

iManager NMS system
1. System Structure and Major Features of U2000
2. Directory Structure of U2000
3. Major Functions of U2000

PDH Service Configuration
1. Linear MSP Configurations
2. Two-Fiber MSP Rings Configurations
3. Four-Fiber MSP Rings
4. SNCP Configurations
5. Per-NE Service Configurations
6. Path-Specific Service Configurations

Ethernet Services and Networking Applications
1. Ethernet Terms
2. Ethernet Service Types: EPL, EVPL, EPLAN, EVPLAN
3. Ethernet Service Configurations

NOTE
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1.3.2.6. Participating in the Exam
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1.3.2.7. References
Huawei Certified Transmission Training Courses
Huawei product manuals

1.3.2.8. Recommended Training Program

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<tr>
<th>Training Program</th>
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<tbody>
<tr>
<td>HCNA - Transmission Training</td>
<td>II</td>
<td>10 days</td>
</tr>
</tbody>
</table>
1.3.3. HCNP - Transmission Exam Outline

1.3.3.1. Prerequisites

Passed HCNA - Transmission

1.3.3.2. Exam Content Overview

The HCNP - Transmission exam covers a series of knowledge about NG WDM and some technical topics of MSTP. The NG WDM products include: NG WDM system hardware, NG WDM equipment networking and application, NG WDM optical-layer grooming, NG WDM service configuration, NG WDM equipment commissioning, NG WDM equipment protection, NG WDM alarm signal flow, NG WDM equipment troubleshooting, SOM/FD system introduction, MS-OTN technology introduction, and new technology introduction. MSTP consists of the following parts: Clock protection, ECC maintenance, pointer justification, PCM technology, board replacement, discrete service analysis and processing, MSTP equipment troubleshooting, ASON introduction, and Ethernet indicator test.

1.3.3.3. Exam results valid period

This exam result is valid for 3 years.

1.3.3.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

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1.3.3.5. Key Points of Exam

OptiX WDM Hardware Description

1. Huawei NG WDM product overview
2. OptiX OSN 6800/8800 networking application and product features
3. OptiX OSN 6800/8800 cabinet, subrack and frame
4. OptiX OSN 6800/8800 boards description

NG WDM System Hardware

1. Product Overview
2. Product Functions and Features
3. Hardware Architecture

NG WDM Equipment Networking and Application

1. Network layers and system architecture
2. Site Type
3. Site Application Scenarios
4. Basic Networking Elements

NG WDM Optical-Layer Grooming Solution
1. NG WDM Optical-Layer Grooming Solution
2. NG WDM Electrical-Layer Grooming Solution

NG WDM General Data Configuration
1. Prepare for the configuration.
2. Create and configure NEs and networks.
3. Back up the NE database.

NG WDM Optical-Layer Service Configuration
1. Basic Concepts
2. Configuration Example
3. Configure OCh trails on a per-NE basis.
4. Configure OCh trails on boards.
5. Configure OCh trails by trail.

NG WDM Electrical-Layer Service Configuration
1. Basic Concepts
2. Configuration Example
3. Configure WDM services on a per-NE basis.
4. Configure WDM services in trail mode.
5. Configure WDM services by using the service package method.

NG WDM System Commissioning
1. Preparations Before Commissioning
2. Commission the optical power of the non-coherent system.
3. Commission the optical power of the coherent system.
4. Commission the optical power of the hybrid transmission system.

Test the common indexes of the NG WDM system.
1. Test Overview
2. Main channel feature test
3. Supervisory channel feature test
4. System test

NG WDM equipment protection
1. Equipment-level protection
2. Optical-layer protection
3. Electrical-layer protection

NG WDM Equipment Routine Maintenance
1. Routine maintenance on the equipment side
2. Routine maintenance on the NMS side
NG WDM alarm signal flow
1. Overview
2. Electrical-layer alarm analysis
3. Optical-layer alarm analysis

NG WDM System Troubleshooting
1. Prepare for troubleshooting.
2. Fault locating methods and methods
3. Classification Troubleshooting
4. Case Analysis

Optical Doctor System
1. Introduction to OD System
2. OD System Principles
3. OD System Configuration and Operations

Fiber Doctor System
1. Introduction to Fiber Doctor System
2. Principles of Line Fiber Quality Monitoring
3. Use of the fiber quality detection function

Introduction to NG WDM Packet Technologies
1. IP Overview
2. MPLS technology
3. PWE3 technology
4. MPLS-TP technology

NG WDM Networking and Services
1. Network application
2. Service Introduction
3. Network protection

OSN 1800V Packet Service Configuration
1. Introduction to the 1.ETH PWE3 Service
2. Basic parameter settings
3. ETH PWE3 Service Configuration
4. Protection Configuration

New Technology
1. New technologies beyond 100G
2. New intelligent network technologies
3. New network O&M technologies

MSTP Technical Specifications - Clock Protection
1. Basic Concepts of Clock Protection
2. Standard SSM clock protection analysis
3. Extended SSM clock protection analysis

MSTP Technical Topic - ECC Maintenance and Pointer Adjustment
1. HWECC
2. Pointer justification

MSTP Technology - PCM Technology
1. Introduction to the PCM Technology
2. PCM Principles and Applications
3. PCM board

MSTP board replacement
1. Overview of Board Replacement
2. Replace the faulty board.
3. Board compatibility and substitution
4. Upgrade the board capacity.

Discrete service analysis and processing
1. Basic Concepts of Discrete Services
2. Causes and handling methods of discrete services
3. Procedure for clearing discrete services
4. How to avoid discrete services?

Common Ethernet Service Indicators
1. Basic Concepts of Ethernet
2. Introduction to the Ethernet Performance Test
3. Common Test Indicators for Ethernet Services
4. Methods for testing common Ethernet service indicators

Troubleshooting MSTP Equipment Faults
1. Prepare for fault locating.
2. Fault Locating Method
3. Fault case analysis

ASON ASON optical network
1. Introduction to ASON
2. Basic components of ASON
3. Functions and features of ASON
4. Introduction to 2M ASON

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### 1.3.3.6. Participating in the Exam

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### 1.3.3.7. References

Huawei Certified Transmission Training Courses
Huawei product manuals

### 1.3.3.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
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</thead>
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<td>III</td>
<td>15 days</td>
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</table>
2. Core Network

2.1. Mobile Soft Switch Exam Outline

2.1.1. Introduction of Mobile Soft Switch Exam Outline

<table>
<thead>
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<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
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<th>Pass Score</th>
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<td>60 single choice, multiple choices, and true or false</td>
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<tr>
<td>H35-311</td>
<td>HCNP - Mobile Soft Switch Exam</td>
<td>90 minutes</td>
<td>60 single choice, multiple choices, and true or false</td>
<td>1000</td>
<td>550</td>
</tr>
</tbody>
</table>

2.1.2. HCNA- Mobile Soft Switch Exam Outline

2.1.2.1. Prerequisites

No prerequisites.

2.1.2.2. Exam Content Overview

Mobile switching center and Media Gateway test covers the basic knowledge of mobile core network communication, including TCP/IP, basic theory of mobile soft switch, SS7 signaling, hardware system of the MSOFTX3000 and UMG8900, data configuration for network element interworking, common number analysis, basic call flow and the corresponding protocols, MSOFTX3000 and UMG8900 fault troubleshooting, routine maintenance and major maintenance and operation of the MSOFTX3000 and UMG8900.

2.1.2.3. Exam results valid period

This exam result is valid for 3 years.

2.1.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

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</table>

2.1.2.5. Key Points of Exam

IP network
1. Basic concepts of network, layer 2 signaling exchanging, virtual local area network
2. Architecture of the open systems interconnection protocol and the TCP/IP protocol, functions of each layer and packet encapsulation
3. IPv4 subnetting

Knowledge and principle of the MSOFTX3000 and UMG8900
1. The basic principle and architecture evolution of the core network
2. Product knowledge of the CPCI and ATCA MSOFTX3000, and the board layout and capacity planning of the UMG8900
3. Data configuration for interconnection between the MSOFTX3000 and the UMG8900 and the corresponding network elements
4. Common number analysis of MSOFTX3000
5. Routine maintenance and major maintenance and operation including version upgrade, patch loading, and operation rollback

Basic call flow and the corresponding protocols
1. Signaling analysis during location upgrade, ordinary calls (mobile originated calls, mobile terminated calls and inter-MSC calls), handovers and short messages. The way how the protocols such as H248, BICC, and SIGTRAN are realized in each interface of the MSOFTX3000 and UMG8900

Troubleshooting
1. Troubleshooting in hardware fault and replacement, location update, and common calls

NOTE
This document only provides a general guide for the candidates rather than an actual coverage of the test content.

2.1.2.6. Participating in the Exam

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2.1.2.7. Reference

For product knowledge of the MSC and MGW, refer to the customer product document and manual.

2.1.2.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
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</thead>
<tbody>
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<td>II</td>
<td>21</td>
</tr>
</tbody>
</table>
2.1.3. HCNP - Mobile Soft Switch Exam Outline

2.1.3.1. Requirements for Candidates

No prerequisites.

2.1.3.2. Exam Content Overview

Medium-level mobile soft switch test covers the knowledge of the core network communication, data configuration between interconnected network elements, integrated number and route analysis, integrated signaling analysis and the corresponding protocols, integrated fault location, MSC Pool and AoIP solutions.

2.1.3.3. Exam results valid period

This exam result is valid for 3 years.

2.1.3.4. Re-certification Methods

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</table>

2.1.3.5. Key Points of Exam

IP network

1. Basic concepts in network, layer 2 and layer 3 signaling exchanging, and IP subnetting
2. IP transformation in mobile communications

Product knowledge and principle

1. The principle and architecture of mobile soft switch in the core network; data configuration for interworking between network elements
2. Integrated number and route analysis

The protocols used in mobile soft switch and signaling analysis

1. The protocols such as MAP, CAP, BSSAP/RANAP, BICC, SIP, BICC, SIGTRAN, H248 and SCTP in the mobile soft switching interfaces and the signaling analysis during basic services, supplementary service, value-added services, mobility management, and handovers

Integrated troubleshooting

1. Troubleshooting in the service, including bearer and signaling

Product solutions

1. MSC Pool and AoIP

NOTE

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2.1.3.6. Participating in the Exam

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2.1.3.7. Reference

For product knowledge of the mobile soft switch, refer to the customer product information.

