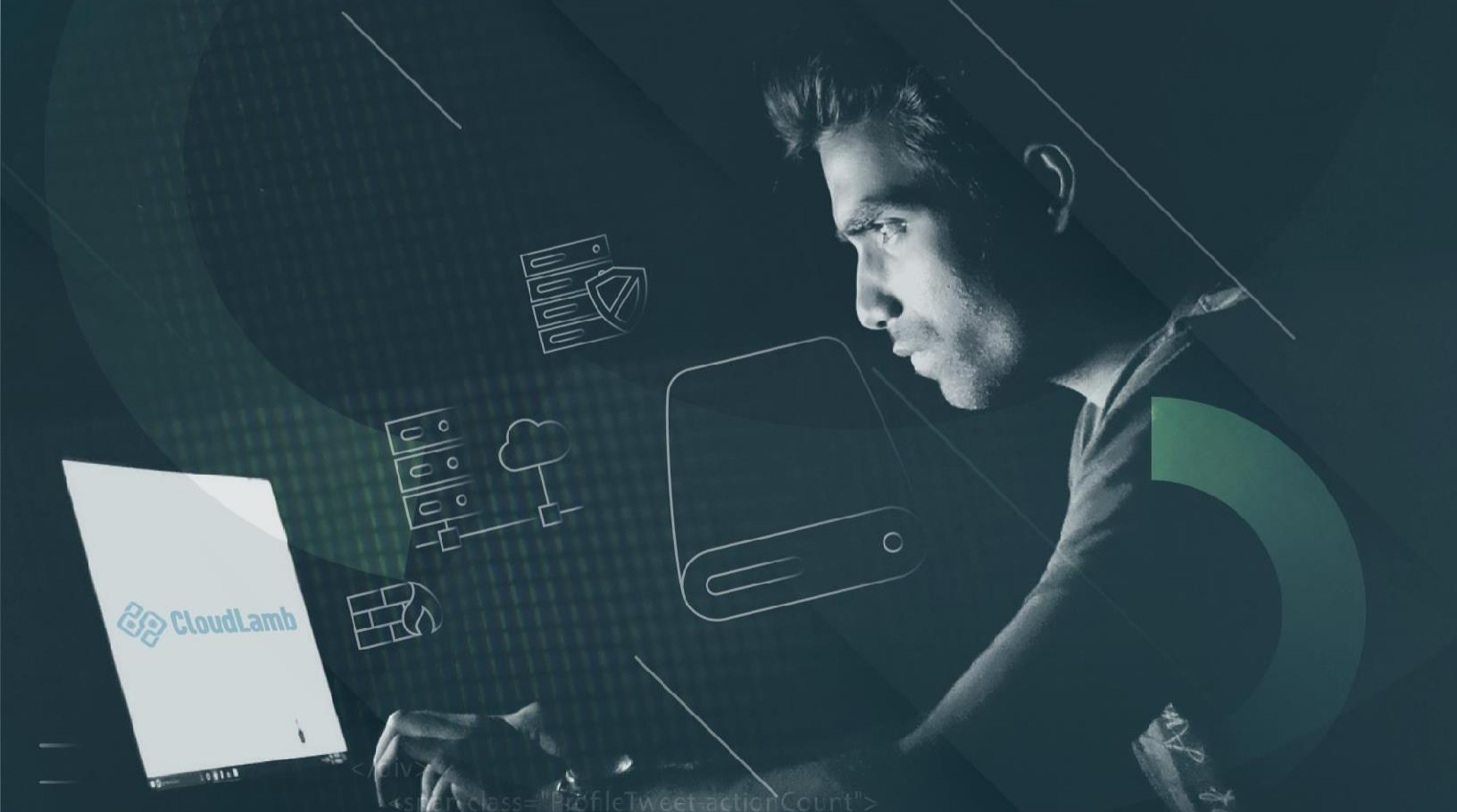
CloudLamb E-Learning

350-401 ENCOR

Implementing and Operating Cisco Enterprise Network Core Technologies (ENCOR)



