HCIA-Datacom

Huawei Certified ICT Associate-Datacom
Training and certificating engineers with basic datacom knowledge and skills

Overview

Passing the HCIA-Datacom V1.0 certification will indicate that you are capable of planning, design,
deployment, O&M, and optimization of small- and medium-sized campus networks.

Objectives

After completing the training, you will be able to:

- Understand the definition of data communication and the capability model of data
- communication engineers.
- Understand the network reference model and the entire data communication process.
- Be familiar with the VRP system and be able to perform basic operations.
- Understand IPv4 address protocol and related concepts
- Understand the forwarding principles of Layer 3 devices such as routers and Layer 3
- switches.
- Understand the concept of routing and use static route or OSPF to build a Layer 3
- network.
- Understand basic Ethernet concepts and describe the functions and working principles of
- Layer 2 switching devices.
- Be familiar with common Ethernet protocols, such as VLAN, Spanning Tree Protocol , link
- aggregation and stacking.
- Configure ACLs and AAA to provide basic security solutions for the network.
- Be familiar with the NAT protocol and master the NAT configuration in different scenarios.
- Master the configuration of common services on enterprise networks, such as DHCP, FTP
- and Telnet.
- Understand basic WLAN concepts and complete basic configurations of small or medium-
- sized WLAN networks.
- Understand basic WAN concepts and WAN solutions such as MPLS and SR.
- Have general knowledge of basic concepts of enterprise network management.

- Be familiar with traditional network management and SDN-based network management
- solutions.
- Have a good command of IPv6 protocols and be able to build small-scale IPv6 networks.
- Have a good command of the campus network construction process. Be able to
- independently construct small-sized campus networks.
- Understand the basic concepts of SDN and programming automation and master the
- basics of Python.

Training Content

1. Data Communication and Network Basics
1.1 Data Communication Network Basics
      Basic Concepts of Data Communication
      Data Transfer Process
      Network Devices and Basic Functions
      Network Type and Topology Type
      Network Engineering
      Network Engineers
1.2 Network Reference Model
      What is Data and Data Transfer
      Common Standard Protocols
      Layered Model Concept
      Application Layer and Related Protocols
      Transport Layer and Related Protocols
      Network Layer and Related Protocols
      Data link Layer and Related Protocols
      Physical Layer and Related Protocols
      Data Transfer, Encapsulation and Decapsulation
1.3 Huawei VRP Basics
      Common Network Devices
      VRP Basics
      CLI Command Views
      Basic Commands and Function Keys of the CLI
2. Constructing an Interconnected IP Network
2.1 Network Layer Protocol and IP Addressing
      Network Layer Protocol
      Concept, Classification, and Special IP Addresses of IPv4
      IP Network and IP Subnet Calculation
      IP Network Address Planning

2.2 IP Routing Basics

    Basic Working Principles of Routers

    Routing Table Concepts

    Routing and Forwarding Features

    Static Route Configuration

2.3 OSPF Basics

    Basic Features of OSPF

    OSPF Application Scenarios

    Working Principle of OSPF

    Basic OSPF configurations

3. Constructing an Ethernet Switching Network

3.1 Ethernet Switching Basics

    Basic Concepts of Ethernet

    Concept of MAC Address

    Working Process and Principles of Layer 2 Switches

    Composition and Formation of a MAC Address Table

3.2 VLAN Principles and Configuration

    Background of VLAN

    Basic Concepts and Principles of VLAN

    VLAN Data Communication Process on a Layer 2 Network

    Basic VLAN Configuration

3.3 Spanning Tree Protocol

    Background of STP

    Basic Concepts and Working Principles of STP

    Basic Concepts of RSTP and Improvements Compared with STP

    Basic STP Configuration

    Other Layer 2 Loop Elimination Technologies

3.4 Ethernet Link Aggregation and Switch Stacking

    Basic Concepts of Link Aggregation

    Working Principles of Manual Link Aggregation

    Working Principles and Features of Link Aggregation in LACP Mode

    Basic Concepts of iStack and CSS

3.5 Implements Communication Between VLANs.

    Working Principles of Sub-interfaces

    Working Mechanism of Layer 3 Switches

    Sub-interface Configuration

    VLANIF Configuration

4. Network Security and Network Access Basics

4.1 ACL Principles and Configuration

    Basic Principles and Functions of ACLs

    Basic Structure and Matching Order of ACL Rules

    Usage of Wildcard mask

    Basic ACL Configuration

4.2 AAA Principles and Configuration

    Basic Principles and Application Scenarios of AAA

    Basic Configuration of the Local AAA

Programming Language

Python Coding Specifications

Implement Basic Automatic O&M Using Python telnetlib.