2.1.3.8. Recommended Training Program

<table>
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<tbody>
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<td>HCNP - Huawei Mobile Soft Switch Training</td>
<td>III</td>
<td>21</td>
</tr>
</tbody>
</table>
3. Wireless Network

3.1. LTE Exam Outline

3.1.1. Introduction of LTE Certification

<table>
<thead>
<tr>
<th>Exam Code</th>
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<th>Exam Duration</th>
<th>Item number</th>
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<td>HCNP - LTE</td>
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<td>H31-431</td>
<td>HCNP - EPC</td>
<td>90 minutes</td>
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</table>

3.1.2. HCNA - LTE Exam Outline

3.1.2.1. Prerequisites

No prerequisites.

3.1.2.2. Exam Content Overview

The HCNA - LTE Exam covers LTE system basics such as E-UTRAN/EPC architecture, principles of OFDM/OFDMA/SC-FDMA, EPC basic principles and HUAWEI LTE eNodeB products overview.

3.1.2.3. Exam results valid period

This exam result is valid for 3 years.

3.1.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

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</table>

3.1.2.5. Key Points of Exam

LTE System Overview
1. Evolution of Cellular Networks
2. 3GPP Releases
3. E-UTRAN Architecture
4. E-UTRAN Interfaces and Protocols
5. EPC Architecture
6. EPC Interfaces and Protocols
7. Radio Interface Techniques
8. Principles of OFDM
9. LTE Channel Structures
10. LTE Frame Structure
11. Downlink OFDMA
12. Uplink SC-FDMA
13. Multiple Input Multiple Output
14. Multimedia Broadcast Multicast Service
15. The Huawei eNodeB family
16. Products and application scenarios
17. Operation and Maintenance
18. Operation and Maintenance
   eNodeB LTE Product Description
      1. eNodeB System Overview
      2. eNodeB System Structure
      3. eNodeB Auxiliary Devices
      4. eNodeB Typical Networking
   OEB82 eNodeB Field Maintenance
   eNodeB LTE Field Maintenance
      1. Local Operation and Maintenance Introduction
      2. check the status of board by LEDs
      3. Routine Operation and Maintenance
      4. Replacing boards and optical module of eNodeB
      5. Routine Maintenance items for eNodeB
      6. Practice
   OEB83 eNodeB Equipment Commissioning
      1. eNodeB Commissioning Overview
      2. eNodeB Remote Commissioning on the M2000
   LTE eRAN Automatic OMCH Establishment
      1. Automatic OMCH establishment phase during base station deployment by PnP
      2. DHCP introduction
      3. Schemes for Obtaining VLAN Information
      4. Procedure for Obtaining Configuration Information in different Scenarios
   eNodeB Operation
      1. Structure of operation and maintenance system
      2. Login eNodeB O&M system
      3. eNodeB equipment management
      4. eNodeB transport management
      5. eNodeB Radio Management
      6. eNodeB clock management
      7. eNodeB inventory and report management
      8. Software Management
   eNodeB LTE Data Introduction for Initial Configuration
      1. eNodeB Data Configuration Introduction
      2. Common Data Parameters Introduction
      3. Data Preparation in Specific Scenarios
4. Practice on
5. a). eNodeB data configuration preparation
6. b). MML for common data
7. c). MML for device data
8. d). MML for transmission data
9. e). MML for radio data
10. f). MML for specific scenario

   eNodeB LTE Initial Configuration by CME
   1. eNodeB Data Configuration by CME Introduction
   2. Preparing eNodeB Data
   3. Creating eNodeB Data
   4. Adjusting eNodeB Data
   5. Checking eNodeB Data
   6. Exporting eNodeB Data

   eNodeB LTE Troubleshooting
   1. Troubleshooting Overview
   2. Troubleshooting Cell Unavailable Faults
   3. Troubleshooting IP Transmission Faults
   4. Troubleshooting Application Layer Faults
   5. Troubleshooting Synchronization Faults
   6. Troubleshooting Transmission Security Faults
   7. Troubleshooting RF Unit Faults
   8. Troubleshooting License Faults

   eNodeB LTE TOP Alarm Handling
   1. Alarm Overview
   2. Top Alarm

   eNodeB LTE Site Solution
   1. Huawei LTE Product Introduction
   2. Typical Out Door Site Coverage Solution
   3. Typical In Door Site Coverage Solution
   4. High-Speed Railway and Road Coverage Solution
   5. FDD+TDD Site Solution
   6. Easy Marco Site Solution
   7. Tower Solution
   8. Related Cable Solution

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### 3.1.2.6. Participating in the Exam

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3.1.2.7. References

- LTE System Overview
- LTE Field Maintenance
- EPC Principle

3.1.2.8. Recommended Training Program

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<td>II</td>
<td>10 days</td>
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</tbody>
</table>
3.1.3. HCNP - LTE Exam Outline

3.1.3.1. Prerequisites

No prerequisites.

3.1.3.2. Exam Content Overview

The HCNP - LTE exam covers details principles of LTE air interface such as OFDMA/SC-FDMA/LTE physical layers, LTE protocols and procedures such as EPS interfaces/EPS protocols/RRC layer/RLC layer/MAC layer, HUAWEI LTE eNodeB operation&maintenance/configuration/troubleshooting.

3.1.3.3. Exam results valid period

This exam result is valid for 3 years.

3.1.3.4. Re-certification Methods

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</tbody>
</table>

3.1.3.5. Key Points of Exam

LTE Air Interface
1. The evolution of cellular networks and 3Gpp release
2. Radio interface techniques
3. OFDMA/SC-FDMA principle, signal generation and processing
4. Radio interface protocols
5. Time-domain and frequency-domain structure in the radio interface in UL and DL for both FDD and TDD mode
6. Channel structure of the radio interface
7. Uplink/downlink transmission technique
8. The paging procedure
9. The cell search procedure
10. The random access procedure
11. Uplink/downlink power controls
12. HARQ
13. Concepts of layers, channel rank, spatial multiplexing, open and closed loop spatial multiplexing, TX diversity, beamforming, SU-MIMO and MU-MIMO

LTE Protocols and E2E Signaling
1. The detail signaling procedure of UE access network
2. The detail signaling procedure of paging
3. The detail signaling procedure of TAU
4. The detail signaling procedure of Handover
5. The detail signaling procedure of detach

eNodeB Reconfiguration
1. Reconfiguration Working Flow
2. Reconfiguration Tools and Operation
3. Radio/Device/Transmission Data Reconfiguration
4. Data Reconfiguration in Typical Scenarios

LTE Advance Troubleshooting
1. eNodeB LTE Antenna & Feeder System Fault Analysis and Troubleshooting
   - Faults related to antenna & feeder system
   - PIM principle and fault analysis
   - VSWR principle and fault analysis
   - TMA working principle and power supply
   - Location by section method in PIM and VSWR troubleshooting
   - Troubleshooting with help of Huawei U2000 and Web LMT

2. EPS End to End IP Protocol Analysis
   - End to end IP protocol architecture
   - Method/ tools on collecting IP layer message
   - Trace analysis:
     - O&M trace
     - Control Plane trace
     - User Plane trace

3. LTE Throughput Analysis
   - Factors affecting LTE throughput
   - Analysis on throughput problem
   - Low throughput
   - Fluctuating Throughput

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3.1.3.7. References

LTE Air Interface
LTE Protocols and Procedures
LTE Operation and Configuration
LTE Reconfiguration
LTE Troubleshooting

3.1.3.8. Recommended Training Program

<table>
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34
| HCNP – LTE Training | III | 10 days |
3.1.4. HCNP - EPC Exam Outline

3.1.4.1. Prerequisites

No prerequisites.

3.1.4.2. Exam Content Overview

The HCNP – EPC exam covers details of EPC ATCA Platform Routine Operation and Maintenance (USN, HSS), EPC USN Data Configuration, EPC UGW Routine Operation and Maintenance, EPC UGW Data Configuration, EPC HSS Data Configuration.

3.1.4.3. Exam results valid period

This exam result is valid for 3 years.

3.1.4.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

<table>
<thead>
<tr>
<th>Re-certification Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>To re-certify, pass ONE of the following before the certification expiration date:</td>
</tr>
<tr>
<td>• Pass the Exam again.</td>
</tr>
</tbody>
</table>

3.1.4.5. Key Points of Exam

EPC ATCA Platform Routine Operation and Maintenance (USN, HSS)

4. system structure and hardware structure of USN9810
5. software related installation and upgrade procedure
6. hardware operation and maintenance
7. security management
8. system information management
9. alarm management
10. trace management
11. data management
12. license management
13. performance management

EPC USN Data Configuration

1. functions of protocol stacks of different interfaces
2. configuration of USN hardware
3. S1-MME Interface Data Configuration
4. S6a Interface Data Configuration
5. S10S11 Interface Data Configuration
6. MM SM Data Configuration

EPC UGW Routine Operation and Maintenance

1. system structure and hardware structure of UGW9811
2. software related installation and upgrade procedure
3. hardware operation and maintenance
4. authorization management
5. system information management
6. alarm management
7. trace management
8. log management
9. license management
10. patch management
11. data backup and restore

EPC UGW Data Configuration
1. functions of protocol stacks of different interfaces
2. UGW9811 S1-U interface data
3. UGW9811 S11 interface data configuration
4. UGW9811 S5/S8 interface data
5. UGW9811 other related interface data configuration
6. UGW9811 APN data configuration
7. UGW9811 VPN data configuration.
8. UGW9811 billing data configuration.

EPC HSS Data Configuration
9. HSS9820 product function and application
10. configuration of subscription data
11. the steps of HSS9820 data configuration
12. hardware and system data configuration
13. interface data configuration
14. basic data configuration steps of USCDB

**NOTE**
The exam content provided here serves only as a general guide to candidates. Other basic knowledge not mentioned here may also be included in the actual exam.

3.1.4.6. Participating in the Exam

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https://home.pearsonvue.com/huawei/

3.1.4.7. References

EPC ATCA Platform  Routine Operation and Maintenance 〈USN, HSS〉
EPC USN Data Configuration
EPC UGW Routine Operation and Maintenance
EPC UGW Data Configuration
EPC HSS Data Configuration

3.1.4.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>HCNP - EPC Training</td>
<td>III</td>
<td>12 days</td>
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</table>
4. RNP & RNO

4.1. LTE RNP&RNO Exam Outline

4.1.1. Introduction of LTE RNP&RNO Exam Outline

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>H35-560</td>
<td>HCNA - LTE RNP&amp;RNO</td>
<td>90min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
<td>1000</td>
<td>600</td>
</tr>
<tr>
<td>H35-561</td>
<td>HCNP - LTE RNP&amp;RNO</td>
<td>90min</td>
<td>50 multiple-choice questions</td>
<td>1000</td>
<td>600</td>
</tr>
</tbody>
</table>

4.1.2. HCNA - LTE RNP&RNO Exam Outline

4.1.2.1. Prerequisites

No prerequisites.