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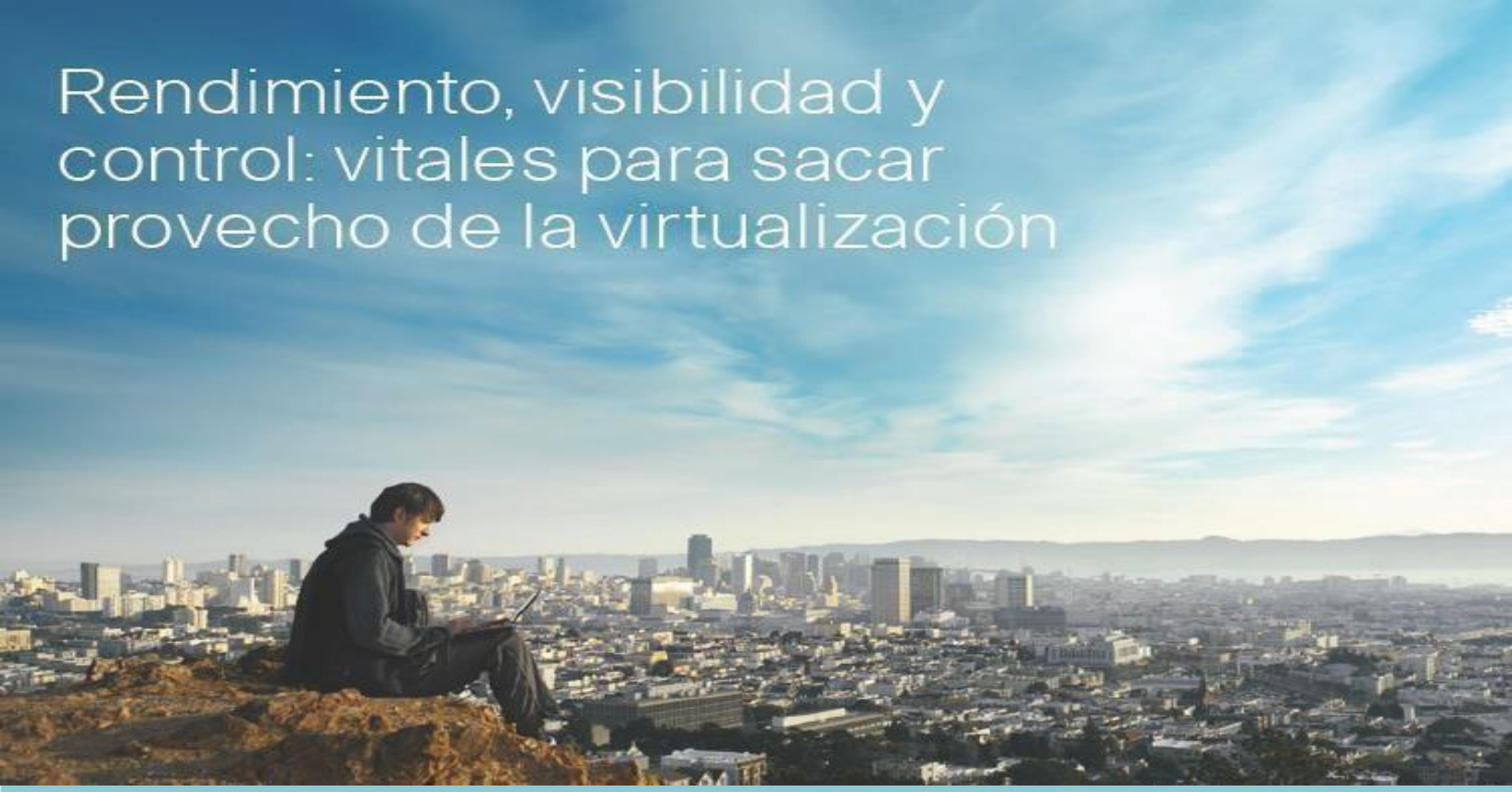

Contenido

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- Enterprise Network Architecture
- Fabric Technologies
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- Advanced STP Tuning
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- VLAN Trunks and EtherChannel Bundles
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- QoS
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- Wireless Signals and Modulation
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- Understanding Wireless Roaming and Location Services
- Authenticating Wireless Clients
- Connectivity
- Virtualization
- Foundational Network Programmability Concepts
- Introduction to Automation Tools

