



Convergence Technologies Professional (CTP) Course 3: Convergence Technologies (EMEA Version)

The *Convergence Technologies* course teaches you the fundamental concepts, standards and practises related to converged networks. Through hands-on training, you will learn the vendor-independent networking skills and concepts required for entry-level professionals seeking employment in the Information Technology (IT) or telecommunications industries.

In *Convergence Technologies*, you will learn to identify the characteristics of circuit-based and packet-switched technologies, identify differences between the call flow in convergence-based calls and the call flow in circuit-based calls, and identify the types of signaling protocols for converged networks. You will identify the transport protocols used for real-time communications, and learn about the functions of gatekeepers and gateways. You will also compare and contrast the three major signaling protocols for VoIP.

You will learn how to determine whether an existing network is capable of supporting convergent services, and you will identify the specific elements required for a successful VoIP implementation. You will also learn about common convergence devices, learn about codecs and their bandwidth requirements, and describe the impact of compressing voice in a network. You will learn about various wireless convergence technologies, identify standards for transporting facsimile across convergent networks, and identify the features of presencing and unified messaging. You will also identify methods for providing video services through a converged solution.

You will define delay, latency, jitter and wander, and identify their impact on real-time communications; and you will also identify the importance of a jitter buffer. You will learn about the need for Quality of Service (QoS) and identify QoS technologies used in converged networks. In addition, you will learn to identify the factors that affect the bandwidth of packetized voice, and identify requirements for transporting modem and fax transmissions through a converged solution. You will also identify industry standards for determining voice and video quality, troubleshoot convergent communications over wireless networks, and identify security concerns and solutions.

This course prepares you to take the Telecommunications Industry Association (TIA)-endorsed CTP (Convergence Technologies Professional) exam. This course has been written to standards specific to EMEA countries. However, the CTP exam does not focus on differences between EMEA and North American standards.

All CTP courses offer Case Studies for class discussion about real-world skills applications. Guided, step-by-step labs provide opportunities to practise new skills. You can challenge yourself and review your skills after each lesson in the Lesson Summary and Lesson Review sections. Additional skill reinforcement is provided in Activities, Optional Labs, Lesson Quizzes and a Course Assessment that are available from your instructor.

This coursebook includes a supplemental CD-ROM containing the lab files used in class. To practise the skills presented in class or to perform any labs that were not completed, refer to the Classroom Setup section for information about system requirements and lab files.



Topics

Convergent Network Traffic Protocols

Convergence
Benefits of Convergent Networks
Characteristics of Convergent Networks
The Smart Network and the Dumb Network
Transport Through a Packet-Switched Network
Realtime Transport Protocol (RTP)
Realtime Transport Control Protocol (RTCP)
VoIP Signaling Protocols
Session Initiation Protocol (SIP)
SIP Components
SIP Messages
SIP Calls
H.323
H.323 Architecture
H.323 Protocol Stack

H.323 Calls
SIP vs. H.323
Media Gateway Control Protocol (MGCP)

Implementing VoIP

Planning a Convergent Network
Numbering Plans
G.7xx Codecs
Calculating VoIP Bandwidth Requirements
Wireless Convergence Technologies
IP Multimedia Subsystem (IMS)
Facsimile
Presencing
Unified Messaging
Video Services
T.120 Multimedia Conferencing Standards
Internet Protocol Television (IPTV)

Common Convergence Devices
Power Issues for Convergent Networks

Traffic, Troubleshooting and Security

VoIP Variables
Mean Opinion Score (MOS)
Maintaining and Troubleshooting Convergent Networks
Security in Convergent Networks
Protocol Review
Overview of Network Attacks
Denial-of-Service (DOS) Attacks
Distributed Denial-of-Service (DDOS) Attacks
VLAN Hopping
MAC Address Movements
Intrusion Detection
Maintaining Your Networks

Target Audience

Field technicians, voice and telephony technicians, networking administrators, systems engineers, data-communications technicians, technical sales and marketing professionals, data professionals who need telephony, telephony professionals who need data, and any individual interested in pursuing or advancing a data or convergence technologies career.

Job Responsibilities

Implement products and services in accordance with industry standards, apply basic troubleshooting practices, verify interoperability, identify components of a converged network and the challenges of integrating circuit-switched and packet-switched networks, properly implement IP addressing plans, and establish Voice-over IP (VoIP) requirements.

Course Length

Convergence Technologies is a 12-hour course.

Prerequisites

Candidates who hold certifications such as CIW Foundations, CIW Server Administrator, Network+ or Cisco CCNA will derive the most benefit from this course. At least 12 months of networking experience is recommended before taking this course. For example, students should already be familiar with configuring a basic TCP/IP network. Students must also have completed the *Data Networking* and *Telephony Networking* courses or be able to demonstrate equivalent networking knowledge.