11. Typical Campus Network Architectures and Practices

11.1 Typical Networking Architecture and Cases

Campus Network Architecture

Campus Network Lifecycle

Campus Network Construction Cases

Campus Network Construction Practice

HCIP-Datacom-Advanced Routing & Switching Technology

Huawei Certified ICT Professional-Datacom-Advanced Routing & Switching Technology Training and certificating senior engineers who possess advanced routing and switching Knowledge and advanced skills in the datacom field.

Overview

Passing HCIP-Datacom-Advanced Routing & Switching Technology V1.0 certificate indicates that you are competent for the position of network engineer in a medium-or large-sized enterprise, be capable of planning and designing, deploying and maintaining, and locating faults on a mediumor large-sized enterprise network by using Huawei Datacom devices, and design solutions with high security, availability, and reliability for network applications.

Objectives

After completing the HCIP-Datacom-Core Technology training, you will be able to:
(1)Understand the entire process of forwarding data packets by network devices.
(2)Understand the working principles and configurations of OSPF, IS-IS, and BGP.
(3)Deploy route control and traffic path control.
(4)Understand the working principles of RSTP/MSTP.
(5)Understand the working principles of stacking technology.
(6)Understand the working principle of multicast and set up a multicast network.
(7)Configure ICMPv6, NDP, and IPv6 addresses.
(8)Master Huawei firewall technologies.
(9)Configure basic security features for network devices.
(10)Master the basic configurations for network reliability.
(11)Describe common network management protocols.
(12)Understand Huawei enterprise datacom solutions.

After completing the HCIP-Datacom-Advanced Routing & Switching Technology training, you will be able to:
(1)Describe OSPF and IS-IS fast convergence technologies.
(2)Configure OSPF and IS-IS equal-cost routes.
(3)Describe the application scenarios of OSPF forwarding addresses.
(4)Using regular expressions in AS_Path filter and community filter configurations.
(5)Configure BGP ORF and peer group functions.
(6)Analyze the differences between OSPFv3 and OSPFv2.
(7)Describe the IPv6 extensions of IS-IS.
(8)Describe the IPv6 extensions of BGP.
(9)Describe the working principle of VLAN aggregation.
(10)Describe the application scenarios of MUX VLAN.
(11)Describe the QinQ implementation mode.
(12)Describe the types and configurations of port isolation.

(13)Describe the technical principles of port security.

(14)Implements MAC address flapping detection.

(15)Expound the switch traffic suppression and storm control functions.

(16)Describe the application scenarios of DHCP snooping.

(17)Describe the working principle of IP Source Guard.

(18)Describe the working principle of MPLS.

(19)Describe the basic concepts and working mechanism of LDP.

(20)Describe the basic concepts of MPLS VPN.

(21)Describe route transmission and label distribution of MPLS VPN.

(22)Describe the MPLS VPN data forwarding process.

(23)MPLS VPN Deployment (Intranet Solution)

(24)MPLS VPN Deployment (Hub&Spoke Solution).

(25)Describe the extended functions and features of OSPF for MPLS VPN.

(26)Describe routine maintenance items.

(27)Describe the functions and features of Information Center.

(28)Using Common Maintenance Tools

(29)Describe troubleshooting methods.

(30)Analyze the fault that the neighbor relationship of the routing protocol cannot be established.

(31)Write the troubleshooting guide.

(32)Describe the operation procedure and specifications of the migration.

(33)Describe common migration scenarios.

Training Content

HCIP-Datacom-Core Technology Training Content (10 Working days)

1. IP Routing Basics

Introduction to Network Devices: Hardware modules of modular switches, Three planes of network devices, Packet processing on network devices.

IP Routing Basics: RIB and FIB, Route import scenario.

2. OSPF Core Knowledge

OSPF Basics: Introduction to dynamic routing protocols, Basic OSPF concepts, Process of establishing an OSPF neighbor relationship, Basic OSPF configuration

OSPF Route Calculation: Intra-area route calculation, Inter-area route calculation, External route calculation

OSPF Special Area and Other Features: Stub area and totally stub area, NSSA area and totally NSSA area, Inter-area route summarization and external route summarization, OSPF Features

3. IS-IS Core Knowledge

IS-IS Principles and Configuration: Basic concepts of IS-IS, IS-IS working principle, Basic IS-IS configuration

4. BGP Core Knowledge

BGP Basics: BGP overview, Basic concepts of BGP, Basic BGP configuration

BGP Path Attributes and RRs

BGP route selection

BGP EVPN Basics: MP-BGP, EVPN overview, Common EVPN routes, Typical EVPN application scenarios

5. Routing and Traffic Control

Routing Policy and Route Control: Route matching tool, Routing policy tool, Route control cases

Traffic Filtering and Forwarding Path Control: Policy-based routing, MQC, Traffic filtering

