IMPLEMENTING CISCO MULTICAST 2.0 (MCAST)

COURSE OVERVIEW:
The Implementing Cisco Multicast (MCAST) v2.0 course is a five-day instructor-led course covering the fundamentals of IP multicasting. These fundamentals include multicast applications, sources, receivers, group management, and IP multicast routing protocols (such as Protocol Independent Multicast [PIM]) used within a single administrative domain (intradomain). The issues of switched LAN environments and reliable IP multicasting are covered as well. The course provides technical solutions for simple deployments of IP multicast within a provider or customer network. The curriculum provides the configuration and troubleshooting guidelines for implementation of IP multicast on Cisco routers. The labs provide students with the hands-on experience that is needed to successfully deploy IP multicast.

WHO WILL BENEFIT FROM THIS COURSE?
• Network professionals and Systems Engineers
• Partners
• Customers

PREREQUISITES:
To fully benefit from this course, students should have the following prerequisite skills and knowledge:
• Work experience and configuration skills for Cisco routers and LAN switches
• Cisco CCNA® certification
• Knowledge gained from attending authorized Cisco course ROUTE "Implementing Cisco IP Routing"

COURSE OBJECTIVES:
After completion of this course, students will be able to...
• Introduce IP multicast services, to evaluate the functional model of IP multicasting and the technologies present in IP multicasting, acknowledge IP multicast benefits and associated caveats, and determine various types of multicast applications in order to understand the IP multicast conceptual model and its implementation prerequisites
• Identify IP multicast issues on a data link layer, explain the methods of mapping network layer multicast addresses to data link layer addresses, and list the mechanisms for constraining multicast streams in a LAN environment
• Introduce Protocol Independent Multicast sparse mode (PIM-SM) as the most current scalable IP multicast routing protocol to learn the principles of protocol operation and details, become familiar with the determinism built into sparse mode multicast protocols, and configure and deploy PIM-SM in complex IP multicast network deployments
• Review RP distribution solutions, recognize the drawbacks of manual RP configuration, become familiar with the Auto-Rendezvous Point (Auto-RP) and the bootstrap router (BSR) mechanisms, and introduce the concept of Anycast RP that works in combination with the Multicast Source Discovery Protocol (MSDP)
• Recognize the drawbacks of the PIM-SM and introduce two extensions to provide possible solutions; learn about mechanics of the Source Specific Multicast (SSM) and bidirectional mode of PIM-SM in order to configure and deploy SSM and bidirectional mode of the PIM-SM in a large service provider network
• Explain basic concepts of Multiprotocol BGP (MP-BGP) and its use in the IP multicast environment, apply steps that are associated with configuring MP-BGP with Address Family Identifier (AFI) syntax to support IP multicast in the interdomain environment
• Configure and deploy MSDP in the interdomain environment
• Introduce solutions to mitigate security issues in the IP multicast network. Examine and implement suitable virtual private network (VPN) technologies, such as Generic Routing Encapsulation (GRE) with IP Security (IPsec) and Group Encrypted Transport (GET) VPN
• Describe the process of monitoring and maintaining multicast high-availability operations, introduce the PIM triggered join feature, and describe how load splitting IP multicast traffic over Equal-Cost Multipath (ECMP) works.

• After gaining the knowledge of multicast and multicast-related technologies in the previous modules, you will be faced and challenged with three real-life scenarios for multicast applications. You will be able to answer to and design multicast-related application and network solutions in customer and service provider networks.

**COURSE OUTLINE:**

**Module 1: IP Multicast Concepts and Technologies**

**Lesson 1: Introducing IP Multicast**
- IP Multicast Benefits and Caveats
- IP Multicast Application Type
- IP Multicast Addressing
- Multicast Sessions and Directory Services

**Lesson 2: Understanding the Multicast Service Model**
- Basic IP Multicast Model
- Functions of the IP Multicast Network

**Lesson 3: Defining Multicast Distribution Trees and Forwarding**
- RPF Check
- Source Distribution Trees
- Shared Distribution Trees

**Lesson 4: Reviewing Multicast Protocols**
- Dense Mode
- Sparse Mode and Variants
- Multicast Protocols in Interdomain IP Multicasting
- Reporting Group Membership

**Module 2: Multicast on the LAN**

**Lesson 1: Mapping Layer 3 to Layer 2**
- Multicast MAC Addresses
- Internet Group Management Protocol
- IGMP Version 2
- IGMP Version 3
- Configure and Monitor IGMP

**Lesson 2: Working with Cisco Group Management Protocol**
- Explain Cisco Group Management Protocol
- Configure and Troubleshoot Cisco Group Management Protocol on Cisco Routers
- Configure and Troubleshoot Cisco Group Management Protocol on Cisco LAN Switches
- Identify Cisco Group Management Protocol Implementation Issues

**Lesson 3: Using IGMP Snooping**
- IGMP Snooping
- IGMP Snooping Configuration and Troubleshooting
- IGMP Snooping Implementation Issues
- Introduction to RGMP
- Introduce IGMPv3 Host Stack

**Module 3: PIM Sparse Mode**

**Lesson 1: Introducing Protocol Independent Multicast Sparse Mode**
- PIM-SM Concepts
- PIM-SM Packets
- PIM-SM States and Flags

**Lesson 2: Understanding PIM-SM Protocol Mechanics**
- PIM Neighbor Discovery
- PIM-SM Forwarding
- PIM-SM Joining
- PIM-SM Registering
- PIM-SM SPT Switchover
- PIM-SM Pruning
Lesson 3: Using PIM-SM in a Sample Situation
- PIM-SM State Maintenance
- PIM-SM Review
- PIM-DM Fallback

