

NETWORKING (WAN & LAN)

WAN

Module 1: Network Fundamentals

- Network and its Types
- Transmission Modes
- Basics of IP addresses
- Networking Devices (Hub, Switch, Router, Repeater, Firewall)
- Ethernet LAN Cabling
- ISO/OSI Reference Model and TCP/IP Model.
- Describe the impact of infrastructure components in an enterprise network.
- (Firewalls, Access points, Wireless controllers)
- Describe the effects of cloud resources on enterprise network architecture
- Basic virtual network infrastructure.
- Network topologies. (Star, Mesh, Hybrid)
- IPv4 addressing and subnetting.
- VLSM Design & Summarization
- Cisco Router Hardware and basic router Administration
- Cisco Router CLI basic commands
- Protecting router access with passwords
- Accessing Cisco router with SDM
- Cisco router IOS Management
- Router boot sequence
- Backup and restore Cisco IOS
- Backup and restore Configuration files
- Accessing Cisco router over the network (telnet, ssh)

Module 2: Routing Technologies

- Basic Routing concepts.
- Packet forwarding
- Message forwarding
- Router lookup process
- Configuring router for the first time using CONSOLE
- Boot process of Cisco IOS routers
- Basic Router configuration
- Interface (Serial, Ethernet, Gigabit-Ethernet)
- Administrative distance
- Hop Counts
- Wildcard mask

- Static Routing.
- Default Routing
- Dynamic Routing
- DVRP (Distance Vector Routing Protocol)
 - ✓ RIP V1
 - ✓ RIP V2
 - ✓ EIGRP
- LSRP (Link State Routing Protocol)
 - ✓ OSPF
- Path Vector
 - ✓ BGP Exterior
 - ✓ BGP Interior
- Manage Cisco IOS Files
 - ✓ Boot preferences / Cisco IOS image(s)
 - ✓ Licensing
- Differentiate methods of routing and routing protocols
 - ✓ Static vs. Dynamic
 - ✓ Link state vs. Distance Vector
- Verify & troubleshooting routing protocols

Module 3: LAN Switching Technologies

- Switch working
- Identify basic switching concepts
- Types of switching
- Collision / Broadcast Domains
- CAM Table
- Configure and verify initial switch configuration
- Switch operation (ping, telnet and SSH)
- Identify enhanced switching technologies
- RSTP / PVSTP
- Ether channels
- Configure and verify VLANs / Trunking
- DTP / Auto negotiation
- Configure and verify PVSTP operation
- Root bridge election / STP Modes
- Troubleshoot interface and cable issues (collisions, errors, duplex, speed).
- Spanning Tree Protocol
- PVST+ and RPVST+.
- Configure, verify, and troubleshoot VLANs (normal/extended range)
- Inter Vlan Routing.
- Configure, verify, and troubleshoot Interswitch connectivity (Trunk ports).
- Configure, verify and troubleshoot STP related optional features (Portfast and BPDU Guard).
- Configure, verify, and troubleshoot (Layer 2/Layer 3) EtherChannel. (Static,PAGP ,LACP)

Module 4: WAN Technologies

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- Wireless Devices (Router, Access Points)
- Introduction to WAN Networks
- WAN encapsulation types (HDLC, PPP)
- WAN Connectivity using serial dedicated networks
- Introduction to frame-relay technologies
- Implementing frame-relay wan network
- Introduction to DSL technologies (ADSL, SDSL)
- Introduction to VPN
- Configuring IPSEC site-site VPN using SDM
- Cisco Router Hardware & basic router Administration
- Cisco Router CLI basic commands
- Protecting router access with passwords
- Breaking Router Passwords
- Accessing Cisco router with SDM
- Cisco router IOS Management
- Router boot sequence
- Backup & restore Cisco IOS
- Backup & restore Configuration files
- Accessing Cisco router over the network (telnet, ssh)
- Cisco Discovery Protocol
- Router connectivity & troubleshooting

Module 5: LAN & WAN Advance

- Configure and verify DHCP (IOS Router)
- Configuring router interfaces to use DHCP
- DHCP options
- Excluded addresses, Lease time
- ACL (Types, Features & Applications of ACLs)
- Standard, Extended, Named & Numbered
- Log option
- Configure and verify ACL.
- Identify the basic operation of NAT
- Purpose, Pool, Static, 1 to 1 & Overloading
- Source addressing & One-way NAT
- Configure and verify NAT
- Configure and verify NTP as a client
- Recognize High availability (FHRP, VRRP, HSRP & GLBP)
- Configure and verify Sys log
- Describe SNMP v2 & v3

Module 6: Infrastructure Services

- Describe DNS lookup operation.
- Configure and verify DHCP on a router.

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- Configure, verify, and troubleshoot basic HSRP.
- Configure, verify, and troubleshoot inside source NAT.

