

# Implementing VoIP Networks



<b>Course Length</b>	Three (3) days
<b>Course Code</b>	NFSVP3
<b>Course Title:</b>	Implementing VoIP Networks
<b>Prerequisites</b>	An understanding of VoIP fundamentals is extremely helpful.
<b>Course Overview:</b>	This course takes a closer look at VoIP architecture, protocols and considerations when implementing a VoIP network. The course reviews VoIP technology and protocols and allows time for hands-on equipment learning. The course can be customized to include specific vendor equipment to provide the student with training on the actual equipment they will be configuring in their workplace.

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## Course Outline

### Overview of VoIP technology

- Transporting Voice using IP
- Carrier Grade quality for Voice
- Transporting voice using the Internet

### Network Overview Diagram

### Overview of the IP protocol suite

- The IP Header
- IP Routing
- IP version 4 and IP version 6
- IP multicast
- IP security

### Transmission Control Protocol (TCP)

- TCP Header
- TCP connections

## **The User Datagram Protocol**

Using UDP to transmit voice instead of TCP

## **Real-Time Transport Protocol**

RTP Control Protocol (RTCP)

RTCP reports

RTCP packets

Calculating Round trip time

Calculating Jitter

## **Speech coding techniques**

Voice Quality and Sampling

Types of speech coders

G.711, G.728, G.729, G.723.1

Selecting Codecs

## **H.323**

H.323 Architecture

Signaling

Protocols

Addressing

## **RAS signaling**

RAS messages

RAS functions

Gatekeeper and Endpoint communications

## **Call Signaling**

Q.931

Call setup procedures

Interaction between Call signaling and H.245

## **H.245 Control Signaling**

Message groupings

Procedures

## **Conference Calls**

## **Session Initiation Protocol (SIP)**

- SIP Architecture
- SIP messaging
- Message sequence
- Redirect and Proxy servers
- Session Description Protocol (SDP)
- SIP interworking
  - PSTN interworking
  - SIP working with H.323

## **Media Gateway Control**

- Separation of Media and Call control
- Softswitch architecture
- Media Gateway Control requirements
- Media Gateway Control protocols
  - MGCP
  - MEGACO/H.248

## **VoIP and SS7**

- SS7 overview
- SS7 Protocols
- SS7 network Architecture
- Integrating SS7 and VoIP architectures
- Sigtran protocols

## **Quality of Service (QoS)**

- Need for QoS
- QoS solutions
- Resource Reservation Protocol (RSVP)
- DiffServ
- Service Level Agreements
- Multi-Protocol Label Switching (MPLS)

## **Traversing the Network**

- Firewalls
- NAT
- SBC

## **Accessing the Network**

- Modems
- DSL
- Cable
- Dedicated bandwidth services

## Fax over IP (FoIP)

### Implementations

- IP PBX and Hosted PBX solutions
- IP Voice mail
- Music on Hold
- IP faxing
- IP call centers

### Hands-on

- Hand-set configurations
- Router settings
- PBX configurations
- Placing a call
- Using the Internet to place a call
- Troubleshooting – common network problems
- Network monitoring – view calls as they are placed across the network



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