

Understanding Voice over IP

Prepare yourself for the next stage of telephony

The technology of Voice over IP, that is, of making telephone calls over data networks such as the Internet, has now reached the tipping point. Understanding Voice over IP is the course that gives the learner the in-depth knowledge of Voice over IP and the TCP/IP protocol that it is based on. VoIP technology is making deep inroads in all types organizations, even residential telephony, such that it will eventually become the standard telephone technology. Information Technology personnel, as well as management, need this course to do their job now or plan for future implementations of Voice over IP.

Course design

This course provides an easy path to understand Voice over IP technology which is itself a complicated set of independent technologies; it does this by building on progressively more technical material in a logical fashion, using hands-on labs to reinforce the concepts and testing the student on their retention and understanding of the material.

This course is unique

- This course does not assume that you have a telephony or IT background.
- The material is complete in one course. The TCP/IP protocol knowledge that is the basis of VoIP is included. A prerequisite course is not required.
- Hands-on classroom labs provide the learner with the experience of setting up a SIP server and making VoIP calls. The VoIP protocols are examined using protocol analyzers. Quality of service and codec issues are examined by experimenting with these variables and listening to the results in class.

This is a 4 day instructor led course with hands-on lab exercises. The course outline is on the reverse of this flyer. The course textbook is Understanding Voice Over IP Technology by Nicholas Wittenberg ISBN-10: 1-4354-2727-0

Two audiences, one course!

This course will be of benefit to the following:

1. Non-technical audience who needs to understand VoIP. This may include the following:
 - Management who evaluate and make the decisions on deploying VoIP technology for their organizations.
 - Marketing and sales professionals for computer and telephony products.
 - Professionals in the telephone or communications industry who will be facing VoIP sooner rather than later.
 - IT professionals who will need to integrate with or support VoIP on their systems.
2. Technical audience who need to understand VoIP at a deeper level.
 - Professionals who provide support or administration for their IT systems.
 - Professionals who provide support or deployment of the VoIP system.
 - Software engineers, system engineers, network administration and support.

Understanding Voice over IP Course Outline

Section 1: Voice over IP Overview

Lesson 1 - Voice over IP Overview

This lesson provides a brief description of the Voice over IP technology and looks at scenarios in which it has been adopted.

Lesson 2 - Why VoIP

This lesson looks at the benefits of VoIP including savings on long distance charges, new features and integration into computer data systems. It also looks at the issues of Voice over IP such as loss of service with power outages, the cost to upgrade the network and problems with the 911 service.

Lesson 3 - How Does VoIP Work?

This lesson provides an overview of the process of making a call, including setting up the connection and transmitting the conversation. A comparison is made to the public telephone system and how it works.

Lesson 4 - Quality of Service

This lesson examines the issues surrounding providing a good quality for voice conversations. Since the underlying TCP/IP protocol was not designed for a telephone service, providing a good quality of service requires modifying the base technology and adding new features.

Lesson 5 - Is Your Network Ready for VoIP?

This lesson looks at the practical considerations for anyone contemplating the adoption of this technology including power outages, upgrading their network and maintenance.

Lesson 6 – Components of the Voice over IP System

This lesson looks at the components of the VoIP system and what an organization needs to purchase. Typical systems using components from CISCO, Nortel, Lucent and Avaya are looked at.

Section 2: TCP/IP, the Platform for VoIP

Lesson 7 – Introduction to TCP/IP

This lesson explores the protocol that VoIP is built upon. An understanding of it is required for any technical discussion of VoIP.

Lesson 8 – Data Link Layer

This lesson looks at the Ethernet technology not only because it carries the VoIP conversation on the local area network but also because IP telephones are connected directly to it.

Lesson 9 – Internet Protocol

This lesson looks at IP which provides the identification and routing services for VoIP.

Lesson 10 – IP Addressing

This lesson looks at the crucial area of addressing and subnetting. Mis-configuration of IP is the most common cause of network failure.

Lesson 11 – TCP and UDP

This lesson looks at TCP and UDP which provide various services including guaranteed delivery of data. VoIP uses each of these protocols at different times and it is important to understand their different characteristics.

Lesson 12 – DHCP

This lesson looks at the DHCP service which is used by VoIP devices such as IP telephones to receive their configurations.

Lesson 13 – DNS

This lesson looks at the DNS service which is used to resolve domain names to IP addresses.

Section 3: Voice over IP Technical Details

Lesson 14 - How IP Handles Voice

This lesson looks at the Real Time Protocol which transports the voice conversation over the digital network.

Lesson 15 - Voice to Digital

This lesson looks at the complicated process of converting voice into a signal that can be used on the digital network. The student will learn how this process is performed by the codec and at the end, the student will be able to intelligently select the proper codec to use on his network.

Lesson 16 - Implementing QoS

This lesson looks at how quality of service is implemented in VoIP at the packet level. This includes protocols such as DiffServe, 802.1Q/p and MPLS.

Lesson 17 - H.323

This lesson looks at the H.323 protocol, which was the protocol first used to set up telephone calls and is still used by telephone companies and large organizations.

Lesson 18 - SIP in Detail

This lesson looks at the SIP protocol, which is used to set up telephone calls on modern networks.

Lesson 19 - Voice Gateways

This lesson looks at voice gateways, which is the interface to the public telephone system, and their implementation in small and large organizations. Particular attention is paid to the protocol used by gateways, MGCP/Megaco.

Lesson 20 – Setting up a modern VoIP System

This lesson looks at practical consideration when setting up a VoIP system. Topics include provisioning trunk lines to the public telephone system and Internet, DID, ENUM, traversing NAT/Firewalls and creating dial plans.