Module 7: Infrastructure Security

- Configure, verify, and troubleshoot port security.
- Describe common access layer threat mitigation techniques.
- Configure, verify, and troubleshoot IPv4 and IPv6 access list for traffic filtering.
- Configure, verify, and troubleshoot basic device hardening.

Module 8: Infrastructure Management

- Configure and verify device-monitoring protocols. (SNMP, SYSLOG)
- Configure and verify device management.
- Configure and verify initial device configuration.
- Perform device maintenance.
- Password recovery and configuration register.
- Use Cisco IOS tools to troubleshoot and resolve problems.
- Describe network programmability in enterprise network architecture.

Module 9: Working on GNS3

- Configure Router by real IOS image
- Interior BGP
- IP Addressing of Computers by CLI
- Using 'Putty' to access Router

Module 10: Troubleshooting

- Troubleshoot and Resolve VLAN problems
- Identify that VLANs are configured
- port membership corrects
- IP address configured
- Troubleshoot and Resolve trunking proble
- correct trunk states
- correct encapsulation configured
- correct vlans allowed
- Troubleshoot and Resolve STP
- Root switch
- Priority
- Mode is correct
- Port states
- Troubleshoot and Resolve routing issues
- Routing is enabled
- Routing table is correct
- Correct path selection

- Troubleshoot and Resolve OSPF problems
- Neighbour advances
- Hello and Dead timers
- OSPF area, Interface MTU
- Network types, Neighbour states
- OSPF topology database
- Troubleshoot and Resolve inter VLAN
- Connectivity
- Encapsulation
- Subnet, Native VLAN
- Port mode trunk status

LAN

Module 11: Basics of Windows Server

- Networking concepts, History of Server OS
- Introduction to Windows Server 2012 & 2016
- Features of Windows Server 2016
- Installation of Windows Server 2012, 2016 (Split Method)
- Installation of Standard and Data-Centre Server
- Installation of GUI and CLI Server
- Configure MBR and GPT disks
- Install servers Plan for a server installation
- Plan for server roles
- Plan for a server upgrade; install Server Core
- Migrate roles from previous versions of Windows Server

Module 12: Configure server roles and features

- Configure file and share access
- Create and configure shares; configure share permissions; configure offline files
- configure NTFS permissions; configure access-based enumeration (ABE)
- configure Volume Shadow Copy Service (VSS); configure NTFS quotas
- Configure print and document services
- Configure the Easy Print print driver; configure Enterprise Print Management;
- configure drivers; configure printer pooling; configure print priorities; configure printer permissions
- Configure servers for remote management
- Configure WinRM; configure down-level server management; configure servers for day-to-day management tasks; configure multi-server management; configure Server Core;configure Windows Firewall

Module 13: Install and administer Active Directory

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- Installing domain controller
- Add or remove a domain controller from a domain
- Upgrade a domain controller; install Active Directory Domain Services (AD DS) on a Server Core installation; install a domain controller from Install from Media (IFM); resolve DNS SRV record registration issues; configure a global catalog server
- Create and manage Active Directory users and computers Automate the creation of Active Directory accounts; create, copy, configure, and delete users and computers; configure templates; perform bulk Active Directory operations; configure user rights; offline domain join; manage inactive and disabled accounts
- Create and manage Active Directory groups and organizational units (OUs) Configure group nesting; convert groups including security, distribution, universal, domain local, and domain global; manage group membership using Group Policy enumerate group membership; delegate the creation and management of Active Directory objects; manage default Active Directory containers; create, copy, configure, and delete groups and OUs
- Features of Active Directory
- Installation of Primary Domain Controller (PDC)
- Installation of Additional Domain Controller (ADC)
- Configure service authentication Create and configure Service Accounts; create and configure Group Managed Service Accounts; create and configure Managed Service Accounts; configure Kerberos delegation; manage Service Principal Names (SPNs)
- Configure Domain Controllers Configure Universal Group Membership Caching (UGMC); transfer and seize operations masters; install and configure a read-only domain controller (RODC); configure Domain Controller cloning
- Maintain Active Directory Back up Active Directory and SYSVOL; manage Active Directory offline; optimize an Active Directory database; clean up metadata; configure Active Directory snapshots; perform object- and container-level recovery; perform Active Directory restore
- Installation of Tree Domain Controller (TDC)
- Installation of Child Domain Controller (CDC)
- AD-Recycle Bin

Module 14: Active Directory Trusts

- Introduction to Trust Relationship
- Categories, Directions and Types of Trusts
- Domain Level and Functional/Forest Level
- One Way/Two-way Trust
- Authentication Protocols
- Configuring Forest Trusts between 2016 Forests

Module 15: Group Policy

- Create Group Policy objects (GPOs) Configure a Central Store; manage starter GPOs; configure GPO links; configure multiple local group policies; configure security filtering
- Configure security policies Configure User Rights Assignment; configure Security Options settings; configure Security templates; configure Audit Policy; configure Local Users and Groups; configure User Account Control (UAC)