4.1.2.2. Exam Content Overview

The Huawei Certified Network Associate - LTE RNP&RNO exam covers: LTE basic theories, wireless propagation principle, Site survey, LTE radio network planning and RF optimization knowledges.

4.1.2.3. Exam results valid period

This exam result is valid for 3 years.

4.1.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

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<tbody>
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</tr>
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<td>• Pass any subject of the high-level certification in the field of the local technology</td>
</tr>
</tbody>
</table>

4.1.2.5. Key Points of Exam

LTE System Overview

1. Evolution of Cellular Networks and 3Gpp releases
2. LTE Network Architecture
3. E-UTRAN Interfaces and Protocols
4. LTE Air Interface Principles
5. Radio Interface Techniques
6. eNodeB Product Overview
7. Products and application scenarios
8. Operation and Maintenance

LTE Air Interface basic and signaling flow

9. LTE Air Interface Overview
10. Radio interface protocols
11. RRC Layer Introduction
12. PDCP Layer Introduction
13. RLC Layer Introduction
14. MAC Layer Introduction
15. OFDMA/SC-FDMA principle, signal generation and processing
16. Channel structure of the radio interface
17. Uplink/downlink physical signals
18. UE Power ON Procedure
19. Default bearer establish and attach procedure
20. Paging Procedure
21. TAU Procedure
22. Handover Procedure

LTE Radio Network Planning Basic
23. LTE Radio Network Planning Process
24. Differences between 2G/3G and LTE Dimensioning
25. LTE coverage and capacity planning overview
26. LTE site survey

LTE Radio Network Feature basic
1. LTE eRAN Idle Mode Behavior
2. LTE eRAN Handover Feature
3. LTE eRAN Power Control Feature
4. LTE eRAN Scheduling Feature

Probe and Assistant Application
1. GENEX Probe Introduction
2. GENEX Probe Operation Process
3. GENEX Assistant Introduction
4. GENEX Assistant Operation Process for LTE Network
5. Practice

LTE Single Site Verification
1. SSV preparation
2. SSV test and report

LTE Radio Network RF Optimization
1. Overview of RF Optimization
2. Basic Process of RF Optimization
3. Test Preparations
4. Data Collection
5. Coverage Problem Analysis
6. Handover Problem Analysis
7. RF Adjustment
8. LTE Interference Diagnosis
The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.

4.1.2.6. Participating in the Exam

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4.1.2.7. References

4.1.2.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCNA - LTE RNP&amp;RNO Training</td>
<td>II</td>
<td>10</td>
</tr>
</tbody>
</table>
4.1.3. HCNP - LTE RNP&RNO Exam Outline

4.1.3.1. Prerequisites

No prerequisites.

4.1.3.2. Exam Content Overview

The Huawei Certified Network Professional - LTE RNP&RNO exam covers: key points of network planning, key points of network optimization, Probe/Assistant tool usage, LTE air interface, LTE signaling procedure, comparison between FDD and TDD, basic algorithm and parameters for LTE network optimization, and LTE single-site verification, LTE traffic statistics KPIs and 4G->2G/3G interoperability overview.

4.1.3.3. Exam results valid period

This exam result is valid for 3 years.

4.1.3.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

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</table>

4.1.3.5. Key Points of Exam

LTE Air Interface

1. The evolution of cellular networks and 3Gpp release
2. LTE Radio interface techniques
3. OFDMA/SC-FDMA principle, signal generation and processing
4. Radio interface protocols
5. Time-domain and frequency-domain structure in the radio interface in UL and DL for both FDD and TDD mode
6. Channel structure of the radio interface
7. Uplink/downlink transmission technique
8. The paging procedure
9. The cell search procedure
10. The random access procedure
11. Uplink/downlink power controls
12. HARQ
13. Concepts of layers, channel rank, spatial multiplexing, open and closed loop spatial multiplexing, TX diversity, beamforming, SU-MIMO and MU-MIMO

LTE Protocols and E2E Signaling

1. The detail signaling procedure of UE access network
2. The detail signaling procedure of paging
3. The detail signaling procedure of TAU
4. The detail signaling procedure of Handover
5. The detail signaling procedure of detach
LTE Radio Network Design and Planning

1. LTE Radio Network Coverage Dimensioning
   - LTE Radio Network Planning Introduction
   - LTE Radio Network Planning Process
   - LTE Radio Network Coverage Dimensioning
   - LTE Link Budget
   - Propagation Model
   - Site Number Dimensioning

2. LTE Radio Network Capacity Dimensioning
   - Capacity Dimensioning Procedure
   - Network Throughput
   - Introduction of Traffic Model
   - Traffic Model and Parameters
   - Network Throughput Calculation
   - Cell Throughput
   - DL Throughput Analysis
   - UL Throughput Analysis
   - Throughput per Cell(IP)
   - Capacity Dimensioning

3. LTE Cell Planning
   - LTE Radio Parameter Planning Overview
   - Frequency Planning
   - TA Planning
   - PCI Planning
   - PRACH Planning

LTE Radio Network Features

1. LTE eRAN Idle Mode Behavior
   - Idle Mode Overview
   - PLMN selection
   - Cell selection
   - Cell reselection
   - System information reception
   - Tracking area registration
   - Paging monitoring procedure

2. LTE eRAN Handover Feature
   - Mobility Management Overview
   - Intra-frequency Handover
   - Inter-frequency Handover

3. LTE eRAN Power Control Feature
   - Power control overview
   - Downlink power control
   - Uplink power control
4. LTE eRAN Scheduling Feature
   - Overview of Scheduling
   - Downlink Scheduling
   - Uplink Scheduling
   - Scheduling Deployment Strategy

5. LTE eRAN CS Fallback
   - LTE Voice Solution
   - CS Fallback Procedure
   - Network Architecture for CS Fallback to UTRAN/GERAN
   - Combined EPS/IMSI Attach Procedure
   - CS Fallback to UTRAN
   - CS Fallback to GERAN
   - Decisions and Configuration of eNodeB in CS Fallback
   - Selection of CS Fallback Mechanisms

6. LTE eRAN Physical Channel Resource Management
   - PDCCH resource management
   - PDCCH symbols adaptively adjusted
   - CCE aggregation adaptively adjusted
   - DL/UL CCE ratio adaptively adjusted
   - PUCCH resource management
   - Adaptive SR period adjustment
   - Adaptive PUCCH resource adjustment

LTE Interoperability
1. LTE eRAN Interoperability in Idle Mode (LTE->GU)
   - LTE Interoperability in Idle Mode Overview
   - IRAT PLMN Selection Procedure
   - IRAT Cell Selection Criteria
   - IRAT Cell Reselection Criteria
   - IRAT Signaling Procedure in Idle Mode

2. LTE eRAN Interoperability in Connection Mode (LTE->GU)
   - Technical Overview and Basic Concepts
   - Measurement Configuration
   - Measurement Triggering/Stopping Phase of an IRAT Handover
   - Redirection
   - Blind Handover
   - Measurement Phase of an IRAT Handover
   - Decision Phase of an IRAT Handover
   - Execution Phase of an IRAT Handover
   - IRAT Signaling Procedure in Connection Mode

LTE Radio Network Optimize problem analysis
1. LTE Access Fault Diagnosis (Drive Test)
Basic Principle of Access
- Access Fault Diagnosis Process
- Operations of Access Fault Diagnosis

2. LTE Handover Fault Diagnosis (Drive Test)
- Handover Procedure Review
- Handover Fault Analysis
- Typical Case of Handover Fault

3. LTE Call Drop Diagnosis (Drive Test)
- Call Drop Fault Diagnosis Process
- Operations of Call Drop Fault Diagnosis
- Handling of call drop problems

4. LTE Traffic Fault Diagnosis (Drive Test)
- Traffic Fault Diagnosis Process
- Operations of Traffic Fault Diagnosis
- Handling of Traffic Fault Issue
- Typical Cases for Traffic Fault

LTE Radio Network Performance management

1. LTE eRAN KPI Introduction and Improvement
- LTE eRAN KPI Overview
- Performance Measurement System
- LTE eRAN KPI Details
- Accessibility KPI and Analysis
- Retainability KPIs and Analysis
- Mobility KPIs and Analysis
- Equipment Related and Analysis
- Utilization KPIs / Traffic KPI and Analysis
- Transport Performance Counter and Analysis
- LTE eRAN KPI Improvement
- LTE Performance Improvement

2. LTE Call Drop Diagnosis (KPI)
- E-RAB Release Procedure
- Call Drop Definition and KPI Statistics
- Typical Call Drop Issue and Analysis Procedure
- Typical Call Drop Issue Analysis

3. LTE Handover Fault Diagnosis (KPI)
- Handover Failure Procedure
- Handover Failure Definition and KPI Statistics
- Typical Handover Failure Issue and Analysis Procedure
- Typical Handover Failure Issue Analysis

4. LTE Wireless Parameter Audit and Key Parameter Optimization
- LTE Global Parameter Introduction
- LTE Parameter Classification
LTE Voice Solution Overview
1. Voice Solution in LTE
2. CSFB and VoLTE Solution Comparison
3. VoLTE Network and IMS overview
4. Basic Flow of VoLTE

LTE-A Pro Key Technology Overview
1. MBB Industry Updates & Insights
2. 4.5G Definition and System Level Evolution
3. 4.5G Solution and Key Technologies

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### 4.1.3.6. Participating in the Exam

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To find the Pearson VUE authorized test centers. Please log on the homepage of the Pearson VUE: https://home.pearsonvue.com/huawei/

### 4.1.3.7. References

### 4.1.3.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCNP-LTE RNP&amp;RNO Training</td>
<td>III</td>
<td>15</td>
</tr>
</tbody>
</table>
5. Cloud

5.1. Cloud DataCentre Operations Exam Outline

5.1.1. Introduction of Cloud DataCentre Operations Exam

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>H31-521</td>
<td>HCNA – Cloud DataCentre Operations Exam</td>
<td>90 min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
<td>1000</td>
<td>600</td>
</tr>
<tr>
<td>H31-522</td>
<td>HCNP – Cloud DataCentre Operations Exam</td>
<td>90 min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
<td>1000</td>
<td>600</td>
</tr>
</tbody>
</table>

5.1.2. HCNA - Cloud DataCentre Operations Exam Outline

5.1.2.1. Prerequisites

No prerequisites.