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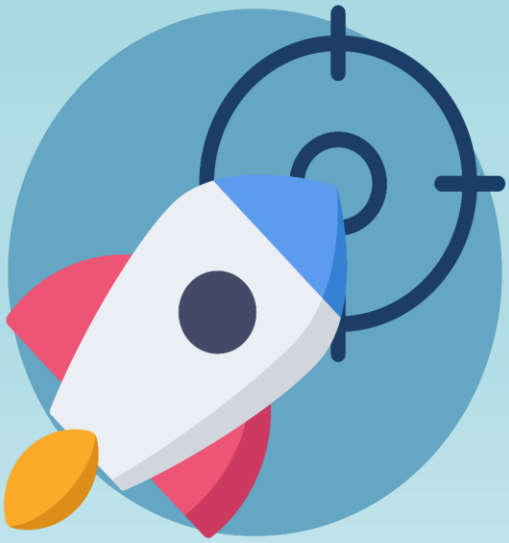
Desglose de temas:

Packet Forwarding

- Layer 2 Forwarding
- Collision Domains
- Virtual LANs
- Access Ports
- Trunk Ports
- Layer 2 Diagnostic Commands
- Layer 3 Forwarding
- Local Network Forwarding
- Packet Routing
- IP Address Assignment
- Verification of IP Addresses
- Forwarding Architectures
- Process Switching
- Cisco Express Forwarding
- Centralized Forwarding
- Distributed Forwarding
- CEF
- Stateful Switchover

Enterprise Network Architecture

- Foundation Topics
- Hierarchical LAN Design Model
- Access Layer
- Distribution Layer
- Core Layer
- Enterprise Network Architecture
- Two-Tier Design (Collapsed Core)
- Three-Tier Design
- Layer 2 Access Layer (STP Based)
- Layer 3 Access Layer (Routed Access)
- Simplified Campus Design
- Software-Defined Access (SD-Access) Design



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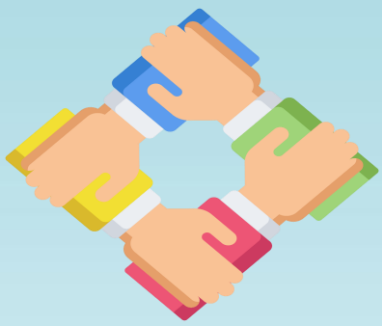
Fabric Technologies

- Software-Defined Access (SD-Access)
- What Is SD-Access?
- SD-Access Architecture
- Physical Layer
- Network Layer
- Underlay Network
- Overlay Network (SD-Access Fabric)
- SD-Access Fabric Roles and Components
- Fabric Control Plane Node
- SD-Access Fabric Concepts
- Controller Layer
- Management Layer
- Cisco DNA Design Workflow
- Cisco DNA Policy Workflow
- Cisco DNA Provision Workflow
- Cisco DNA Assurance Workflow
- Software-Defined WAN (SD-WAN)
- Cisco SD-WAN Architecture
- vManage NMS
- vSmart Controller
- Cisco SD-WAN Routers (vEdge and cEdge)
- vBond Orchestrator
- vAnalytics
- Cisco SD-WAN Cloud OnRamp
- Cloud OnRamp for SaaS
- Cloud OnRamp for IaaS

Network Assurance

- Network Diagnostic Tools
- ping
- traceroute
- Debugging
- Conditional Debugging
- Simple Network Management Protocol (SNMP)
- syslog
- NetFlow and Flexible NetFlow
- Switched Port Analyzer (SPAN) Technologies
- Local SPAN
- Specifying the Source Ports
- Specifying the Destination Ports
- Local SPAN Configuration
- Remote SPAN (RSPAN)
- Encapsulated Remote SPAN (ERSPAN)
- Specifying the Source Ports
- Specifying the Destination
- IP SLA
- Cisco DNA Center Assurance



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Spanning Tree Protocol

- Spanning Tree Protocol Fundamentals
- IEEE 802.1D STP
- 802.1D Port States
- 802.1D Port Types
- STP Key Terminology
- Spanning Tree Path Cost
- Building the STP Topology
- Root Bridge Election
- Locating Root Ports
- Locating Blocked Designated Switch Ports
- Verification of VLANS on Trunk Links
- STP Topology Changes
- Converging with Direct Link Failures
- Indirect Failures
- Rapid Spanning Tree Protocol
- RSTP (802.1W) Port States
- RSTP (802.1W) Port Roles
- RSTP (802.1W) Port Types
- Building the RSTP Topology
- Exam Preparation Tasks

