

## **COURSE 115 VOICE COMMUNICATIONS: THE PSTN, CARRIERS, VOIP AND SIP**

A one-day course for non-engineers on the telephone network and telephone calls.

We begin with the Public Switched Telephone Network and basic telephony concepts of analog loops, trunks, circuit switching, digital voice and 64 kb/s DS0 channels.

Next, we'll understand telephone companies, the components of a telecom service and how carriers actually implement services with different types of equipment, and how carriers interconnect to provide competitive services.

The final chapters cover the nuts and bolts of Voice over IP (VoIP), SIP, softswitches and SIP trunking, and implementation choices for businesses and organizations.

### **1. THE PSTN**

- A. The Public Switched Telephone Network (PSTN)
- B. Analog Circuits and The Voiceband
- C. Plain Ordinary Telephone Service (POTS)
- D. Network Architecture: Access, Switching, Transmission
- E. Digital Voice
- F. 64kb/s G.711 Standard
- G. Legacy Digital Hierarchy DS0-DS3
- H. Legacy Circuit Switches: PBX and Centrex

### **2. CARRIERS, COMPETITION AND INTERCONNECT**

- A. The Telecom "Network Cloud"
- B. How Telecommunications Services Are Actually Implemented
- C. Network Equipment: How and Where Each is Used
- D. Domestic Telephone Companies
- E. Switching Center Hierarchy
- F. LD Competition: Switched Access, LECs, IXCs and POPs
- G. CLEC: Collocation plus ILEC Dark Fiber
- H. Carrier Network Model: Regional Rings, POPs and MANs

### **3. VOICE OVER IP (VOIP)**

- A. Voice Packetization
- B. Measuring Voice Quality
- C. Impairments and Effects on Sound Quality
- D. Codecs and Compression
- E. Network Delay and Jitter
- F. RTP and UDP
- G. The VoIP Protocol Stack

### **4. SIP**

- A. What SIP is and What it Can Do
- B. SIP URIs: "Telephone Numbers"
- C. SIP proxy servers and call setup
- D. Softswitches and Call Managers vs. SIP
- E. SIP Trunking

### **5. VOIP FOR BUSINESSES AND ORGANIZATIONS**

- A. VoIP-Enabled PBX
- B. PBX Replacement with Softswitches
- C. Hosted PBX
- D. IP Centrex
- E. Open-Source IP-PBX Software Solutions
- F. IP Phone Features and Uses