5.1.2.2. Exam Content Overview

HCNA - Cloud DataCentre Operations examination covers the basic knowledge of Cloud computing, virtualization, FusionCompute system architecture and FusionManager system architecture, the basic O&M of the data center, the basic knowledge of data center infrastructure, network security knowledge, IT routine maintenance process.

5.1.2.3. Exam results valid period

This exam result is valid for 3 years.

5.1.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

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</tbody>
</table>

5.1.2.5. Key Points of Exam

Cloud platform
4. Cloud computing overview
5. Computing virtualization
6. Network virtualization
7. Storage virtualization
8. FusionCompute system architecture
9. FusionManager system architecture

Host storage DR
1. Server, storage, and DR overview
2. General configurations of servers, storage, and BC&DR
3. Routine O&M of servers, storage, and BC&DR

Network security
1. TCP/IP basics
2. Basic principles of routers
3. Basic principles of switches
4. Basic security principles
5. Introduction to the firewall technology
6. IPS/IDS technology basics
7. Introduction to Huawei hardware products

O&M monitoring
1. FusionCompute alarm monitoring and routine maintenance
2. FusionManager alarm monitoring and routine maintenance

Rules and specifications
1. IT routine maintenance process

NOTE
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5.1.2.6. Participating in the Exam

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5.1.2.7. References

FusionSphere V100R006C10SPC300 Product Documentation
FusionSphere V100R006C10 PoC Test Suite (Server Virtualization)

5.1.2.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCNA - Cloud DataCentre Operations Training</td>
<td>II</td>
<td>10 days</td>
</tr>
</tbody>
</table>
5.1.3. HCNP - Cloud DataCentre Operations Exam Outline

5.1.3.1. Prerequisites

No prerequisites.

5.1.3.2. Exam Content Overview

HCNP- Cloud DataCentre Operations examination covers Cloud maintenance and ITIL service management, Cloud OS solution deployment and management, Cloud DC cloud management platform, Cloud DC infrastructure O&M, Cloud DC BC&DR, and migration solutions, Cloud DC security management.

5.1.3.3. Exam results valid period

This exam result is valid for 3 years.

5.1.3.4. Re-certification Methods

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</tbody>
</table>

5.1.3.5. Key Points of Exam

Cloud maintenance and ITIL service management
1. IT O&M management in the cloud architecture
2. Brief introduction to cloud computing and IT service management
3. Overview of IT service management in the cloud environment
4. IT service lifecycle management in the cloud environment
5. IT service management on public and private clouds

Cloud OS solution deployment and management
1. Introduction to the cloud OS FusionSphere OpenStack solution
2. Introduction to FusionSphere OpenStack
3. Introduction to cloud OS FusionSphere OpenStack installation and configuration
4. Introduction to cloud OS products
5. Routine operations of the cloud OS
6. Routine management of cloud OS FusionSphere OpenStack OM
7. Routine cloud OS maintenance and troubleshooting

Cloud DC cloud management platform
1. Cloud DC cloud management platform overview
2. Cloud DC cloud management platform installation management
3. Cloud DC cloud management platform maintenance management
4. Cloud DC cloud management platform operating management
5. Routine maintenance and troubleshooting of cloud management platform
Cloud DC infrastructure O&M
1. Introduction to eSight products
2. Introduction to eSight product installation and configuration
3. Introduction to eSight server and storage management
4. eSight routine maintenance and troubleshooting

Cloud DC BC&DR, and migration solutions
1. Analysis of and introduction to DC consolidation and migration requirements

Cloud DC security management
1. Cloud DC security management

NOTE
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5.1.3.6. Participating in the Exam

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5.1.3.7. References

FusionSphere V100R006C10SPC300 Product Documentation
FusionSphere V100R006C10 PoC Test Suite (Server Virtualization)
FusionSphere V100R005C10 Maintenance Instruction (Server Virtualization) 01

5.1.3.8. Recommended Training Program

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<td>15 days</td>
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</table>
5.2. Cloud Solutions Architect Exam Outline

5.2.1. Introduction of Cloud Solutions Architect Exam

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
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<td>H31-511</td>
<td>HCNA – Cloud Solutions Architect Exam</td>
<td>90 min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
<td>1000</td>
<td>600</td>
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</table>

5.2.2. HCNA - Cloud Solutions Architect Exam Outline

5.2.2.1. Prerequisites

No prerequisites.

5.2.2.2. Exam Content Overview

HCNA- Cloud Solutions Architect examination covers the e-Government cloud data center ICT technology basic knowledge, vertical industry basics and Informationization Trend (government, education, medical), Huawei industry cloud solution (government, education, medical), solution expert role perception and professional capability (requirement analysis, solution architecture design and presentation)

5.2.2.3. Exam results valid period

This exam result is valid for 3 years.

5.2.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

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</table>

5.2.2.5. Key Points of Exam

Cloud Computing Overview
1. The Evolution of Cloud Computing
2. Cloud Computing Basic Concepts
3. TCloud Computing and Benefits
4. Cloud Computing Core Technologies

Overview and Security of Data Center
1. Overview and Trends of Data Center
2. Architecture and Scenario of Data Center
3. Key Technologies of Data Center
4. Data Center Security
5. Use Case of Data Center

Server & Operating System Basis
1. Basic Concept of Server
2. Key Server Components
3. Mainstream Server Introduction
4. Operating System Overview
5. Development and Characteristics of Three Major Operating System
6. Linux Introduction

Storage Technology
1. Basic Conception of Storage
2. Storage Application Environment
3. RAID Technology
4. Network Storage
5. Mainstream Vendors Storage Solution

FusionSphere Solution Introduction
1. The challenge for the traditional IT Infrastructure
2. HUAWEI FusionSphere Solution Overview
3. HUAWEI FusionSphere Solution Architecture
4. HUAWEI FusionSphere Solution Functions
5. HUAWEI FusionSphere Solution Deployment
6. HUAWEI FusionSphere Solution Successful Cases

Database Basis
1. Database basics
2. Mainstream relational database introduction
3. Mainstream non-relational database introduction
4. Rules and specifications

IP Network Basis
1. Basic Internet Network
2. TCP/IP Protocol Stack
3. Functions of Each Layer of the Protocol Stack

Switching and routing technology
1. The Ethernet switching technology
2. Technical principle of the IP route

Data Center Technology and Networking
1. Data Center Brief Introduction
2. Key Technologies of Data Center
3. Data Center Structure Introduction
4. Data Center Device

Cloud service market Insight, Telco cloud service capabilities map
1. Cloud Service Market Insight
2. Microsoft Azure and AWS Overview and Competition Analysis
3. Cloud Service Capabilities Map

Government Industry Cloud
1. The Challenge and Trend in Government Industry
2. Cloud will Enable Government Successful Transformation
3. E-Government & Government Cloud Solution Introduction
4. Global Government Cloud Successful Case Sharing

Financial Industry Cloud
1. Trends and Challenges in the Financial Industry
2. Financial Industry Cloud Solution
3. Financial Cloud Sales Strategy and Case Sharing

Healthcare Industry Cloud
1. Trends and Challenges in the healthcare industry
2. Healthcare Cloud Solution Introduction
3. Healthcare Cloud Case Sharing

Retail industry cloud
1. Retail Industry Trends and Challenges
2. Retail Industry Requirement Analysis
3. Retail Industry Cloud Solutions
4. Success Stories

Education Cloud
1. Challenges and Trends of Education Informationization
2. Development Strategy of Education Informationization
3. Scenarios and Requirements of Education Cloud
4. Typical Education Cloud Solutions and Case Sharing

Scientific Research Cloud
1. Challenges and Trends of Scientific Research
2. Cloud Scenarios Analysis on Scientific Research Industry
3. Cloud Solution on Scientific Research Industry
4. Cloud Scenarios Case Sharing of Scientific Research Industry

Industrial Manufacturing Cloud
1. Cloud Significance for Manufacturing Industry
2. Cloud Strategy for Manufacturing Companies
3. Cloud Provider and Consumer Strategy
4. Cloud Orchestration and Solution
5. Conclusion and Case Sharing

Automotive Industry Cloud
1. Trends and Challenges in the Automotive Industry
2. Automotive Industry Cloud Solution
3. Rapid Cloudification and Cloud Service Selling
4. Carrier’s Automotive Cloud Case Sharing
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5.2.2.6. Participating in the Exam

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5.2.2.7. References

Huawei product manuals

5.2.2.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCNA - Cloud Service Sales &amp; Pre-sales Training</td>
<td>II</td>
<td>MOOC 2 Weeks+8 days</td>
</tr>
</tbody>
</table>
5.3. Cloud Applications Exam Outline

5.3.1. Introduction of Cloud Applications Exam

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>H31-531</td>
<td>HCNA – Cloud SysOps Administrator Exam</td>
<td>90 min</td>
<td>60 multiple-choice questions</td>
<td>1000</td>
<td>600</td>
</tr>
</tbody>
</table>

5.3.2. HCNA - Cloud SysOps Administrator Exam Outline

5.3.2.1. Prerequisites

No prerequisites.

5.3.2.2. Exam Content Overview

HCNA - Cloud SysOps Administrator examination covers cloud service application engineers involved in the Huawei public cloud solution and common basis of cloud service knowledge.

5.3.2.3. Exam results valid period

This exam result is valid for 3 years.