Advanced STP Tuning

- STP Topology Tuning
- Root Bridge Placement
- Modifying STP Root Port and Blocked Switch Port Locations
- Modifying STP Port Priority
- Additional STP Protection Mechanisms
- Root Guard
- STP Portfast
- BPDU Guard
- BPDU Filter
- Problems with Unidirectional Links
- STP Loop Guard
- Unidirectional Link Detection

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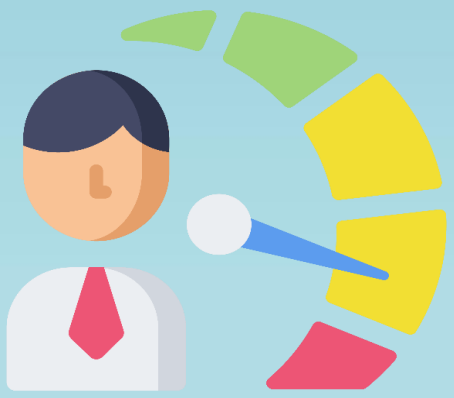
Multiple Spanning Tree Protocol

- Multiple Spanning Tree Protocol
- MST Instances (MSTIs)
- MST Configuration
- MST Verification
- VLAN Assignment to the IST
- Trunk Link Pruning
- MST Region Boundary
- MST Region as the Root Bridge
- MST Region Not a Root Bridge for Any VLAN



VLAN Trunks and EtherChannel Bundles

- VLAN Trunking Protocol
- VTP Communication
- VTP Configuration
- VTP Verification
- Dynamic Trunking Protocol
- EtherChannel Bundle
- Dynamic Link Aggregation Protocols
- PAgP Port Modes
- LACP Port Modes
- EtherChannel Configuration
- Verifying Port-Channel Status
- Viewing EtherChannel Neighbors
- LACP
- PAgP
- Verifying EtherChannel Packets
- Advanced LACP Configuration
- LACP System Priority
- LACP Interface Priority
- Load Balancing Traffic with EtherChannel Bundles

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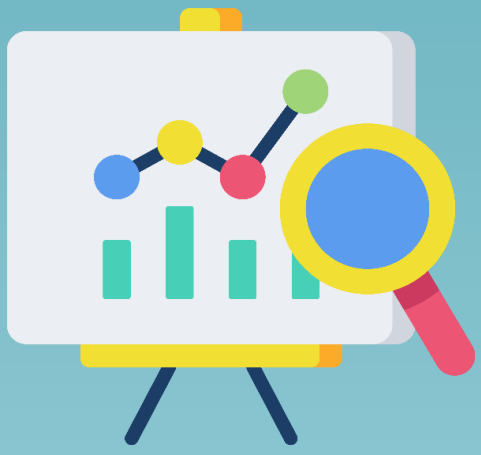

IP Routing Essentials

- Routing Protocol Overview
- Distance Vector Algorithms
- Enhanced Distance Vector Algorithms
- Link-State Algorithms
- Path Vector Algorithm
- Path Selection
- Prefix Length
- Administrative Distance
- Metrics
- Equal Cost Multipathing
- Unequal-Cost Load Balancing
- Static Routing
- Static Route Types
- Directly Attached Static Routes
- Recursive Static Routes
- Fully Specified Static Routes
- Floating Static Routing
- Static Null Routes
- IPv6 Static Routes
- Virtual Routing and Forwarding

EIGRP

- EIGRP Fundamentals
- Autonomous Systems
- EIGRP Terminology
- Topology Table
- EIGRP Neighbors
- Path Metric Calculation
- Wide Metrics
- Metric Backward Compatibility
- Load Balancing
- Failure Detection and Timers
- Convergence
- Route Summarization

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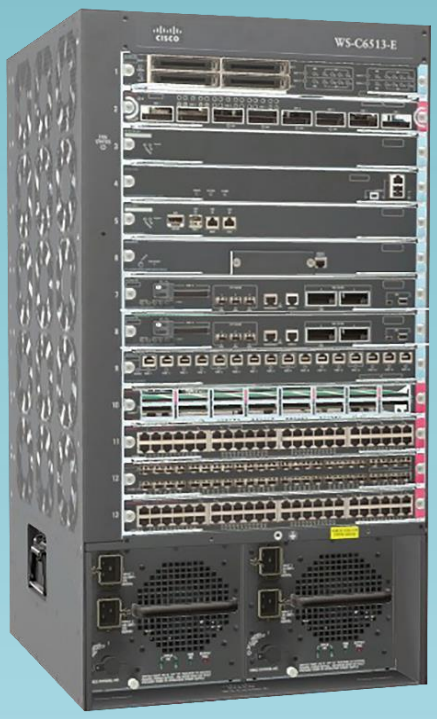