6. Switching Core Knowledge

RSTP Principles and Configuration: RSTP overview, Improvements of RSTP over STP, RSTP working process, Basic RSTP configurations

MSTP Principles and Configuration: MSTP overview, Basic concepts of MSTP, Working principles of MSTP, Basic MSTP configuration

Stack and CSS: Overview of Stack and CSS technologies, Stacking principles, CSS principles, Basic configuration

7. Multicast Basics

IP Multicast Basics: Basic concepts of IP multicast, Multicast data forwarding principle

IGMP Principles and Configuration: IGMP working principle, Introduction to the IGMP feature

PIM Principles and Configuration: PIM basics, PIM-DM, PM-SM

8. IPv6 Core Knowledge

IPv6 Overview: IPv6 overview, Introduction to IPv6 addresses

ICMPv6 and NDP: ICMPv6 overview, NDP overview, Router discovery, Duplicate address detection, Redirection

IPv6 address configuration: IPv6 address configuration mode, Stateless IPv6 address autoconfiguration, DHCPv6, Implementation of IPv6 address autoconfiguration

9. Network Security Basics

Huawei Firewall Technology: Firewall overview, Basic concepts of firewalls, Basic firewall configuration

Network Device Security Features: Security hardening policies for common devices, Network device security hardening deployment example

VPN Technology Overview: VPN technology overview, Common VPN technologies

Basic Concepts and Applications of VRF

10. Network Reliability

BFD Principles and Configuration: BFD Overview, BFD working principle, BFD application scenarios, Basic BFD configurations

VRRP Principles and Configuration:VRRP overview, VRRP working principles, Typical VRRP application, Basic VRRP configuration

11. Network Service and Management

DHCP Principles and Configuration: DHCP background, DHCP working principle and configuration, DHCP Relay working principle and configuration

Introduction to Network Management Protocols: Development of network management, Functional features of network management, Network management protocols, Application scenarios of network management

12. Large-scale WLAN Architecture

Large-Scale WLAN Networking and Deployment: Overview of large-scale WLAN networking, VLAN pool, DHCP technology, Roaming technology, High reliability technology, Network Admission Control technology

13. Network Solution

Enterprise Datacom Solution Overview: Campus, Data center , SDN-WAN, SD-WAN

HCIP-Datacom-Advanced Routing & Switching Technology Training Content(5 Working days)

1. Advanced IGP Features

Advanced IGP Features: OSPF fast convergence, OSPF Route Control, Other OSPF Features, Advanced IS-IS Features

2. Advanced BGP Features

Advanced BGP Features: BGP route control, Introduction to BGP Features, Networking of BGP RRs

3. IPv6 Routing

IPv6 Routing: IPv6 static route, OSPFv3 Principles and Configuration, IS-IS (IPv6) Principles and Configuration, BGP4+ Principles and Configuration

4. Advanced Ethernet Technologies

Advanced VLAN Technology: Super-VLAN, MUX-VLAN, QinQ

Ethernet Switching Security: Port Isolation , MAC Table Security, Port security , MAC Address Flapping Prevention and Detection , MACsec , Switch traffic control , DHCP Snooping , IP Source Guard

5. MPLS Technology

MPLS Principles and Configuration: MPLS Overview, MPLS Forwarding, Static LSP

MPLS LDP Principles and Configuration: Basic Concepts of LDP, Working Principle of LDP, Basic LDP Configurations

MPLS VPN Principles and Configuration: MPLS VPN Overview, MPLS VPN route exchange, MPLS VPN packet forwarding, MPLS VPN Configuration and Implementation

MPLS VPN Deployment and Application: MPLS VPN Application and Networking Overview, Typical Application Scenarios and Deployment of MPLS VPN, OSPF VPN expansion

6. Network O&M

Network O&M: Routine Maintenance, Information collection tool

7. Troubleshooting

Troubleshooting: Structured troubleshooting process, Core Ideas and Methods of Network Troubleshooting, Troubleshooting Common Network Faults

8. Network Migration

Network Migration: Basic Concepts of Migration, Migration Process

HCIE-Datacom

Huawei Certified ICT Expert-Datacom
Training and certificating experts with professional knowledge and skills of multi-scenario convergence solutions in the datacom network field.

Overview

Passing the HCIE-Datacom certification will indicate that you have a solid theoretical knowledge omulti-scenario convergence solutions for enterprise networks, and be able to use Huawei Datacom products and solutions to plan, deploy, maintain, and optimize enterprise campus networks, WAN interconnection, and bearer WAN. You will be competent for the expert positions of full-scenario enterprise networks (including account managers, project managers, pre-sales experts, post-sales experts, network architects, etc.

