

## QUALITY OF SERVICE (QoS) IN MULTIMEDIA IP NETWORKS

**A**ppplied Learning Solutions' Quality of Service in Multimedia IP Networks provides technical and market insights into the predominant approaches to Quality of Service issues encountered by carriers, service providers and end-user organizations who are trying to move toward Everything over IP (EoIP). Big bandwidth alone is not enough, clever prioritization schemes can't do the job alone and most organizations are reluctant to even consider going back to separate networks for voice, data and video. The proper QoS answer requires a balancing act and fine tuning of the network, including consideration of any service level agreements (SLAs) that may be in place for the subject network.

### *Length:*

Two days

### *Audience:*

This course is designed for senior engineers, network architects and planners.

### *Objectives:*

At the end of the course the attendee will be able to:

- Use QoS terms and acronyms correctly
- Describe key steps in the timeline of QoS development
- Discuss the reasons why DiffServ is preferred over Intserv in modern IP networks
- Mix and match multiple layer QoS mechanisms for optimum overall multimedia performance
- Explain pros and cons of major Quality of Service (QoS) mechanisms used in IP networks
- Fine tune QoS issues in IP networks
- Advise clients or internal resources on a proper mix of QoS tools

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### COURSE OUTLINE

#### Day 1

##### 1. Overview of QoS

- Quality of Service (QoS)
- Quality of Experience (QoE)
- QoS vs QoE
- QoS in a Multimedia World
- Service Differentiation
- Service Level Agreements (SLA)
- IP Multimedia Services
- Carrier Issues
- Service Provider Issues
- Enterprise Issues

##### 2. QoS Portfolio

- Prioritization
- Bandwidth Reservation
- Route Optimization
- Hybrid(s)

##### 3. IP CoS / DiffServ (Differentiated Services)

- Overview and History
- Protocol Elements
- Advantages and Shortcomings

##### 4. 802.1 p/q (LAN Switching Prioritization and VLAN)

- Overview and History
- Protocol Elements
- Advantages and Shortcomings

##### 5. Weighted Fair Queuing/Class Based Weighted Fair Queueing (WFQ/CBWFQ), Low Latency Queueing (LLQ/DLLQ), Priority Queueing (PQ)

- Overview and History
- Protocol Elements
- Advantages and Shortcomings

##### 6. Packet Fragmentation / Segmentation

- Overview and History
- Protocol Elements
- Advantages and Shortcomings

##### 7. Frame Relay Priority PVCs and RTP Priority

- Overview and History
- Protocol Elements
- Advantages and Shortcomings

#### Day 2

##### 8. ATM CoS

- Overview and History
- Protocol Elements
- Advantages and Shortcomings

##### 9. Intserv / RSVP (IP Reservation Protocol)

- Overview and History
- Protocol Elements
- Advantages and Shortcomings

##### 10. Bandwidth Reservation (VoDSL)

- Overview and History
- Protocol Elements
- Advantages and Shortcomings

##### 11. TDM Bandwidth Reservation (Packet Cable)

- Overview and History
- Protocol Elements
- Advantages and Shortcomings

##### 12. MPLS / gMPLS

- Overview and History
- Protocol Elements
- Advantages and Shortcomings

##### 13. Assuring IP QoS

- Network Architecture
- Design
- Traffic Engineering

##### 14. Network Architecture, Design and Traffic Engineering for IP QoS

### Conclusion