5.3.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

<table>
<thead>
<tr>
<th>Re-certification Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>To re-certify, pass ONE of the following before the certification expiration date:</td>
</tr>
<tr>
<td>• Pass the Exam again.</td>
</tr>
<tr>
<td>• Pass any subject of the high-level certification in the field of the local technology</td>
</tr>
</tbody>
</table>

5.3.2.5. Key Points of Exam

Huawei Public Cloud Computing Overview

Image Management Service (IMS)
1. IMS overview
2. Process of creating an image
3. IMS O&M
4. IMS service combination

Virtual Private Cloud (VPC)
1. VPC overview
2. Process of creating a VPC
3. VPC O&M

Elastic Cloud Server (ECS)
1. ECS overview
2. Process of creating an ECS
3. ECS O&M
4. ECS service combination
Elastic Load Balance (ELB)
1. ELB overview
2. Process of creating ELB
3. ELB O&M
4. ELB service combination

Elastic Volume Service (EVS) and Volume Backup Service (VBS)
1. EVS and VBS
2. Processing of creating EVS and VBS
3. EVS and VBS O&M
4. EVS and VBS service combination

Cloud Eye Service (CES)
1. CES overview
2. Processing of creating CES
3. CES O&M

Auto Scaling (AS)
1. AS overview
2. Process of creating AS
3. AS O&M
4. AS service combination

Virtual Private Cloud (VPC)
1. VPC overview
2. Process of creating a VPC
3. VPC O&M

Bare Metal Server (BMS)
1. BMS overview
2. Process of allocating a BMS
3. BMS O&M

Relational Database Service (RDS)
1. RDS overview
2. Process of creating an RDS
3. RDS O&M
4. RDS service combination

Cloud Container Engine (CCE)
1. CCE overview
2. Process of creating a CCE
3. CCE O&M

NOTE
The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.
5.3.2.6. Participating in the Exam

The exam is delivered by Pearson VUE authorized test centers. You can register with the nearest test center to take the exam.

To find the Pearson VUE authorized test centers, please log on the homepage of the VUE:
https://home.pearsonvue.com/huawei/

5.3.2.7. References

Huawei product manuals

5.3.2.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
</tr>
</thead>
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</table>
5.4. Planning and Building Cloud DC Exam (Carrier) Outline

5.4.1. Introduction of Planning and Building Cloud DC Exam

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>H13-511</td>
<td>HCNA-Cloud-BCCP (HCNA—Cloud-Building Cloud Computing Platform)</td>
<td>90 min</td>
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<td>600</td>
</tr>
<tr>
<td>H13-522</td>
<td>HCNP-Cloud-CRPM Cloud Resource Pool Management</td>
<td>90 min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
<td>1000</td>
<td>600</td>
</tr>
<tr>
<td>H13-523</td>
<td>HCNP-Cloud-CDSM Cloud Desktop Solution Management</td>
<td>90 min</td>
<td></td>
<td>1000</td>
<td>600</td>
</tr>
<tr>
<td>H13-524</td>
<td>HCNP-Cloud-COSM Cloud Operating System Management</td>
<td>90 min</td>
<td></td>
<td>1000</td>
<td>600</td>
</tr>
</tbody>
</table>

5.4.2. HCNA-Cloud-BCCP Exam Outline

5.4.2.1. Prerequisites

No prerequisites.

5.4.2.2. Exam Content Overview

The HCNA-Cloud-BCCP exam covers basic cloud computing technologies, configuration, and maintenance, includes cloud computing theory, key cloud computing technologies, Huawei cloud computing hardware and software architecture, and deployment & management.

5.4.2.3. Exam results valid period

This exam result is valid for 2 years.

5.4.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

<table>
<thead>
<tr>
<th>Certification</th>
<th>Period of Validity</th>
<th>Date of Recertification</th>
<th>ReExam</th>
<th>Start Date of Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCNA-Cloud</td>
<td>3 Years</td>
<td>After passing the last certification</td>
<td>Same as initial certification</td>
<td>Date of passing reExam</td>
</tr>
</tbody>
</table>

5.4.2.5. Key Points of Exam

1. Basic concept and values of cloud computing.
2. Basic knowledge and technical theory of cloud computing.
3. Principles, features and related applications of virtualization technologies.
4. Components, deployment and basic configuration of FusionCloud.
5. Functionality and architecture of FusionCompute.
6. Functionality and architecture of FusionManager.
7. Functionality and architecture of FusionAccess.
8. Deployment management and configuration of cloud computing solutions.

NOTE
The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.

5.4.2.6. Participating in the Exam
The exam is delivered by Pearson VUE authorized test centers. You can register with the nearest test center to take the exam.
To find the Pearson VUE authorized test centers, please log on the homepage of the VUE:
https://home.pearsonvue.com/huawei

5.4.2.7. References
Huawei HCNA-Cloud-BCCP Training Courses
Huawei FusionSphere products documents
Huawei FusionCloud Desktop Cloud products documents
Huawei FusionCompute products documents
Huawei FusionManager products documents
Huawei FusionAccess products documents

5.4.2.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCNA - Cloud DataCenter Architect Training</td>
<td>II</td>
<td>5 days</td>
</tr>
</tbody>
</table>
5.4.3. HCNP-Cloud-CRPM Exam Outline

The following table lists the exams, exam codes, exam names, and exam durations of Huawei Cloud certification programs. This document describes the H13-522-ENU HCNP-Cloud-CRPM exam outline. For other exam outlines, please refer to the corresponding training materials or obtain them from the website: http://support.huawei.com/learning.

<table>
<thead>
<tr>
<th>Certification Program</th>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Pass Score/Total Score</th>
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<tbody>
<tr>
<td>HCNP-Cloud</td>
<td>H13-522</td>
<td>HCNP-Cloud-CRPM (Huawei Certified Network Professional-Cloud Resource Pool Management)</td>
<td>90 min</td>
<td>600/1000</td>
</tr>
</tbody>
</table>

5.4.3.1. Exam Content

The HCNP-Cloud-CRPM exam covers but not limited to cloud resource pool management, cloud data center architecture, virtualization theory, distributed storage, server virtualization concepts and operations, etc.

5.4.3.2. Key Points

**Huawei Cloud Computing Solution Architecture Overview**
1) Cloud computing solution architecture
2) Huawei Cloud Computing solution
3) Huawei Cloud Data Center solution
4) Huawei virtualization overview

**Huawei Computing Virtualization**
1) Computing virtualization basic concepts
2) CPU Virtualization
3) Memory Virtualization
4) FusionCompute Key Features

**Huawei Huawei Storage Virtualization**
1) Storage Model
2) Virtualization Storage Connection
3) Storage Virtualization Principles
4) Storage Virtualization Features
5) Common Functions of Storage Virtualization

**Huawei Distributed Storage System**
1) FusionStorage Introduction
2) FusionStorage Architecture and Principles
3) FusionStorage Deployment Configurations

**Huawei Network Virtualization**
1) Network Virtualization Background
2) Virtual Switch
3) Software-defined Network
4) Typical Networking
5.4.3.3. NOTE
The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.

5.4.3.4. Participating in the Exam
The exam is delivered by Pearson VUE authorized test centers. You can register with the nearest test center to take the exam.
To find the Pearson VUE authorized test centers, please log on the homepage of the VUE:
https://home.pearsonvue.com/huawei

5.4.3.5. References
Huawei HCNP-Cloud-CRPM Training Courses
Huawei FusionSphere Product Documents
Huawei FusionStorage Product Documents

5.4.3.6. Training Program Recommended
HCNP-Cloud– Training
5.4.4. HCNP-Cloud-CDSM Exam Outline

The following table lists the exams, exam codes, exam names, and exam durations of Huawei Cloud certification programs. This document describes the H13-523-ENU HCNP-Cloud-CDSM exam outline. For other exam outlines, please refer to the corresponding training materials or obtain them from the website of Huawei:http://support.huawei.com/learning.

<table>
<thead>
<tr>
<th>Certification</th>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Pass Score/Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCNP-Cloud</td>
<td>H13-523</td>
<td>HCNP-Cloud-CDSM (Huawei Certified Network Professional-Cloud Desktop Solution Management)</td>
<td>90 min</td>
<td>600/1000</td>
</tr>
</tbody>
</table>

5.4.4.1. Exam Content

The HCNP-Cloud-CDSM exam covers but not limited to FusionCloud desktop solution planning and design, installation and deployment, operation and maintenance. Including link clone, full memory, GPU desktop technology, desktop client, application virtualization, etc.

5.4.4.2. Key Points

1) Huawei FusionCloud Desktop Solution Overview
2) Huawei FusionCloud Desktop Provisioning and Management
3) Huawei FusionCloud Desktop Solution Working Principle and Component Interaction
4) Huawei FusionCloud Desktop Solution Planning and Design
5) Huawei FusionCloud Desktop Installation
6) Linked Clone Desktop Technology and Solution
7) Full Memory Desktop Technology and Solution
8) GPU Virtualization and Passthrough Technologies and Solutions
9) SBC Application Virtualization Technology and Solution
10) Huawei FusionCloud Desktop Management and Maintenance
11) Huawei FusionCloud Desktop Clients
12) Huawei FusionCloud Desktop Troubleshooting

5.4.4.3. NOTE

The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.

5.4.4.4. Participating in the Exam

The exam is delivered by Pearson VUE authorized test centers. You can register with the nearest test center to take the exam.

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https://home.pearsonvue.com/huawei
5.4.4.5. References

Huawei HCNP-Cloud Training Courses
Huawei FusionCloud Desktop Solution documents

5.4.4.6. Training Program Recommended

HCNP-Cloud- Training
5.4.5. HCNP-Cloud-COSM Exam Outline

The following table lists the exams, exam codes, exam names, and exam durations of Huawei Cloud certification programs. This document describes the H13-524-ENU HCNP-Cloud-COSM exam outline. For other exam outlines, please refer to the corresponding training materials or obtain them from the website of Huawei: http://support.huawei.com/learning.

<table>
<thead>
<tr>
<th>Certification Program</th>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Pass Score/Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCNP-Cloud</td>
<td>H13-524</td>
<td>HCNP-Cloud-COSM (Huawei Certified Network Professional-Cloud Operating System Management)</td>
<td>90 min</td>
<td>600/1000</td>
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</tbody>
</table>

5.4.5.1. Exam Content

The HCNP-Cloud-COSM exam covers but not limited to cloud operating system construction and management, OpenStack configuration, cloud service management, ManageOne features, etc.

5.4.5.2. Key Points

1) FusionSphere OpenStack Overview
2) FusionSphere OpenStack Service Principles
3) FusionSphere Cloud Data Center solution Overview
4) FusionSphere Cloud Data Center System Resource Model
5) FusionSphere Cloud Data Center System Planning
6) FusionSphere OpenStack Deployment Configuration
7) FusionSphere OpenStack Operation Management
8) ManageOne Solution Introduction
9) ManageOne ServiceCenter Introduction
10) ManageOne OperationCenter Introduction
11) Huawei Cloud Data Center O&M Tools

5.4.5.3. NOTE

The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.

