IPv4/v6 Multicast Curriculum

Course Summary

IP Multicast Basics

- Introduction to IP Multicast
- IP Multicast Addressing
- Multicast vs Unicast Forwarding
- IP Multicast "Routes"
- IP Multicast Routing Protocols
- Reverse Path Forwarding (RPF) and Multicast
- Multicast Routing Tables (MRIB) on IOS-XE, IOS-XR and Junos devices

IP Multicast Receiver Signaling

- Receiver to Last Hop Router communication
- IPv4
    - Internet Group Management Protocol – IGMP for Unknown Sources
    - Version 1 vs. Version 2
    - Internet Group Management Protocol – IGMP for Known Source
    - Version 3
- IPv6
    - Multicast Listener Discovery Protocol – MLD for Unknown Sources
    - Version 1
    - Multicast Listener Discovery Protocol – MLD for Known Sources
    - Version 2
- Multicast-aware layer 2 switches
    - IGMP snooping
- Implementing IGMP on IOS-XE, IOS-XR and Junos devices
- Implementing MLD on IOS-XE, IOS-XR and Junos devices

IP Multicast Source Signaling

- Source to First Hop Router Communication
- Understanding source signaling on IOS-XE, IOS-XR and Junos devices

Protocol Independent Multicast (PIM)

- Introduction to PIM
- Basic PIM messages
    - Hello message
    - Join/Prune message

Source Specific Multicast

- IGMPv3/MLDv2 redux
- PIM operations in SSM
    - PIM (S, G) Join messages
- Implementing SSM with PIM on IOS-XE, IOS-XR and Junos devices

PIM Sparse Mode

- PIM Rendezvous Point
    - (*, G) Join messages
    - Register messages
- Implementing Static PIM RPs on IOS-XE, IOS-XR and Junos devices
- PIM-SM from Receiver PoV
- PIM-SM from Source PoV
- PIM-SM with Receivers and Sources
- PIM-SM SPT switchover
- Implementing basic PIM-SM on IOS-XE, IOS-XR and Junos devices

PIM Rendezvous Point Operations

- Dynamic RP information dissemination via PIM Bootstrap Router (BSR)
- Implementing PIM BSR on IOS-XE, IOS-XR and Junos devices
- Embedded RP for PIM in IPv6 environments
- Implementing Embedded RP on IOS-XE, IOS-XR and Junos devices
- Anycast RP for PIM
    - Anycast RP with Multicast Source Discovery Protocol (MSDP)
    - Native PIM Anycast-RP
- Implementing Anycast-RP for IOS-XE, IOS-XR and Junos devices

Bidirectional PIM (BIDIR-PIM)

- BIDIR-PIM mechanics
- BIDIR-PIM use-cases
- Implementing BIDIR-PIM on IOS-XE, IOS-XR and Junos devices

Interdomain IP Multicast

- MP-BGP IPv4/IPv6 Multicast AFI
- Multicast Source Discovery Protocol (MSDP)
- Implementing Interdomain IP Multicast on IOS-XE, IOS-XR and Junos devices

RPF issues in Multicast

- Static RPF overrides (Static "multicast routes"
- Multitopology Routing (MTR) on Cisco devices
- Inet.2 concepts on Junos devices
- Solving RPF issues on IOS-XE, IOS-XR and Junos devices

Multicast Security

- Multicast scoping
- RP security
  - o Filtering at the RP
  - o Filtering rogue RPs
  - o PIM BSR boundary