

APPLIED IP VIDEO AND VOICE MONITORING & TROUBLESHOOTING THEORY & PRACTICE™ WORKSHOP

You may be the IP networking guru but, chances are, you are miffed and mystified by this whole multimedia thing. Sure, it runs over that familiar Internet Protocol, it even uses TCP and UDP with which you are so familiar. But, that's where the similarity, and the familiarity, ends. If this describes you then Applied Learning Solutions' IP Video and Voice Monitoring & Troubleshooting™ Workshop is just the skills tune up you need.

If you have a sound working knowledge of the IP protocol suite, some exposure to IP multimedia and a familiarity with protocol analyzers this is program for you because it offers a total of 7.75 focused lab and workshop hours in two days. This breaks down to 50% workshop and lab, 37% lecture and 13% interactive group discussion "debriefs" that allow you to understand what you've learned and to learn from the course facilitator and your peers.

Objectives:

At the end of this course the participant will be able to:

1. understand the internal protocol operations of key IP multimedia protocols for voice and video.
2. describe similarities and differences between call set up, media transport and call tear down for voice and video.
3. monitor IP voice and video traffic in a multimedia network.
4. analyze and troubleshoot call traces of connectivity problems.
5. detect call connection problems and suggest solutions from call traces in a small-to-medium enterprise (SME) and carrier multimedia services examples.
6. perform root cause analysis on call traces for several of the most pervasive problems in IP multimedia.
7. view and dissect Quality of Service and Quality of [User] Experience (QoE) issues for IP video and voice systems.
8. explain MICE and its role in the future of the Internet and IP-based services.

Who Should Attend:

This course is designed specifically for engineers who install, select or support IP multimedia – voice and/or video - implementations and/or perform troubleshooting, provide technical help desk engineering support, consultants and technical sales support engineers.

Course Prerequisites:

In order to get the most out of the course the attendee must have a strong working knowledge of the IP protocol suite and formal training in IP multimedia protocols or equivalent practical knowledge. Knowledge of the operation of protocol analyzers. Experience with ClearSight, Ethereal, Network General Sniffer, Hammer Call Analyzer or similar systems is not required but it is a plus.

Requirements:

All students must bring a personal notebook computer on which they have administrative rights to load and install new software and, optionally, loaded with the ClearSight Analyzer version 6.x full version or demo version with at least two days left in the demonstration period. Workshop participants will receive a 14 day demo version of ClearSight 6.x.

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Day 1

1. Course Intro: Lecture / 60 minutes

- Overview
- ClearSight Analyzer
- Logistics & Labs
- MICE – Multimedia/Internet/Communications/Entertainment

2. SIP/SDP Overview: Lecture / 30 minutes

- SIP Servers
 - Proxy Servers
 - Redirect Servers
 - Location and Directory Servers
 - Registration
 - Locating SIP Servers
- SIP Messages and Procedures
 - Message Structure
 - Requests and Responses
 - Addressing
 - Completion/Error Codes
- Basic Call Flows and Service Examples
- Session Description Protocol (SDP)

SIP/SDP Lab / 30 minutes

- Call Set-Up
- Session Description
- Call Tear-Down

3. Skinny Overview: Lecture / 30 minutes

- Cisco CallManager/CallManager Express
- Skinny Messages and Procedures
 - Message Structure
 - Requests and Responses
 - Addressing
 - Completion/Error Codes
- Cisco Voice Log Translator (VLT)
- Basic Call Flows and Service Examples

Skiny Lab / 30 minutes

- Cisco VLT Operation
- Call Set-Up
- Call Tear-Down

4. MGCP Overview: Lecture / 30 minutes

- MGCP Concepts and Configuration
- Components
 - Concepts
 - Sessions
 - Control Commands
- MGCP Call Flows

MGCP Lab / 30 minutes

- Call Set-Up
- Call Tear-Down

5. RTP Overview: Lecture / 30 minutes

- Version
- Padding
- Extension
- CSRC Count
- Marker
- Payload Type (PT)
- Sequence Number
- Time Stamp
- Synchronization Source (SSRC)
- Contributing Source Identifier (CSRC)

6. RTCP Overview: Lecture / 30 minutes

- Version
- Padding
- Reception Report Count
- Packet Type
- Reception Report Elements
- RCTP XR
 - VoIP (RFC3611)
 - Video Draft RFC

RTP/RTCP Lab / 30 minutes

- Audio Payloads
- Video Payloads
- RTCP Reports

7. RTSP Overview: Lecture / 30 minutes

- Subscribe
- Set Up
- Get Parameters
- Set Parameters

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- Describe
- Play
- Pause
- Record
- Teardown

RTSP Lab / 30 minutes
Protocol
Commands

8. Media Stream Coding: Lecture / 45 minutes

- Audio Codecs
- Video Codecs

Media Streams Lab / 45 minutes
Audio Coding
Video Coding

End of Day 1

Day 2

1. QoS/QoE Overview: Lecture / 60 minutes

- QoS vs QoE
- Voice/Video Quality vs "Call Quality"
- Metrics - Voice
 - Packet Delivery
 - Delay
 - Jitter
 - MoS
 - R Value
 - ICPIF
- Metrics - Video
 - Packet Delivery
 - Delay
 - Jitter
 - VQ Factor
 - MDI

Workshops are different from labs in that they are designed in a loosely structured discovery format that allows individual learners to assist and learn from each other as well as applying solid troubleshooting skills to isolate and identify problems or issues with the call traces they have been provided. This approach allows for maximum skills development and greatest transfer of skills to the learners actual work environment.

Call Connection Workshop / 45 minutes

Detect problems during the call establishment and parameter negotiation phase of the call and suggest solutions. A variety of errored connections will be studied, each with slightly different call establishment problems.

Debrief: Group Discussion / 15 minutes

Connectivity Workshop / 45 minutes

Analyze and troubleshoot multiple call traces of phone and video connectivity problems. Connectivity problems may be a result of lower or higher layer protocol issues and it will be up to the workshop participant to diagnose the problem and offer their best theory as to the problem and possible solutions.

Debrief: Group Discussion / 15 minutes

Call Echo Workshop / 45 minutes

Determine source of echo, troubleshoot echo cancellation issues and consider the contribution of electrical vs acoustic echo to call degradation for voice calls.

Debrief: Group Discussion / 15 minutes

Broken Speech/Choppy Video Workshop / 45 minutes

Perform root cause analysis on SIP call traces for one of the most pervasive and difficult problems in multimedia. Issues related to delay, delay variation, network congestion, prioritization, packet ordering and discard will be studied in this workshop.

Debrief: Group Discussion / 15 minutes

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Voice QoS/QoE Workshop /45 minutes

View and dissect Quality of Service and Quality of [User] Experience impairments on SIP, Skinny and MGCP call traces, understand differences in MOS and R-Values and calculations relative to different call types. Listen to media samples of impairments and develop a keener understanding of the impact of different types of impairments on voice calls.

Debrief: Group Discussion / 15 minutes

Video QoS/QoE Workshop / 45 minutes

View and dissect Quality of Service and Quality of [User] Experience. See impact of impairments on call traces of video connections and monitor video connections. Key points will be monitoring MDI and VQ Factors of QoE as they relate to QoS parameters.

Debrief: Group Discussion / 15 minutes

2. Wrap Up

- Q&A and Group Discussion / 30 minutes