5.4.5.4. Participating in the Exam

The exam is delivered by Pearson VUE authorized test centers. You can register with the nearest test center to take the exam.

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https://home.pearsonvue.com/huawei

5.4.5.5. References

Huawei HCNP-Cloud Training Courses
Huawei FusionSphere Product Documents
Huawei ManageOne OperationCenter Product Documents
Huawei ManageOne ServiceCenter Product Documents
5.4.5.6. Training Program Recommended

HCNP-Cloud- Training
6. IoT

6.1. IoT Exam Outline

6.1.1. Introduction of IoT Exam

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>H12-111</td>
<td>HCNA - IoT</td>
<td>90 min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
<td>1000</td>
<td>600</td>
</tr>
<tr>
<td>H35-631</td>
<td>HCNP - IoT Wireless</td>
<td>90 min</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H35-632</td>
<td>HCNP - IoT Platform</td>
<td>90 min</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

6.1.2. HCNA - IoT Exam Outline

6.1.2.1. Prerequisites

No prerequisites.

6.1.2.2. Exam Content Overview

HCNA-IoT examination covers Internet of Things layered architecture, Internet of Things communication technology, Internet of Things industry application, Internet of Things security, IoT connection management platform, OceanConnect service process, Internet of Things operating system, Huawei LiteOS Kernel, middleware and open interface, Huawei LiteOS development environment, Industrial IoT gateway function and application, Family IoT gateway function and application, NB-IoT technology, ELTE-IoT technology.

6.1.2.3. Exam results valid period

This exam result is valid for 3 years.

6.1.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

<table>
<thead>
<tr>
<th>Re-certification Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>To re-certify, pass ONE of the following before the certification expiration date:</td>
</tr>
<tr>
<td>• Pass the Exam again.</td>
</tr>
<tr>
<td>• Pass any subject of the high-level certification in the field of the local technology</td>
</tr>
</tbody>
</table>

6.1.2.5. Key Points of Exam

Solution introduction about Internet of Things
1. IoT solution
2. Communication technology of IoT solution
3. Application and solution of IoT Industries

IoT connection management platform
1. IoT connection management platform
2. OceanConnect service process flow
IoT operating system
1. IoT operating system
2. Huawei LiteOS Kernel module
3. Huawei LiteOS middleware and Open API
4. Huawei LiteOS development environment

Introduction of IoT gateway
1. Industrial IoT Gateway
2. Home IoT Gateway

NB-IoT and eLTE-IoT

NOTE
The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.

6.1.2.6. Participating in the Exam

The exam is delivered by Pearson VUE authorized test centers. You can register with the nearest test center to take the exam.
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https://home.pearsonvue.com/huawei/

6.1.2.7. References

Huawei Certified IoT Training Courses
Huawei product manuals

6.1.2.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>HCNA - IoT Training</td>
<td>II</td>
<td>5</td>
</tr>
</tbody>
</table>
6.1.3. HCNP - IoT Wireless Exam [To Be Developed] Outline

6.1.3.1. Notes

6.1.3.2. This Exam is in planning, if you are interested in this, you are welcome to contact our local training manager or drop an email to lscertificate@huawei.com.

6.1.3.3. Prerequisites

No prerequisites.

6.1.3.4. Exam Content Overview

HCNP-IoT wireless examination include but are not limited to NB-IoT radio network planning knowledge, base station product knowledge, wireless base station configuration and deployment process, air interface technology, E2E signaling process, key NB-IoT features, key performance KPIs, and key wireless parameters.

6.1.3.5. Exam results valid period

This exam result is valid for 3 years.

6.1.3.6. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

<table>
<thead>
<tr>
<th>Re-certification Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>To re-certify, pass ONE of the following before the certification expiration date:</td>
</tr>
<tr>
<td>• Pass the Exam again.</td>
</tr>
</tbody>
</table>

6.1.3.7. Key Points of Exam

NB-IoT overview
1. IoT concepts
2. Introduction to common wireless technologies adopted in IoT
3. NB-IoT network architecture
4. Main NB-IoT features
5. Main NB-IoT applications in vertical industries

NB-IoT network deployment
1. NB-IoT product introduction
2. NB-IoT baseband units
3. NB-IoT RF units
4. NB-IoT site solutions
5. NB-IoT network deployment and activation

NB-IoT air interfaces
1. NB-IoT system architecture
2. Introduction to NB-IoT protocol stacks and functions
3. NB-IoT frame structure
4. Introduction to NB-IoT uplink physical channels and signals
5. Introduction to NB-IoT downlink physical channels and signals

NB-IoT signaling and protocols
1. NB-IoT system message introduction
2. Analysis of signaling messages and major IEs in an Attach/Detach procedure
3. Analysis of signaling messages and major IEs in a Service Request procedure
4. Analysis of signaling messages and major IEs in a TAU procedure
5. Analysis of an MO data transmission procedure
6. Analysis of an MT data transmission procedure

Key NB-IoT features
1. Introduction to PSM principles
2. Introduction to eDRX principles
3. Introduction to congestion control principles
4. Introduction to NB-IoT coverage extension principles
5. Introduction to NB-IoT paging extension principles

NB-IoT network planning
1. Uplink and downlink budgets
2. Wireless network coverage estimation
3. Network traffic model
4. System capacity estimation
5. Basic cell parameter planning

Introduction to NB-IoT performance management and key parameters
1. General architecture of NB-IoT KPIs
2. Definitions, measurement points, and calculation formulas of NB-IoT KPIs of the accessibility type
3. Definitions, measurement points, and calculation formulas of NB-IoT KPIs of the retainability type
4. Definitions, measurement points, and calculation formulas of NB-IoT KPIs of the service integrity type
5. Definitions, measurement points, and calculation formulas of NB-IoT KPIs of the availability type
6. Definitions, measurement points, and calculation formulas of other common KPIs

Introduction to common NB-IoT parameters and timers as well as the corresponding setting principles

**NOTE**
The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.

6.1.3.8. Participating in the Exam

The exam is delivered by Pearson VUE authorized test centers. You can register with the nearest test center to take the exam.

To find the Pearson VUE authorized test centers, please log on the homepage of the VUE:
https://home.pearsonvue.com/huawei/

6.1.3.9. References

HCNP-Wireless Training Courses
Huawei product manuals
### 6.1.3.10. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
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</thead>
<tbody>
<tr>
<td>HCNP-IoT Wireless Training</td>
<td>II</td>
<td>5</td>
</tr>
</tbody>
</table>
6.1.4. HCNP - IoT Platform Exam [To Be Developed] Outline

6.1.4.1. Notes

This Exam is in planning, if you are interested in this, you are welcome to contact our local training manager or drop an email to lscertificate@huawei.com.

6.1.4.2. Prerequisites

No prerequisites.

6.1.4.3. Exam Content Overview

HCNP-IoT platform examination include but are not limited to Huawei IoT platform planning and deployment, feature application and maintenance, routine O&M, and platform fault analysis and handling.

6.1.4.4. Exam results valid period

This exam result is valid for 3 years.

6.1.4.5. Re-certification Methods

<table>
<thead>
<tr>
<th>Re-certification Methods</th>
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</thead>
<tbody>
<tr>
<td>To re-certify, pass ONE of the following before the certification expiration date:</td>
</tr>
<tr>
<td>• Pass the Exam again.</td>
</tr>
</tbody>
</table>

6.1.4.6. Key Points of Exam

**IoT Platform Overview**

1. Introduction to the IoT connection management platform
2. Platform Services and Functions
3. Platform for Software and Hardware
4. Platform Interfaces and Protocols

**IoT Platform Planning and Virtual layer deployment**

1. VLAN planning for IoT platform
2. Data plan for IoT platform
3. Virtual layer deployment IoT platform

**IoT Platform Deployment**

1. Platform Data Planning
2. Platform Software and Hardware Installation
3. Basic Data Configuration
4. Platform Interfaces

**IoT Platform Key Features**

1. Device connection management
2. Business Enablement
3. Management Portal
4. Basic Management
5. IoT Agent
   IoT Platform operation and maintenance
   1. IoT Platform Performance Monitoring
   2. Common functions and operation methods of the maintenance portal
   3. Routine maintenance and methods of the platform
   IoT Platform fault analysis and handling
   1. Common Fault Locating and handling Methods of IoT Platform
   2. Operation of Common Data Collection and Analysis Tool
   3. Platform Fault Case Analysis

**NOTE**
The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.

6.1.4.7. Participating in the Exam
The exam is delivered by Pearson VUE authorized test centers. You can register with the nearest test center to take the exam.
To find the Pearson VUE authorized test centers, please log on the homepage of the VUE:
https://home.pearsonvue.com/huawei/

6.1.4.8. References
Huawei Certified HCNP-Wireless Training Courses
Huawei product manuals

6.1.4.9. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>HCNP-IoT Platform Training</td>
<td>II</td>
<td>5</td>
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</table>
7. SDN

7.1. SDN Exam Outline

7.1.1. Introduction of SDN Technology Exam

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
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<th>Pass Score</th>
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<tbody>
<tr>
<td>H31-611</td>
<td>HCNA – SDN Exam</td>
<td>90 min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
<td>1000</td>
<td>600</td>
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<tr>
<td>H31-612</td>
<td>HCNP – SDN Exam</td>
<td>90 min</td>
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</tbody>
</table>

7.1.2. HCNA - SDN Exam Outline

7.1.2.1. Prerequisites

No prerequisites.

7.1.2.2. Exam Content Overview

The HCNA - HCNA (SDN) exam covers datacom basics, SDN Architecture and Ecosystem, Key Technologies in Network Future such as Concepts and ONF and IETF Standards and SDN Products, SDN Layer 2 and Layer 3 Networking Principles, OpenFlow Protocol and Netconf Protocol and Restful Protocol.

7.1.2.3. Exam results valid period

This exam result is valid for 3 years.