Módulo 1

OSPF

- OSPF Fundamentals
- Inter-Router Communication
- OSPF Hello Packets
- Router ID
- Neighbors
- Designated Router and Backup Designated Router
- OSPF Configuration
- OSPF Network Statement
- Interface-Specific Configuration
- Statically Setting the Router ID
- Passive Interfaces
- Requirements for Neighbor Adjacency
- Sample Topology and Configuration
- Confirmation of Interfaces
- Verification of OSPF Neighbor Adjacencies
- Verification of OSPF Routes
- Default Route Advertisement
- Common OSPF Optimizations
- Link Costs
- Failure Detection
- Hello Timer
- Dead Interval Timer
- Verifying OSPF Timers
- DR Placement
- Designated Router Elections
- DR and BDR Placement
- OSPF Network Types
- Broadcast
- Point-to-Point Networks
- Loopback Networks

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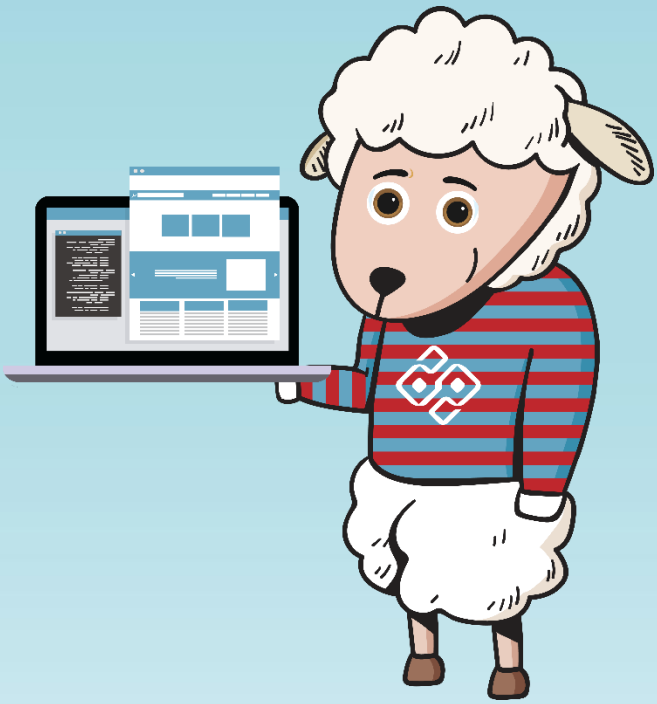
Advanced OSPF

- Areas
- Area ID
- OSPF Route Types
- Link-State Announcements
- LSA Sequences
- LSA Age and Flooding
- LSA Types
- LSA Type 1: Router Link
- LSA Type 2: Network Link
- LSA Type 3: Summary Link
- Discontiguous Networks
- OSPF Path Selection
- Intra-Area Routes
- Interarea Routes
- Equal-Cost Multipathing
- Summarization of Routes
- Summarization Fundamentals
- Interarea Summarization
- Summarization Metrics
- Configuration of Interarea Summarization
- Route Filtering
- Filtering with Summarization
- Area Filtering
- Local OSPF Filtering

OSPFv3

- OSPFv3 Fundamentals
- OSPFv3 Link-State Advertisement
- OSPFv3 Communication
- OSPFv3 Configuration
- OSPFv3 Verification
- Passive Interface
- Summarization
- Network Type
- IPv4 Support in OSPFv3



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BGP

- BGP Fundamentals
- Autonomous System Numbers
- Path Attributes
- Loop Prevention
- Address Families
- Inter-Router Communication
- BGP Session Types
- BGP Messages
- BGP Neighbor States
- Basic BGP Configuration
- Verification of BGP Sessions
- Prefix Advertisement
- Receiving and Viewing Routes
- BGP Route Advertisements from Indirect Sources
- Route Summarization
- Aggregate Address
- Atomic Aggregate
- Route Aggregation with AS_SET
- Multiprotocol BGP for IPv6
- IPv6 Configuration
- IPv6 Summarization

