

Course Catalog 2012-2013

VOIP



Voice over Internet Protocol (VoIP)

Convergence of voice and data is now a common place mainstream technology. This course investigates the characteristics of voice transmission and then studies the impact on IP networks. Practical sessions with soft phones, hard phones and gateways allow the students to see all aspects of VoIP. Network analyzers are used to study packets on the wire.

VOIP Training Course Objectives

By the end of the course delegates will be able to:

- Describe the issues of voice and data convergence.
- Describe techniques, which can be used in IP to provide low uniform delay.
- Evaluate VOIP technologies.
- Design data networks, which will support voice.

Who should attend?

Anyone working in the field of networking or telecommunications

Course Prerequisites

32 Hours, 12 Classes, 3 Hours per class

Course Duremention

Intro to data communications & networking, TCP/IP fundamentals

Course Content

Lesson 01: What is VoIP?

- What is VoIP
- Brief review of IP
- Brief review of telephones and voice

Lesson 02: Configuring IP softphones

- What are softphones?
- Downloading, installing
- Building the base IP network
- A simple VoIP call with softphones
- Internet telephony

Lesson 03: Addressing

- E164, FQDN
- IP addresses
- URIs
- DNS
- SIP addressing
- H.323 addressing

Lesson 04: VoIP issues

- Bandwidth
- Delay
- Jitter
- Digitizing voice
- Digitization steps
- Coding
- Quality issues
- MOS
- Voice compression
- Silence suppression
- Packetizing voice
- Prioritizing voice
- Jitter buffers
- Hands on: Simple packet analysis

Lesson 05: Architectures

- Desktop
- Backbone
- Gateway
- Hard phones
- PoE
- Integrating phones and PCs
- Carriers
- Softswitches
- Hands on: Integrating Softphones
- Hard phones and analog phones

Lesson 06: IP performance and QOS

- ITU delay recommendations
- IP TOS field
- DiffServ
- IP precedence
- Queuing strategies; FIFO, WFQ, custom, priority, RED, LLQ

Lesson 07: VOIP protocol stack

- RTP
- RTCP
- Mixers and translators
- RSVP
- Bandwidth
- Erlang models
- Link layer overhead
- Hands on: Calculating VoIP bandwidth, analyzing RTP packets

Lesson 08: ITU Recommendation H.323

- Architecture
- Protocols
- Terminals
- Call setup
- Gatekeepers
- Gateway discovery
- H.323 registration with a gatekeeper
- Hands on: PC to PC using H.323
-

Lesson 09: IETF – Session Initiation Protocol

- What is SIP?
- SIP protocol stack
- SDP
- Sip architecture
- SIP messages
- Initial SIP phone startup
- SIP servers
- proxy server
- redirect server
- Hands on: PC to PC using SIP

Course Content

Lesson 10: Carrier networks

- Signaling systems (SS7)
- media gateways
- Media gateway controllers
- Signaling gateways
- MGCP
- Megaco
- SIGTRAN
- Hands on: PSTN interworking

Lesson 11: Video over IP

- Video components
- Digital video
- Pictures and audio, video codecs, issues and solutions
- video conferencing
- multipoint video conferencing, video protocol stack

