

**Course Description:** Implementing Cisco Quality of Service (QoS) v2.3 provides learners with in-depth knowledge of quality of service (QoS) requirements, conceptual models such as best effort, Integrated Services (IntServ) and Differentiated Services (DiffServ), and the implementation of QoS on Cisco IOS platforms. The curriculum covers the theory of QoS, design issues, and configuration of various QoS mechanisms to facilitate the creation of effective administrative policies providing QoS.

Case studies and lab exercises included in the course help learners to apply the concepts mastered in individual modules to real-life scenarios. The course also gives learners design and usage rules for various advanced QoS features and the integration of QoS with underlying Layer 2 QoS mechanisms. This gives learners the opportunity to design and implement efficient, optimal, and trouble-free multiservice networks.

Upon completion of this course, the learner will be able to identify, describe, and correctly implement the appropriate QoS mechanisms that are required to create an effective administrative policy providing QoS.

**Who Should Attend:** The primary audience for this course is pre- and post-sales technical engineers responsible for designing, implementing, or troubleshooting networks, network architects responsible for designing multiservice networks to carry voice, video, and data traffic in an enterprise or service provider environment, and Cisco CCIP® and Cisco CCVP® candidates

**Prerequisites:** Students should have completed Interconnecting Cisco Networking Devices (ICND) or Cisco CCNA® certification.

**Benefits of Attendance:** Upon completion of this course, students will be able to:

- Explain the need to implement QoS and explain methods for implementing and managing QoS
- Identify and describe different models used for ensuring QoS in a network and explain key QoS mechanisms used to implement the models
- Explain the use of MQC and Cisco AutoQoS to implement QoS on the network
- Classify and mark network traffic to implement a policy defining QoS requirements
- Use Cisco QoS queuing mechanisms to manage network congestion
- Use Cisco QoS congestion avoidance mechanisms to reduce the effects of congestion on the network
- Use Cisco QoS traffic policing and traffic shaping mechanisms to effectively limit the rate of network traffic
- Use Cisco link efficiency mechanisms to improve the bandwidth efficiency of low-speed WAN links
- Select the most appropriate QoS mechanisms for providing QoS using Cisco "best practices" in service provider and enterprise networks

### Course Outline:

#### Module 1: Introduction to QoS

Understanding the Need for QoS  
Understanding QoS  
Implementing QoS

#### Module 2: The Building Blocks of QoS

Identifying Models for Implementing QoS  
Understanding the Integrated Services Model  
Understanding the Differentiated Services Model  
Identifying QoS Mechanisms  
Lab 2-1: QoS Lab Setup and Initialization  
Lab 2-2: Baseline QoS Measurement

#### Module 3: Introduction to MQC and Cisco AutoQoS

Introducing Modular QoS CLI  
Introducing Cisco AutoQoS VoIP  
Introducing Cisco AutoQoS for the Enterprise  
Lab 3-1: Configuring QoS with Cisco AutoQoS

#### Module 4: Classification and Marking

Understanding Classification and Marking  
Using MQC for Classification  
Using MQC for Class-Based Marking  
Using NBAR for Classification  
Configuring QoS Preclassify  
Configuring QoS Policy Propagation via BGP  
Configuring LAN Classification and Marking  
Understanding QoS in the Life of a Packet  
Lab 4-1: Classification and Marking Using MQC  
Lab 4-2: Classification Using NBAR  
Lab 4-3: Configuring QoS Preclassify  
Lab 4-4: LAN-Based Packet Classification and Marking

#### Module 5: Congestion Management

Introducing Queuing  
Understanding Queuing Implementations  
Configuring FIFO and WFQ  
Configuring CBWFQ and LLQ  
Configuring LAN Congestion Management  
Configuring Basic Queuing  
Lab 5-2: Configuring LLQ  
Lab 5-3: Configuring Queuing on a Catalyst Switch

#### Module 6: Congestion Avoidance

Introducing Congestion Avoidance  
Introducing RED  
Configuring Class-Based Weighted RED  
Configuring Explicit Congestion Notification  
Lab 6-1: Configuring DSCP-Based WRED

#### Module 7: Traffic Policing and Shaping

Understanding Traffic Policing and Shaping  
Configuring Class-Based Policing  
Configuring Class-Based Shaping  
Configuring Class-Based Shaping on Frame Relay Interfaces  
Frame Relay Voice-Adaptive Traffic Shaping and Fragmentation  
Lab 7-1: Configuring Class-Based Policing  
Lab 7-2: Configuring Class-Based Shaping

#### Module 8: Link Efficiency Mechanisms

Understanding Link Efficiency Mechanisms  
Configuring Class-Based Header Compression  
Configuring Link Fragmentation and Interleaving  
Lab 8-1: Configuring Class-Based Header Compression  
Lab 8-2: Configuring LFI

#### Module 9: QoS Best Practices

Understanding Traffic Classification Best Practices  
Deploying End-to-End QoS  
Providing QoS for Security