Advanced BGP

- BGP Multihoming
- Resiliency in Service Providers
- Internet Transit Routing
- Branch Transit Routing
- Conditional Matching
- Access Control Lists
- Standard ACLs
- Extended ACLs
- Prefix Matching
- Prefix Lists
- IPv6 Prefix Lists
- Regular Expressions (regex)
- Route Maps
- Conditional Matching
- Multiple Conditional Match Conditions
- Complex Matching
- Optional Actions
- The continue Keyword
- BGP Route Filtering and Manipulation
- Distribute List Filtering
- Prefix List Filtering
- AS Path ACL Filtering

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Advanced BGP

- Route Maps
- Clearing BGP Connections
- BGP Communities
- Well-Known Communities
- Enabling BGP Community Support
- Conditionally Matching BGP Communities
- Setting Private BGP Communities
- Understanding BGP Path Selection
- Routing Path Selection Using Longest Match
- BGP Best Path Overview
- Weight
- Local Preference
- Locally Originated via Network or Aggregate Advertisement
- Accumulated Interior Gateway Protocol
- Shortest AS Path
- Origin Type
- Multi-Exit Discriminator
- eBGP over iBGP
- Lowest IGP Metric
- Prefer the Oldest eBGP Path
- Router ID
- Minimum Cluster List Length
- Lowest Neighbor Address

Multicast

- Multicast Fundamentals
- Multicast Addressing
- Layer 2 Multicast Addresses
- Internet Group Management Protocol
- IGMPv2
- IGMPv3
- IGMP Snooping
- Protocol Independent Multicast
- PIM Distribution Trees
- Source Trees
- Shared Trees
- PIM Terminology
- PIM Dense Mode
- PIM Sparse Mode
- PIM Shared and Source Path Trees
- Shared Tree Join
- Source Registration
- PIM SPT Switchover
- Designated Routers
- Reverse Path Forwarding
- PIM Forwarder
- Rendezvous Points
- Static RP
- Auto-RP
- Candidate RPs
- RP Mapping Agents
- PIM Bootstrap Router
- Candidate RPs

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Secure Network Access Control

- Network Security Design for Threat Defense
- Next-Generation Endpoint Security
- Network Access Control (NAC)
- 802.1x
- EAP Methods
- EAP Chaining
- MAC Authentication Bypass (MAB)
- Web Authentication (WebAuth)
- Local Web Authentication
- Enhanced Flexible Authentication
- Cisco TrustSec
- Ingress Classification
- Propagation
- Egress Enforcement
- MACsec
- Downlink MACsec
- Uplink MACsec

Network Device Access Control and Infrastructure Security

- Access Control Lists (ACLs)
- Numbered Standard ACLs
- Numbered Extended ACLs
- Named ACLs
- Port ACLs (PACLs) and VLAN ACLs (VACLs)
- PACLs
- VACLs
- PACL, VACL, and RACL Interaction
- Terminal Lines and Password Protection
- Password Types
- Password Encryption
- Username and Password Authentication
- Configuring Line Local Password Authentication
- Verifying Line Local Password Authentication
- Configuring Line Local Username and Password Authentication
- Verifying Line Local Username and Password Authentication
- Privilege Levels and Role-Based Access

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Network Device Access Control and Infrastructure Security

- Control (RBAC)
- Verifying Privilege Levels
- Controlling Access to vty Lines with ACLs
- Verifying Access to vty Lines with ACLs
- Controlling Access to vty Lines Using Transport Input
- Verifying Access to vty Lines Using Transport Input
- Enabling SSH vty Access
- Auxiliary Port
- EXEC Timeout
- Absolute Timeout
- Authentication, Authorization, and Accounting (AAA)
- TACACS+
- RADIUS
- Configuring AAA for Network Device Access Control
- Verifying AAA Configuration
- Zone-Based Firewall (ZBFW)
- The Self Zone
- The Default Zone
- ZBFW Configuration
- Verifying ZBFW
- Control Plane Policing (CoPP)
- Configuring ACLs for CoPP
- Configuring Class Maps for CoPP
- Configuring the Policy Map for CoPP
- Applying the CoPP Policy Map
- Verifying the CoPP Policy







