

## **Module 1: Plan The Wired Network Solutions**

- Gather customer requirements and network design
- Information gathering steps and questionnaire
- Create and use a Proof-of-Concept (POC) plan
- Creating and using a golden configuration

## **Module 2: Troubleshooting**

- Troubleshooting Principles
- Troubleshooting Zones
- Troubleshooting Components
- Problem-solving methodology
- Identification and Analysis
- Hypothesis and Validation
- Implement and Verify
- Log files and debugging
- Assess and set desired debugging states
- Remote logging and log rotation
- Event and Account logging
- Password reset
- Diagnostic Commands
- Resource utilization
- Capacities and Environment
- Diagnostic tools and diag on-demand
- Support Files
- Traffic Analysis
- Mirroring concepts and configuration
- Mirroring validation
- Wireshark setup and usage
- Wireshark display filters

## **Module 3: Monitoring and Automation Tools**

- Network Automation and REST API
- REST methods
- Using the REST interface
- Sending REST API Requests
- Swagger resource reference and interface
- cURL CLI tool and library
- Postman
- Network Analytic Engine
- Overview
- Scripts and agents
- Script types and sources
- NAE maximums
- Script components

- Agent functions
- Troubleshooting
- Other Monitoring
- IP SLA use and configuration
- SNMPv3 use and configuration
- NetEdit topology and logs

#### **Module 4: VSX, VSF, and Layer 2 Technologies**

- Overview
- Stack requirements
- Member roles and links
- Link failure and split detection
- Split stack link and member failures
- VSF Troubleshooting
- Status and members
- Links and topology
- Removing a VSF member
- VSX
- Overview
- Components
- Aggregation: Single routing model
- Aggregation: Multiple VRF routing
- Virtual and System MAC guidance
- VSX Best Practices
- Nodes, bandwidth, and ISL
- Roles and synchronization
- Configuration sync
- LAG and MSTP configuration
- SVI configuration
- VSX Troubleshooting
- Status and LAG interfaces
- Configuration and VSX sync
- Debugging
- Configuration consistency
- Link/interface status
- MAC/peer consistency
- LACP interfaces
- Configuration parser
- VSX Split Brain
- Analyze conditions and results
- Analyze failure scenarios

#### **Module 5: Layer 3 Routing and OSPF**

- Overview
- Default route
- Floating static routes
- Static Routes with BFD

- Routes with Tags
- Policy Based Routing
- Overview
- Configuration
- Validation
- VRF
- OSPF Single Area
- Review
- Adjacencies
- Route table vs. diagram
- Neighbour table vs. diagram
- LSDB vs diagram
- LSDB vs network types
- OSPF Multi-area
- OSPF review
- LSA types and usage
- ABRs
- Route aggregation and filtering
- Interface costs
- Passive interfaces
- Authentication
- BFD
- Best practice and troubleshooting review

## **Module 6: BGP**

- Sessions and states
- eBGP multihop
- iBGP full-mesh
- Validate BGP peers
- BGP Advertisement
- Three key points about BGP advertisements
- iBGP and next-hop-self
- BGP reachability requirement
- The network command
- Aggregate-address command
- BGP Metrics and Tuning
- Path selection criteria
- Prefix lists and route maps
- Weight
- Local Preference
- AS path length
- MED
- Route Control
- Reasons to control eBGP routes
- Route control implementation
- Route control validation
- Inbound route control
- Peer groups

- Route reflectors
- Route Redistribution
- Intro to Redistribution
- Overview
- Redistribute static to OSPF
- Static to OSPF configuration and validation
- OSPF Type 1 vs Type 2 routes
- Using and tuning the default metric
- Compare tuning techniques
- Prefix list tuning and validation
- Redistribute OSPF to BGP
- Scenario
- Configuration
- Network statements and route maps
- Advanced Route Redistribution
- Scenario
- AS-path list
- Improve BGP convergence times
- Route tags

#### **Module 7: VRF and Route Leaking**

- Overview
- Configuration
- Verification
- VRF Route Leaking
- Methods
- Restrictions and limitations
- Static route leaking configuration and validation
- Dynamic route leaking configuration and validation

#### **Module 8: Multicast**

- Introduction
- IP address assignments
- Network Access and L2 Multicast
- Switching multicast frames
- MAC address mapping
- IGMP – v1, v2, v3
- IGMPv3 messages – membership report, querier election,
- IGMPv3 Snooping
- IGMPv3 Configuration and verification
- VSX and IGMPv3
- IP Multicast at Layer 3
- Overview
- Tree types Shared/RP, source/SPF trees
- Group states
- RPF
- PIM

- Versions
- Messages
- PIM-SIM
- Designated Routers
- Rendezvous Point
- Build-up process
- Wireshark analysis
- RP Configuration
- Static RP
- Dynamic RP
- BSR mechanism
- Wireshark analysis
- VSX and PIM
- Multicast Deployment
- Overview
- PIM Configuration
- Multicast Troubleshooting

## **Module 9: QoS**

- Overview
- Traffic characterization
- Differentiated Services model
- AOS-CX QoS processing
- Ingress Stage
- Rate Limiting
- Configuration
- Verification
- Prioritization Stage
- Classifier and Class of service
- Marking and Trust
- Configuration and Verification
- Queuing Stage
- Configuration and verification
- Scheduler Stage
- Strict Priority
- DWRR and WFQ
- Configuration and verification
- Remark QoS
- Configuration
- Verification

## **Module 10: Dynamic Segmentation**

- Objective and benefits
- Port-based vs user-based tunnelling
- UBT components
- Understanding UBT
- Tunnel establishment

- Role assignment and redirection
- Infrastructure requirements
- Broadcast and multicast traffic
- Configuration and Wireshark analysis
- Verification commands
- Deployment Using Net Edit
- Configure dynamic segmentation using NetEdit
- Verify dynamic segmentation using NetEdit

## **Module 11: Network Security**

- Overview
- Applying ACLs
- Object Groups
- ACL verification
- Counting and logging
- ACL resource utilization
- Classifier Policies
- Overview
- Configuration
- Application
- Verification
- Control Plane Policing
- Overview
- Configuration
- Verification
- Local User and Group Management
- Local AAA
- Built-in user groups
- User-defined user groups
- TACACS+ Management
- Remote AAA using TACACS+
- Communication with TACACS+ server
- Configure and verify AAA using TACACS+
- DHCP Snooping and ARP Inspection
- DHCP snooping configuration and verification
- Dynamic ARP operation, configuration, and verification

## **Module 12: IPv6**

- Features
- Headers
- Extension headers
- Address representation
- Address Types
- Unicast
- Multicast
- Any cast
- ICMPv6

- Overview
- Neighbour discovery
- Manual IPv6 Addressing
- Configuration
- Verification
- DAD
- Dynamic IPv6 Addressing
- Router Advertisements
- SLAAC
- DHCPv6
- IPv6 Routing
- Static
- OSPFv3
- IPv6 Access Control Lists
- Configuration
- Verification