Lesson 4: Configuring and Monitoring PIM-SM
- PIM-SM Configuration
- Configuring Static RP
- Debugging PIM-SM

Module 4: Rendezvous Point Engineering
Lesson 1: Identifying RP Distribution Solutions
- Dynamic RP Information Distribution
- Auto-RP Mechanism
- BSR Mechanism
- Anycast RP

Lesson 2: Implementing Auto-RP
- Configuring the Candidate RPs
- Configuring the Mapping Agents
- Tune the Auto-RP
- Troubleshoot the Auto-RP
- Constrain the Scope

Lesson 3: Using PIMv2 BSR
- BSR Solution
- Configure BSR
- Troubleshoot BSR
- Constrain the Scope of BSR Message Flooding

Lesson 4: Using Anycast RP and MSDP
- Explain MSDP
- Distribution Trees in MSDP
- Configure Basic MSDP
- Explain Anycast RP
- Implement Anycast RP

Module 5: PIM Sparse Mode Protocol Extensions
Lesson 1: Introducing Source Specific Multicast
- SSM Concepts
- SSM Deployment with IGMPv3

Lesson 2: Configuring and Monitoring SSM
- Configure IGMPv3
- Configure SSM
- Introducing SSM Mapping
- Monitor SSM

Lesson 3: Reviewing Bidirectional PIM
- Bidirectional Multicast Trees
- PIM-SM Bidirectional Mode Operation
- Designated Forwarder

Lesson 4: Configuring and Monitoring Bidirectional PIM
- Configure PIM-SM Bidirectional Mode
- Monitor PIM-SM Bidirectional Mode

Module 6: Multiprotocol Extensions for BGP
Lesson 1: Introducing MP-BGP
- BGP Example
- BGP Fundamentals
- MP-BGP Overview
- MP-BGP Update Messages and Capability Negotiation
- Implementation of MP-BGP

Lesson 2: Configuring and Monitoring MP-BGP
- Configuring MP-BGP
- Configuring Incongruent MP-BGP Topologies
- Monitoring MP-BGP
Module 7: Interdomain IP Multicast
Lesson 1: Examining Dynamic Interdomain IP Multicast
- ISP Requirements to Deploy IP Multicast
- SSM Role in Interdomain IP Multicast
- MSDP Role in Interdomain IP Multicast

Lesson 2: Explaining Multicast Source Discovery Protocol
- Using MSDP
- MSDP Concepts
- MSDP Peers
- MSDP Messages
- MSDP SA Messages

Lesson 3: Using MSDP SA Caching
- MSDP SA Caching Overview
- MSDP SA Caching Server
- MSDP SA Caching Client
- Pseudo-MSDP Peer

Lesson 4: Configuring and Monitoring MSDP
- Enabling MSDP
- MSDP SA Message Distribution Control
- MSDP Configuration Example
- MSDP MD5 Password Authentication
- MSDP Monitoring and Debugging

Module 8: IP Multicast Security
Lesson 1: Introducing IP Multicast and Security
- Threats in a Multicast Environment
- Securing a Network Element
- Security at the Network Edge
- PIM and Internal Security

Lesson 2: Securing a Multicast Network
- Multicast Network Security
- Sender Control
- Receiver Control
- Admission Control
- Securing MSDP
- Using GET VPN to Protect IP Multicast

Module 9: Multicast Optimization and High-Availability Features
Lesson 1: Using Multicast Optimization and High-Availability Features
- Threats in a Multicast Environment
- PIM Triggered Joins
- Load Splitting IP Multicast Traffic over ECMP

Module 10: Applications of Multicast
Lesson 1: Exploring IP Multicast and Video Applications
- Examine Situations in Video Applications
- Design a Solution

Lesson 2: Using IP Multicast in Mission-Critical Environments
- Examine Situations in Mission-Critical Environments
- Cisco PGM Implementation
- Design a Solution

Lesson 3: Exploring How Enterprise IT Uses IP Multicasting Globally
- Examine Situations in a Large Enterprise Environment
- Develop a Solution That Meets Enterprise IT Needs
Sunset Learning Institute (SLI) Differentiators:
Sunset Learning Institute (SLI) has been an innovative leader in developing and delivering authorized technical training since 1996. Our goal is to help our customers optimize their cloud technology investments by providing convenient, high quality technical training that our customers can rely on. We empower students to master their desired technologies for their unique environments.

What sets SLI apart is not only our immense selection of trainings options, but our convenient and consistent delivery system. No matter how complex your environment is or where you are located, SLI is sure to have a training solution that you can count on!

Premiere World Class Instruction Team
- All SLI instructors have a four-year technical degree, instructor level certifications and field consulting work experience.
- Sunset Learning has won numerous Instructor Excellence and Instructor Quality Distinction awards since 2012

Enhanced Learning Experience
- The goal of our instructors during class is ensure students understand the material, guide them through our labs and encourage questions and interactive discussions.

Convenient and Reliable Training Experience
- You have the option to attend at any of our established training facilities or from the convenience of your home or office with the use of our HD-ILT network (High Definition Instructor Led Team)
- All Sunset Learning Institute classes are guaranteed to run – you can count on us to deliver the training you need when you need it!

Outstanding Customer Service
- Dedicated account manager to suggest the optimal learning path for you and your team
- Enthusiastic Student Services team available to answer any questions and ensure a quality training experience during your week at Sunset Learning Institute