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Wireless Infrastructure

- Wireless LAN Topologies
- Autonomous Topology
- Lightweight AP Topologies
- Pairing Lightweight APs and WLCs
- AP States
- Discovering a WLC
- Selecting a WLC
- Maintaining WLC Availability
- Cisco AP Modes
- Leveraging Antennas for Wireless Coverage
- Radiation Patterns
- Gain
- Beamwidth
- Polarization
- Omnidirectional Antennas
- Directional Antennas

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Wireless Signals and Modulation

- Understanding Basic Wireless Theory
- Understanding Frequency
- Understanding Phase
- Measuring Wavelength
- Understanding RF Power and dB
- Important dB Laws to Remember
- Comparing Power Against a Reference: dBm
- Measuring Power Changes Along the Signal Path
- Free Space Path Loss
- Understanding Power Levels at the Receiver
- Carrying Data Over an RF Signal
- Maintaining AP–Client Compatibility
- Using Multiple Radios to Scale Performance
- Spatial Multiplexing
- Transmit Beamforming
- Maximal-Ratio Combining
- Maximizing the AP–Client Throughput

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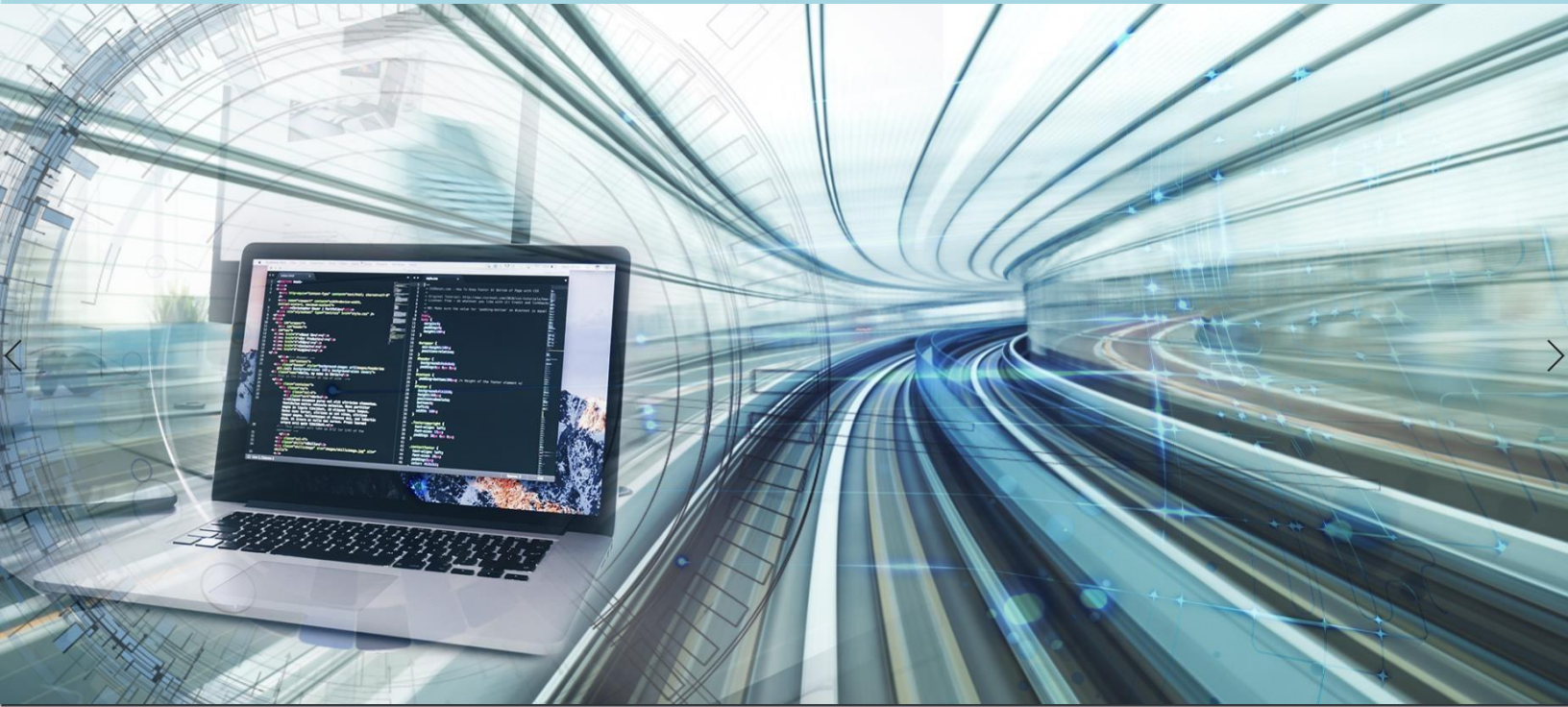
Authenticating Wireless Clients

