

# VoIP Network Analysis with the DA-3400

Course Number	Delivery Method	Course Length	Language of Instruction
TT-DA3400-VoIP	Instructor-Led at Customer Site	2 Days	English
TT-DA3400-VoIP-VC	Instructor-Led via Virtual Class	5 two-hour Sessions	English

## Synopsis

VoIP theory and technical specifications are covered in detail with a heavy emphasis on how the DA-3400 can be used to analyze VoIP networks. This course gives a detailed overview of how to use the DA-3400, building on basic concepts and moving to full testing capabilities. Participants will use this knowledge to test, monitor, and troubleshoot VoIP networks. In addition, participants will utilize Examine and Mentor to analyze network traffic. DA-3400 demo software will be provided to allow students to practice using the DA-3400 GUI during and after the class.

## Prerequisites

Introduction to Internetworking (TT-INT) or equivalent. Strong understanding of Ethernet and IP is also assumed.

## Who Should Attend

Technicians, engineers, and technical support personnel who are directly or indirectly responsible for installing and maintaining VoIP networks with the DA-3400.

## Course Goals

Upon completion of this course, participants will be able to:

- Describe a layered test strategy for VoIP
- Use the DA-3400 to analyze VoIP networks
- Demonstrate a thorough understanding of the DA-3400 interface and analysis capabilities by creating and performing analysis applications

## Course Outline

### DA3400 Basics (VC Session 1)

- Orientation and Course Goals
- DA3400 introduction and applications
- Connecting to the DA3400
- DA3400 screen layout
- DA3400 setup parameters
- DA3400 views
- Reports
- Examine operations overview
- Mentor operations overview

### Internetworking Concepts Review (VC Session 2)

- History of Networks
- Internetworking Motivation and Evolution
- OSI Reference Model Overview
- Communication in the OSI Reference Model
- Transmission Mediums
  - Copper Wire
  - Fiber
  - Free Space (Wireless)
  - Internetworking Devices
  - Repeaters & Hubs
  - Bridges & Switches
  - Routers
  - Gateways
- Terminology

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## Networking Protocols Review (VC Session 3)

- Transmission Control Protocol (TCP)
- User Datagram Protocol (UDP)
- Real Time Protocol (RTP)
- Real Time Control Protocol (RTCP)
- Resource Reservation Protocol (RSVP)

## VoIP Quality (VC Session 3)

- Quality Issues
  - Delay
  - Echo
  - Packet loss
  - Jitter
- Controlling Quality
  - ToS
  - DSCP
  - Weight fair queuing
  - VLAN
- Measuring Quality
  - In-service vs. Out-of-service
  - Mean Opinion Score (MOS)
  - Tiphon
  - R-Value
  - VQMON

## Packet Based Voice and VoIP Signaling Overview (VC Session 4)

- General overview of speech technology
- Vocoding principles
- Vocoder attributes
- Traditional PSTN signaling
- Interfacing the PSTN with VoIP
- Signaling in a VoIP network

## Protocols for Voice and Signaling (VC Session 4)

- G.729, G.711, G.726
- H.323 Family (H.245, H.225, etc)
- Session Initiation Protocol (SIP)
- Media Gateway Control Protocol (MGCP)
- Megaco
- SCCP (Cisco Skinny)

## Testing VoIP with the DA-3400 (VC Session 5)

- Testing approach
- Test Access
- Testing tools
- Analyzing signaling (control plane) functions
- Analyzing voice quality
  - Real time
  - Post analysis with PVA1000

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