7.1.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

<table>
<thead>
<tr>
<th>Re-certification Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>To re-certify, pass ONE of the following before the certification expiration date:</td>
</tr>
<tr>
<td>• Pass the Exam again.</td>
</tr>
<tr>
<td>• Pass any subject of the high-level certification</td>
</tr>
</tbody>
</table>

7.1.2.5. Key Points of Exam

SDN architecture and industrial ecosystem

1. Traditional Network Limitations
2. SDN Overview and History
3. SDN Network Architecture
4. SDN Value Proposition
5. SDN Challenges and Solutions
6. SDN Related Concepts and Organizations
7. SDN Influences to Current Telecom Network

HUAWEI SDN solutions and products

1. SDN routers products
2. SDN CloudEngine Switches
   SDN Layer 2 Networking Principles (DC)
   1. Control Channel Overview
   2. Ethernet Networking Principles
   SDN Layer 3 Networking Principles (DC)
   1. IGP Protocols Introduction And Application in SDN
   2. BGP Protocols Introduction And Application in SDN
   SDN Interface Protocols and Principles (DC)
   1. Introduction of SDN OpenFlow Protocol And Application
   2. Introduction of SDN Netconf Protocol And Application
   3. Introduction of SDN RestFul Protocol And Application
   4. Introduction of SNMP Protocol And Application
   5. Introduction of NetStream Protocol And Application
   SDN VxLAN Overlay Introduction
   1. VxLAN Overlay Overview
   2. VxLAN Basic Concepts
   3. VxLAN Applications in SDN AC-DCN Cloud Fabric Network
   4. VxLAN Configuration Examples in SDN AC-DCN Cloud Fabric Network

**NOTE**
The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.

### 7.1.2.6. Participating in the Exam

The exam is delivered by Pearson VUE authorized test centers. You can register with the nearest test center to take the exam.

To find the Pearson VUE authorized test centers, please log on the homepage of the VUE:

https://home.pearsonvue.com/huawei/

### 7.1.2.7. References

HCNA-SDN (HCNA - Software Defined Networking) Training
VRP Configuration Guide
Huawei product manuals

### 7.1.2.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
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<tbody>
<tr>
<td>HCNA - SDN Training</td>
<td>II</td>
<td>5</td>
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</tbody>
</table>


7.1.3. HCNP - SDN Exam Outline

7.1.3.1. Prerequisites

No prerequisites.

7.1.3.2. Exam Content Overview

HCNP-SDN examination covering the basic knowledge of SDN; introduction and technical principles of SDN CloudEngine switch products; SDN senior network principle; SDN layer 2 & layer 3 network principle; SDN senior forwarding layer characteristics, realization of MPLS based characteristics, MPLS TE in SDN scenarios, GMPLS characteristics in SDN scene; Sdn openflow protocol, openflow protocol, NETCONF configuration; SDN solve project scene, Sdn IPCore/DCI solving scheme, SDN VDC solution, SDN IP + optical solution; SDN senior protocol characteristics, vxlan technology, PCEP principle, MSCP principle.

7.1.3.3. Exam results valid period

This exam result is valid for 3 years.

7.1.3.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

<table>
<thead>
<tr>
<th>Re-certification Methods</th>
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<tr>
<td>To re-certify, pass ONE of the following before the certification expiration date:</td>
</tr>
<tr>
<td>• Pass the Exam again.</td>
</tr>
</tbody>
</table>

7.1.3.5. Key Points of Exam

SDN concepts
1. SDN compared to the traditional network structure
2. NFV concept
3. Comparison between SDN and NFV

SDN products
1. SDN CloudEngine switches
2. SDN SNC and Netmartrix
3. WDM basic principles
4. SDN OSN hardware introduction
5. ASON characteristic

SDN advanced network theory
1. BGP basic characteristics
2. BGP advanced features
3. FlowSpec BGP characteristics
4. AddPath BGP characteristics

SDN layer 2 & layer 3 network principle
1. The principle and application of SDN Ethernet
2. The principle and application of SDN optical network
3. The principle and application of SDN IGP protocol
4. The principle and application of SDN BGP protocol

SDN advanced forwarding layer characteristics
1. MPLS basic characteristics
2. Realization of MPLS TE in SDN scenario
3. Realization of GMPLS characteristics in SDN scenario

SDN OpenFlow protocol
1. SDN OpenFlow protocol (Field format description, message type, configuration)
2. NETCONF configuration

SDN Solution scenario implementation
1. SDN IPCore/DCI Solution
2. SDN vDC Solution
3. SDN IP+Optical Solution

SDN advanced protocol characteristics
1. VXLAN Technology (packet format, packet forwarding mechanism, reliability)
2. PCEP principle
3. MSCP principle

NOTE
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7.1.3.6. Participating in the Exam

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https://home.pearsonvue.com/huawei/

7.1.3.7. References

Huawei Certified Datacom Training Courses — HCNA: Guide to Experiments on Huawei Network Technology and Device
Huawei product manuals

7.1.3.8. Recommended Training Program

<table>
<thead>
<tr>
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<th>Level</th>
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<td>HCNP - SDN Training</td>
<td>II</td>
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</tbody>
</table>
8. Hardware Installation

8.1. Wireless Hardware Installation Exam Outline

8.1.1. Introduction of Wireless Hardware Installation Exam

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
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</thead>
<tbody>
<tr>
<td>H35-910</td>
<td>HCS-wireless Hardware Installation Exam</td>
<td>90 min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
<td>1000</td>
<td>800</td>
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</table>

8.1.2. HCS - Wireless Hardware Installation Exam Outline

8.1.2.1. Prerequisites

No prerequisites

8.1.2.2. Exam Content Overview

The exam covers Specifications, hardware installation procedures, and key installation quality points of common Huawei wireless products, as well as corresponding EHS knowledge.

8.1.2.3. Exam Result Valid Period

This exam result is valid for 3 years.

8.1.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

To re-certify, pass ONE of the following before the certification expiration date:
- Pass the Exam again.

8.1.2.5. Key Points of Exam

- **Key points of written exam**
  - Wireless hardware installation
    1. Wireless products
    2. Wireless hardware installation
    3. Wireless hardware installation service application
  - EHS
    1. EHS general requirements
    2. Working at height
    3. Working with electricity
    4. Driving safety
    5. EHS risk evaluation and actions
    6. Emergency response
Survey and design service process and key points of onsite survey
1. Telecommunications survey and design service
2. Key points of onsite survey
3. Key points of site sketch drawing

Introduction to survey tools and IT systems
1. Tool usage
2. IT systems required for surveys
3. ISDP-eSurvey

Logistic

NOTE
The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.

8.1.2.6. Participating in the Exam

The exam is delivered by Pearson VUE authorized test centers. You can register with the nearest test center to take the exam.
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https://home.pearsonvue.com/huawei

8.1.2.7. References

Huawei Hardware Installation Quality Manual

8.1.2.8. Recommended Training

<table>
<thead>
<tr>
<th>Training Name</th>
<th>Training Level</th>
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<tbody>
<tr>
<td>HCS - Wireless Hardware Installation Training</td>
<td>II</td>
<td>5 Days</td>
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</table>
8.2. Microwave Hardware Installation Exam Outline

8.2.1. Introduction of microwave hardware installation Exam

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>H35-911</td>
<td>HCS-Microwave Hardware Installation Exam</td>
<td>90 min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
<td>1000</td>
<td>800</td>
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</table>

8.2.2. HCS - Microwave Hardware Installation Exam Outline

8.2.2.1. Prerequisites

No prerequisites

8.2.2.2. Exam Content

The exam covers microwave basics、Huawei microwave products microwave survey and LOS survey、microwave hardware installation, as well as corresponding EHS knowledge and logistic knowledge.

8.2.2.3. Exam Result Valid Period

This exam result is valid for 3 years.

8.2.2.4. Re-certification Method

Before your certification expires, you should re-certify with the following methods:

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<th>Re-certification Methods</th>
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<tbody>
<tr>
<td>To re-certify, pass ONE of the following before the certification expiration date:</td>
</tr>
<tr>
<td>• Pass the Exam again.</td>
</tr>
</tbody>
</table>

8.2.2.5. Key Points of Exam

Key points of written exam
Microwave product knowledge
1. Microwave communication principles
2. Antenna
3. IDU/ODU
4. Cables and hybrid coupler
5. Microwave technology knowledge

Microwave survey
Microwave hardware installation
1. Antenna hardware installation
2. IDU/ODU hardware installation
3. Cables and hybrid coupler
4. Overall installation process

Microwave quality standards
Antenna alignment knowledge

EHS
1. EHS general requirements
2. Working at height
3. Working with electricity
4. Driving safety
5. EHS risk evaluation and actions
6. Emergency response

Logistic

NOTE
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8.2.2.6. Participating in the Exam

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8.2.2.7. References

IDU fast installation manual
ODU fast installation manual

8.2.2.8. Recommended Training

<table>
<thead>
<tr>
<th>Training Name</th>
<th>Training Level</th>
<th>Training Duration</th>
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</thead>
<tbody>
<tr>
<td>HCS - Microwave Hardware Installation Training</td>
<td>II</td>
<td>4 days</td>
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</tbody>
</table>
8.3. Data Center and Network Equipment Hardware Installation

Exam Outline

8.3.1. Introduction of Data Center and Network Equipment Hardware Installation Exam

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>H35-912</td>
<td>HCS - Data Center and Network Equipment Hardware Installation</td>
<td>90 min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
<td>1000</td>
<td>800</td>
</tr>
</tbody>
</table>

8.3.2. HCS - Data Center and Network Equipment Hardware Installation Exam Outline

8.3.2.1. Prerequisites

No prerequisites

8.3.2.2. Exam Content

The Data Center and Network equipment room hardware installation Exam covers it equipment hardware installation knowledge and Access passive equipment hardware installation knowledge. The IT equipment hardware installation covers the hardware basics of Huawei server products and Huawei storage products, hardware installation knowledge and survey knowledge; The Access passive equipment hardware installation covers access network principle, product introduction and hardware Installation knowledge, as well as corresponding EHS knowledge and logistic knowledge.

8.3.2.3. Exam Result Valid Period

This exam result is valid for 3 years.