- Open Authentication
- Authenticating with Pre-Shared Key
- Authenticating with EAP
- Configuring EAP-Based Authentication with External RADIUS
- Servers
- Configuring EAP-Based Authentication with Local EAP
- Verifying EAP-Based Authentication Configuration
- Authenticating with WebAuth



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QoS

- The Need for QoS
- Lack of Bandwidth
- Latency and Jitter
- Propagation Delay
- Serialization Delay
- Processing Delay
- Delay Variation
- Packet Loss
- QoS Models
- Classification and Marking
- Classification
- Layer 7 Classification
- Marking
- Layer 2 Marking
- Layer 3 Marking
- DSCP Per-Hop Behaviors
- Class Selector (CS) PHB
- Default Forwarding (DF) PHB
- Assured Forwarding (AF) PHB 3
- Expedited Forwarding (EF) PHB
- Scavenger Class
- Trust Boundary
- Policing and Shaping
- Placing Policers and Shapers in the Network
- Markdown
- Token Bucket Algorithms
- Types of Policers
- Single-Rate Two-Color Markers/Policers
- Single-Rate Three-Color Markers/Policers (srTCM)
- Two-Rate Three-Color Markers/Policers (trTCM)
- Congestion Management and Avoidance
- Congestion Management
- Congestion-Avoidance Tools

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Overlay Tunnels

- Generic Routing Encapsulation (GRE) Tunnels
- GRE Tunnel Configuration
- GRE Configuration Example
- Problems with Overlay Networks: Recursive Routing
- IPsec Fundamentals
- Authentication Header
- Encapsulating Security Payload
- Transform Sets
- Internet Key Exchange
- IKEv1
- IKEv2
- IPsec VPNs
- Cisco Dynamic Multipoint VPN (DMVPN)
- Cisco Group Encrypted Transport VPN (GET VPN)
- Cisco FlexVPN
- Remote VPN Access
- Site-to-Site IPsec Configuration
- Site-to-Site GRE over IPsec
- Site-to-Site VTI over IPsec
- Cisco Location/ID Separation Protocol (LISP)
- LISP Architecture and Protocols
- LISP Routing Architecture
- LISP Control Plane
- LISP Data Plane
- LISP Operation
- Map Registration and Notification
- Map Request and Reply
- LISP Data Path
- Proxy ITR (PITR)
- Virtual Extensible Local Area Network (VXLAN)

IP Services

- Time Synchronization
- Network Time Protocol
- NTP Configuration
- Stratum Preference
- NTP Peers
- First-Hop Redundancy Protocol
- Object Tracking
- Hot Standby Router Protocol
- Virtual Router Redundancy Protocol
- Legacy VRRP Configuration
- Hierarchical VRRP Configuration
- Global Load Balancing Protocol
- Network Address Translation
- NAT Topology
- Static NAT
- Inside Static NAT
- Outside Static NAT
- Pooled NAT
- Port Address Translation

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Understanding Wireless Roaming and Location Services

- Roaming Overview
- Roaming Between Autonomous APs
- Intracontroller Roaming
- Roaming Between Centralized Controllers
- Layer 2 Roaming
- Layer 3 Roaming
- Scaling Mobility with Mobility Groups
- Locating Devices in a Wireless Network

Foundational Network Programmability Concepts

- Command-Line Interface
- Application Programming Interface
- Data Models and Supporting Protocols
- Cisco DevNet
- GitHub
- Basic Python Components and Scripts

Virtualization

- Server Virtualization
- Network Functions Virtualization

Introduction to Automation Tools

- Embedded Event Manager
- EEM Applets
- EEM and Tcl Scripts
- EEM Summary
- Agent-Based Automation Tools
- Puppet
- Chef
- SaltStack (Agent and Server Mode)
- Agentless Automation Tools
- Ansible
- Puppet Bolt
- SaltStack SSH (Server-Only Mode)
- Comparing Tools