VOIP & IP tel

Course 1135 – 40 Hours

Overview

The students will study introduction to PSTN Telephony and VoIP, about Interworking between PSTN protocols and IP protocols (SIGTRAN), protocols IP: some versions H323, SIP, SIP-T, MGCP, MEGACO/H248, IP Telephony systems, design issues, security aspects and QOS

Who Should Attend

- R&D and Marketing staff from companies supplying telecom equipment
- Marketing and maintenance staff from service providers
- Communications and plant managers of companies using telecom equipment and services
- Communications consultants

Prerequisites

- Knowledge of Telephony network, PSTN, SS#7 and ISDN and basic knowledge of data networks and TCP/IP

Course Contents

- Networking recapitulation (separate frontal lecture on customer site)
  - Ethernet frame format
  - IP Architecture
  - Address scheme
  - Configuration
  - Utilities
  - Protocol format
  - ARP
  - ICMP
  - DHCP
  - DNS
  - TCP
  - UDP
  - Wireshark

- VoIP Introduction
  - Introduction to telephony
  - PSTN architecture and functionality
  - Analog Line
  - E1 & PRI
  - SS#7
- Codecs
  - Analog to digital voice
  - PCM G.711
  - Quality of voice, MOS

        - Compression G.723, G.726, G.729, etc.
- IP telephony
    - Traditional telephony
    - Moving towards IP
        - Hardware saving - comparing tdm network with packet network
        - Traffic management and trunk forecasting
        - Circuit vs packet switched networks
    - Services and key terms (ip pbx/ pure IP, hybrid, enabled, centrex , softphone and more)
    - Architecture
        - Terminals
        - Gateways
        - Call Control Servers
        - Application Servers
        - Media Servers
        - Management devices
        - Work process highlights
- Media transport
    - RTP
    - RTCP
    - cRTP
    - Hands on:
        - Wireshark practice with TCP/IP, DHCP, ARP, DNS, HTTP, etc.
        - Capture, analysis and playing of RTP session live traffic
- SIP
    - SIP properties
    - Functional components
    - SIP message format
    - SIP requests
    - SIP responses
    - PSTN Cause Code and SIP Event Mappings
    - SIP transactions
    - SIP procedures
    - Address resolution
    - SDP
    - SIP extensions and enhancements
    - Call flows
    - Interworking
    - SIP design framework
    - Hands on:
        - Wireshark practice with SIP, SDP and correlation with RTP/RTCP live traffic

- H.323
- H.323 - overview (voice / video / data over ip)
    - H.323 - what does it do?
    - What is h.323?
    - Key benefits
- H.323 component descriptions
    - H.323 components and building blocks
    - Endpoints, terminals
    - Gatekeeper properties and gateway properties
    - Mcu , mc , mp characteristics
    - H.323 zone
- H.323 protocol descriptions
- Call signaling models
- Hands on:
- Wireshark practice with H.323 captures
- Industry perspective
- WebRTC
    - Hands on:
        - Wireshark trace of WebRTC live traffic

- SIGTRAN and SIP-T
    - SS#7
    - VoIP and SS#7
    - SCTP
    - SIGTRAN
    - SIP-T
    - Hands on:
        - Wireshark practive with SCTP, SIGTRAN and SIP-T captures
- Gateways
    - Motivations
    - History
    - Architecture
    - Gateway Control Protocol Features
    - MGCP
        - Architecture
        - Connection Model
        - Commands
        - Protocol Issues
        - Packages
        - Example of Message Flows
        - Hands on:
        - Wireshark practice with MGCP captures
    - H.248/Megaco

- Architecture
- Connection Model
- Commands
- Protocol Issues
- Packages
- Example of Message Flows
- Hands on:

  Wireshark practice with MEGACO captures
- Industry Perspective

- QoS
  - What is QoS?
  - QoS over IP:
    - Static / predictive
    - Intserv / RSVP / MPLS / ATM
    - Diffserv
    - Hands on:
    - Wireshark practice with DHCP captures
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  - QoS for VoIP
  - H.323
  - SIP
  - Network management and billing
  - Security
    - Security model
    - Threats
      - Telephony
      - IPTel
      - Application
    - Security strategies
    - IP Network
      - FW
      - NAT traversal (STUN, TURN, ICE)
    - Application
      - SBC
    - AAA - Authentication, Authorization, Accounting
    - LI - Lawful interception
    - Best practices

  - Presence
    - Hands on:
      - Wireshark practice with presence live traffic
  - SIP-IM
    - Hands on:

- Wireshark practice with SIP-IM live traffic
- Asterisk
- Trends
  - NGN
  - FMC
  - 3GPP
  - IMS