Objectives

On completion of this program, the participants will be able to:
 ➢ Describe OSPF and IS-IS fast convergence technologies.
 ➢ Configure OSPF and IS-IS equal-cost routes.
 ➢ Describe OSPF and IS-IS default routes advertisement.
 ➢ Describe the application scenarios of OSPF and IS-IS multi-process.
 ➢ Describe the GR and NSR principles of OSPF and IS-IS.
 ➢ Describe the application scenarios of OSPF forwarding addresses.
 ➢ Describe the working principles of IS-IS LSP fragment extension.
 ➢ Use AS_Path Filter and Community Filter to implement BGP route control.
 ➢ Apply the ORF function and peer group function of BGP.
 ➢ Understand basic configuration for implementing BGP security.
 ➢ Describe the concept and usage of the 4-byte AS number.
 ➢ Describe the networking of BGP RRs.
 ➢ Clarify the types and configurations of port isolation.
 ➢ Clarify the technical principles of port security.
 ➢ Detect MAC address flapping.
 ➢ Clarify switch traffic suppression and storm control functions.
 ➢ Describe application scenarios of DHCP snooping.
 ➢ Clarify how IP Source Guard works.
 ➢ Describe the working scenarios of dual-system hot backup.
 ➢ Describe the basic concepts and terms of MPLS.
 ➢ Describe the working principles of MPLS.
 ➢ Configure static LSPs.
 ➢ Describe the MPLS forwarding process.

- ➢ Describe the basic concepts and working mechanism of LDP.
- ➢ Describe the MPLS label distribution control mode, advertisement mode, and retention mode.
- ➢ Understand Basic LDP configuration.
- ➢ Describe the MPLS VPN model.
- ➢ Describe the basic concepts of MPLS VPN.
- ➢ Describe MPLS VPN routing and label distribution.
- ➢ Describe the MPLS VPN data forwarding process.
- ➢ Perform basic MPLS VPN configurations.
- ➢ Describe the principles of the three cross-domain solutions.
- ➢ Understand basic configuration of three cross-domain solutions.
- ➢ Describe the application scenarios of the three cross-domain solutions.
- ➢ Describe the development histories of EVPN.
- ➢ Describe how EVPN solves VPLS problems.
- ➢ Describe the common routing types and working principles of EVPN.
- ➢ Describe the principles of inter-AS EVPN.
- ➢ Describe typical application scenarios of EVPN.
- ➢ Configure IPv6 static routes.
- ➢ Analyze the differences between OSPFv3 and OSPFv2.
- ➢ Understand basic OSPFv3 configuration.
- ➢ Describes IS-IS extensions to IPv6.
- ➢ Understand basic IS-IS (IPv6) configuration.

Training Content

I. Advanced Routing and Switching Technology
- a. Advanced IGP Features
- b. Advanced BGP Features
- c. Network Security Technologies
- d. MPLS Fundamentals and Configuration
- e. MPLS LDP Fundamentals and Configuration
- f. MPLS VPN Fundamentals and Configuration
- g. MPLS VPN Deployment and Application
- h. Inter-AS MPLS L3VPN
- i. EVPN Fundamentals and Configuration
- j. IPv6 Routing
- k. IPv6 Transition Technologies
- l. QoS Fundamentals
- m. Network O&M

n.   Network Troubleshooting

o.   Network Migration

II.   Campus Network Planning and Deployment

        a.   Enterprise Network Introduction

        b.   Enterprise Campus Network Overview

        c.   VXLAN and Campus Network Virtualization

        d.   Network Admission Control

        e.   Free Mobility

        f.   Large- and Medium-Sized Virtualized Campus Network Design

        g.   Virtualized Campus Network Deployment Guide

        h.   Small- and Medium-Sized Cloud-Managed Campus Network Design

        i.   CampusInsight Intelligent O&M

III.   WAN Interconnection Network Planning and Deployment

        a.   WAN Interconnection Solution and Technologies Overview

        b.   Key Technologies of WAN Interconnection

        c.   SD-WAN Solution Planning and Design

IV.   Bearer WAN Planning and Deployment

        a.   Enterprise Bearer WAN Solution

        b.   Enterprise Bearer WAN Architecture and Key Technologies

        c.   Segment Routing

        d.   SRv6 Fundamentals and Configuration

        e.   Enterprise Bearer WAN Design

        f.   IPE Key Technologies and Evolution Trends

V.   Network Automation

        a.   Network Automation Overview

        b.   SSH Fundamentals and Practice

        c.   NETCONF YANG Fundamentals and Practice

        d.   Telemetry Fundamentals and Practice

        e.   OPS Fundamentals and Practice

        f.   RESTful Fundamentals and Practice

        g.   iMaster NCE-Campus Open APIs Introduction

        h.   iMaster NCE Service Openness And Programmability