- Configure application restriction policies Configure rule enforcement; configure Applocker rules; configure Software Restriction Policies
- Configure Windows Firewall Configure rules for multiple profiles using Group Policy; configure connection security rules; configure Windows Firewall to allow or deny applications, scopes, ports, and users; configure authenticated firewall exceptions; import and export settings

Module 16: Configure file and print services

- Configure Distributed File System (DFS) Install and configure DFS namespaces; configure DFS Replication Targets; configure Replication Scheduling; configure Remote Differential Compression settings; configure staging; configure fault tolerance
- Configure File Server Resource Manager (FSRM) Install the FSRM role; configure quotas; configure file screens; configure reports
- Configure file and disk encryption Configure Bitlocker encryption; configure the Network Unlock feature; configure Bitlocker policies; configure the EFS recovery agent; manage EFS and Bitlockercertificates including backup and restore
- Configure advanced audit policies Implement auditing using Group Policy and AuditPol.exe; create expression-based audit policies; create removable device audit policies

Module 17: Hyper-V

- Create and configure virtual machine settings Configure dynamic memory; configure smart paging; configure Resource Metering; configure guest integration services
- Create and configure virtual machine storage Create VHDs and VHDX; configure differencing drives; modify VHDs; configure pass-through disks; manage snapshots; implement a virtual Fibre Channel adapter
- Create and configure virtual networks Implement Hyper-V Network Virtualization; configure Hyper-V virtual switches; optimize network performance; configure MAC addresses; configure network isolation; configure synthetic and legacy virtual network adapters

Module 18: Deploy and configure core network services

- Configure IPv4 and IPv6 addressing Configure IP address options; configure subnetting; configure supernetting; configure interoperability between IPv4 and IPv6; configure ISATAP; configure Teredo
- Deploy and configure Dynamic Host Configuration Protocol (DHCP) service Create and configure scopes; configure a DHCP reservation; configure DHCP options;configure client and server for PXE boot; configure DHCP relay agent; authorize DHCP server
- Deploy and configure DNS service Configure Active Directory integration of primary zones; configure forwarders; configure Root Hints; manage DNS cache; create A and PTR resource records

Module 19: Deploy, manage, and maintain servers

- Deploy and manage server images Install the Windows Deployment Services (WDS) role; configure and manage boot, install, and discover images; update images with patches, hotfixes, and drivers; install features for offline images
- Implement patch management
- Install and configure the Windows Server Update Services (WSUS) role; configure group policies for updates; configure client-side targeting; configure WSUS synchronization; configure WSUS groups
- Monitor servers
- Configure Data Collector Sets (DCS); configure alerts; monitor real-time performance; monitor virtual machines (VMs); monitor events; configure event subscriptions; configure network monitoring

Module 20: Internet Information Services (IIS)

- IIS Configuration
- Hosting Websites & Virtual Directories
- FTP and HTTP Sites
- Sharing and Permission
- Default Pages
- HTTP Redirection
- Backup and Restoring Sites

Module 21: Terminal Services

- Remote Administration Mode
- User Terminals
- Remote Application

Module 22: Configure network services and access

- Configure DNS zones Configure primary and secondary zones; configure stub zones; configure conditional forwards; configure zone and conditional forward storage in Active Directory; configure zone delegation; configure zone transfer settings; configure notify settings
- Configure DNS records Create and configure DNS Resource Records (RR) including A, AAAA, PTR, SOA, NS, SRV, CNAME, and MX records; configure zone scavenging; configure record options including Time To Live (TTL) and weight; configure round robin; configure secure dynamic updates
- Configure VPN and routing Install and configure the Remote Access role; implement Network Address Translation (NAT); configure VPN settings; configure remote dial-in settings for users; configure routing
- Configure Direct Access Implement server requirements; implement client configuration; configure DNS for Direct Access; configure certificates for Direct Access

LINUX INTRODUCTION

Module 23: Linux Essentials Linux Ideas and History

- An Introduction to Linux and Open Source: what are the central ideas behind the Linux phenomenon and where do they come from?
- Linux Usage Basics
- Browsing the File System
- Users, Groups and Permissions
- Using the bash Shell
- Text Processing Tools
- Investigating and Managing Processes
- Basic System Configuration Tools
- Finding and Processing Files
- Network Clients
- Advanced Topics in Users, Groups and Permissions

Module 24: Linux System Administration

- Administrative Access
- Package Management
- System Services and Security
- System Initialization
- Kernel Monitoring and Configuration
- Network Configuration
- Filesystem Administration
- Additional Storage
- User Administration
- File systems for Group Collaboration
- Centralized User Administration
- Troubleshooting with Rescue Mode

Module 25: Linux Networking and Security Administration

- Course Outline
- System Performance and Security
- System Service Access Controls
- Securing Data
- Network Resource Access Controls
- Organizing Networked Systems
- Network File Sharing Services
- Web Services
- Account Management