8.3.2.4. Re-certification Method

Before your certification expires, you should re-certify with the following methods:

<table>
<thead>
<tr>
<th>Re-certification Methods</th>
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<tbody>
<tr>
<td>To re-certify, pass ONE of the following before the certification expiration date:</td>
</tr>
<tr>
<td>• Pass the Exam again.</td>
</tr>
</tbody>
</table>

8.3.2.5. Key Points of Exam

Key points of written exam

Introduction to Huawei storage products

7. Introduction to enterprise storage hardware

8. Introduction to cloud storage hardware

Hardware installation of OceanStor V3 converged storage products
1. Hardware installation
2. Cable connection
3. Device power-on
4. Installation of the entire E9000
5. Installation of E9000 components

Site survey of Huawei servers
1. Process
2. Key points
3. Survey subjects

Introduction to Huawei storage products
1. Hardware of Enterprise Storage products
2. Hardware of Cloud Storage products

Hardware Installation of OceanStor V3 Converged Storage
1. Hardware installation
2. Cable connection
3. Power-on sequence

Site survey of OceanStor 18000 V3 High-End Storage
1. Delivery mode
2. Introduction to OceanStor 18000 V3
3. Survey objects

Principles of the Access Network and Product Overview
1. Understand the Access Network
2. Copper Line Access
3. Fiber Access
4. Cable Access

Overview of Access Network Device Installation
1. Connection Diagram
2. Interpretation of the Hardware Installation SOP
3. Hardware Quality Standard

EHS
1. EHS general requirements
2. Working at height
3. Working with electricity
4. Driving safety
5. EHS risk evaluation and actions
6. Emergency response

Logistic
The exam content provided here serves only as a general guide to candidates. Other contents not mentioned here may also be included in the actual exam.

8.3.2.6. Participating in the Exam

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To find the Pearson VUE authorized test centers, please log on the homepage of the VUE:

https://home.pearsonvue.com/huawei

8.3.2.7. References

Principles of the Access Network and Product Overview
Overview of Access Network Device Installation
MA5800 Hardware Installation SOP
OLT Hardware Quality Standards of OLT Products
QC Engineering Table of Indoor Products
Practical Training Guide for IT Hardware Installation
IT Hardware Installation Checklist
8.4. FTTX OSP Exam Outline

8.4.1. Introduction of FTTX OSP Exam

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>H35-915</td>
<td>HCS - FTTX OSP Exam</td>
<td>90 min</td>
<td>60 multiple-choice questions (single-answer and multiple-answer), true-false questions</td>
<td>1000</td>
<td>800</td>
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</tbody>
</table>

8.4.2. HCS - FTTX OSP Exam Outline

8.4.2.1. Prerequisites

No prerequisites

8.4.2.2. Exam Content

FTTX OSP hardware installation Exam covers FTTx network Structure, passive product, FTTX OSP implementation solutions, such as Pipe Construction, Aerial Optical Cable Construction, Direct Buried Optical Cable Construction and Air-blown Optical Cable Construction, as well as corresponding EHS knowledge and logistic knowledge.

8.4.2.3. Exam Result Valid Period

This exam result is valid for 3 years.

8.4.2.4. Re-certification

Before your certification expires, you should re-certify with the following methods:

<table>
<thead>
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<tbody>
<tr>
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</tr>
<tr>
<td>• Pass the Exam again.</td>
</tr>
</tbody>
</table>

8.4.2.5. Key Points of Exam

Key points of written exam
Overview of ODN products and optical cables
1. ODN network Structure
2. Features of Major ODN Products

ODN Implementation Solutions and Standards
1. Pipe Construction Standards and Procedure
2. Aerial Optical Cable Construction Standards and Procedure
3. Direct Buried Optical Cable Construction Standards and Procedure
4. Air-blown Optical Cable Construction Standards and Procedure

EHS
1. EHS general requirements
2. Working at height
3. Working with electricity
4. Driving safety
5. EHS risk evaluation and actions
6. Emergency response

Logistic

**NOTE**
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**8.4.2.6. Participating in the Exam**

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To find the Pearson VUE authorized test centers, please log on the homepage of the VUE:

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**8.4.2.7. References**

ODN product and optical cable overview

ODN implementaionsolution and standard

**8.4.2.8. Recommended Training**

<table>
<thead>
<tr>
<th>Training Name</th>
<th>Training Level</th>
<th>Training Duration</th>
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</thead>
<tbody>
<tr>
<td>HCS - FTTX OSP Training</td>
<td>II</td>
<td>3 Days</td>
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</tbody>
</table>
9. Big Data

9.1. Big Data Exam Outline

9.1.1. Introduction of Big Data Exam Outline

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
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<tbody>
<tr>
<td>H13-711</td>
<td>HCNA-Big Data (Huawei Certified Network Associate-Big Data)</td>
<td>90 min</td>
<td>60</td>
<td>1000</td>
<td>600</td>
</tr>
</tbody>
</table>

9.1.2. HCNA-Big Data Exam Outline

9.1.2.1. Prerequisites

No prerequisites.

9.1.2.2. Exam Content Overview

The HCNA-Big Data exam provides knowledge on the architecture, design, deployment, and maintenance of the FusionInsight HD solution. It incorporates the technical principles, design, deployment, management, and maintenance of common big data components. These include HBase, Hive, Loader, MapReduce, Yarn, HDFS, Spark, Flume, Kafka, ZooKeeper, and Streaming.

9.1.2.3. Exam results valid period

This exam result is valid for 3 years.

9.1.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

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<tr>
<td>• Pass the Exam again.</td>
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</table>

9.1.2.5. Key Points of Exam

Module 01 Big Data Industry and Technological Trends
1. Generation and Development of Big Data
2. Big Data Concepts and Hadoop Overview
4. Big Data Ecosystem
5. Big Data Application
6. Big Data Architecture and Value

Module 02 – Distributed File System Technology
1. Component Functions
2. Data Architecture
3. Deployment Planning
4. Deployment Methods
5. Parameter Settings
6. Routine Maintenance

Module 03 MapReduce and Yarn – Distributed Computing Engine Technologies
1. Component Functions
2. Data Architecture
3. Deployment Planning
4. Deployment Methods
5. Parameter Settings
6. Routine Maintenance

Module 04 Spark – Memory-Based Distributed Computing Technology
1. Component Functions
2. Data Architecture
3. Deployment Planning
4. Deployment Methods
5. Parameter Settings
6. Routine Maintenance

Module 05 HBase – Distributed Database
1. Component Functions
2. Data Architecture
3. Deployment Planning
4. Deployment Methods
5. Parameter Settings
6. Routine Maintenance

Module 06 Hive – Data Warehouse Tool
1. Component Functions
2. Data Architecture
3. Deployment Planning
4. Deployment Methods
5. Parameter Settings
6. Routine Maintenance

Module 07 Loader – Data Conversion
1. Component Functions
2. Data Architecture
3. Deployment Planning
4. Deployment Methods
5. Parameter Settings
6. Routine Maintenance

Module 08 Flume – Massive Log Aggregation
1. Component Functions
2. Data Architecture
3. Deployment Planning
4. Deployment Methods
5. Parameter Settings
6. Routine Maintenance

Module 09 Kafka – Message Subscription System
1. Component Functions
2. Data Architecture
3. Deployment Planning
4. Deployment Methods
5. Parameter Settings
6. Routine Maintenance

Module 10 ZooKeeper – Distributed Lock Device
1. Component Functions
2. Data Architecture
3. Deployment Planning
4. Deployment Methods
5. Parameter Settings
6. Routine Maintenance

Module 11 Streaming – Data Transmission Technology
1. Component Functions
2. Data Architecture
3. Deployment Planning
4. Deployment Methods
5. Parameter Settings
6. Routine Maintenance

Module 12 FusionInsight HD Solution Overview
1. FusionInsight Architecture
2. FusionInsight Components and Features

Module 13 FusionInsight HD Integration Design
1. Deployment Constraints
2. Cluster Evaluation Examples
4. Node Planning
5. Disk Planning

Module 14 FusionInsight HD Installation and Deployment
1. Basic Concepts
2. Installation Process
3. Installation Preparation
4. Installation Procedure
5. Post-installation Check
6. System Configuration

Module 15 FusionInsight HD Maintenance
1. FusionInsight HD Functions
2. Maintenance Tools
3. Routine Maintenance
4. Upgrade and Patches

NOTE
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9.1.2.6. Participating in the Exam

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9.1.2.7. References
Huawei Certified HCNA-Big Data Training Courses
Huawei FusionInsight HD Product Documentation

9.1.2.8. Recommended Training Program

<table>
<thead>
<tr>
<th>Training Program</th>
<th>Level</th>
<th>Duration</th>
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<td>HCNA-Big Data (Huawei Big Data Engineer Training)</td>
<td>II</td>
<td>5</td>
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</table>
10. Automatic O&M

10.1. OWS Exam Outline

10.1.1. Introduction of OWS Exam Outline

<table>
<thead>
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<th>Exam Code</th>
<th>Exam Name</th>
<th>Exam Duration</th>
<th>Item number</th>
<th>Total Score</th>
<th>Pass Score</th>
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<tr>
<td>H35-920-ENU</td>
<td>HCDA - OWS Developer</td>
<td>90 min</td>
<td>60</td>
<td>1000</td>
<td>600</td>
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</tbody>
</table>

10.1.2. HCDA - OWS Developer Exam Outline

10.1.2.1. Prerequisites

No prerequisites.

10.1.2.2. Exam Content Overview

The HCDA - OWS Developer certification validate knowledge on

10.1.2.3. Exam results valid period

This exam result is valid for 3 years.

10.1.2.4. Re-certification Methods

Before your certification expires, you should re-certify with the following methods:

<table>
<thead>
<tr>
<th>Re-certification Methods</th>
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<tbody>
<tr>
<td>To re-certify, pass ONE of the following before the certification expiration date:</td>
</tr>
<tr>
<td>• Pass the Exam again.</td>
</tr>
</tbody>
</table>

10.1.2.5. Key Points of Exam

Huawei’s Practice in Digital O&M Transformation

1. App Development Challenges
2. Platform Architecture and Principles
3. Platform Functions in Runtime
4. Studio Basic Functions

APP Basic Configuration

1. App Configuration
2. Model Configuration
3. Service Configuration
4. Data Rule Configuration
5. Page Configuration

Interface Basic Configuration
1. Basic Operation Configuration of the Interface Package
2. Soap interface Configuration
3. Rest interface Configuration
4. Oauth2.0 interface Configuration

Workflow Basic Configuration
1. Introduction to Workflow
2. Create a Process
3. Configure Workflow Chart
4. Configure Workflow Form
5. Configure Workflow Rule

**NOTE**
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10.1.2.6. Participating in the Exam

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To find the Pearson VUE authorized test centers, please log on the homepage of the VUE:
https://home.pearsonvue.com/huawei

10.1.2.7. References

Huawei Certified HCDA – OWS Developer Training Materials
Huawei OWS Secondary Development Guide

10.1.2.8. Recommended Training Program

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