Introduction to Networking Training

Duration: **1 Day**

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info@bilginc.com
bilginc.com

Introduction to Networking provides technical and non-technical professionals who are new to networking with a practical foundation in how modern computer networks operate.

The course introduces essential networking concepts, common hardware components, communication protocols, and widely used industry standards. Participants learn how a computer connects to a network, how devices communicate with one another, and how basic connectivity problems can be investigated.

Starting with Ethernet and Local Area Networks, the programme progresses through TCP/IP architecture, IPv4 addressing, routing, DHCP, ICMP, and Network Address Translation. Important technologies that support everyday network communications, including DNS, TCP, and UDP, are also explored.

For non-technical professionals, the course provides an efficient way to develop networking awareness and become comfortable with commonly used terminology. For technical learners, it provides the foundation required before progressing to more advanced networking subjects and specialist training.

Prerequisites

Participants should be familiar with:

- The Microsoft Windows desktop environment,
- Basic Windows operations,
- Basic Windows Command Line operations.

Previous professional networking experience is not required.

Who Should Attend

This course is particularly suitable for:

- IT professionals who are new to networking,
- Professionals who need a foundation in network technologies,
- Individuals preparing for network support or infrastructure roles,
- Non-network specialists who regularly work with networking teams,
- Learners preparing to progress to more advanced networking courses.

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What You Will Learn

By the end of this course, participants will be able to:

- Connect a PC to a basic network environment,
- Examine PC and network configuration to investigate simple connectivity problems,
- Explain the roles of switches, routers, and other common networking equipment,
- Understand the main protocols and communication methods used by networks,
- Explain the basic operation of Ethernet and Local Area Networks,
- Understand IPv4 addressing and subnet concepts,
- Describe the purpose of key protocols and services including DHCP, ARP, ICMP, TCP, UDP, NAT, and DNS,
- Explain how routers connect separate local networks,
- Use basic network troubleshooting and diagnostic tools.

Training Outline

Module 1 – Local Area Networks

- Fundamental network concepts
- Local Area Networks and Ethernet
- IEEE networking standards
- Network segments, frames, and addressing
- Ethernet MAC Addressing
- Types of network data delivery
- The DIX / Ethernet Version II frame
- LAN hardware and switches
- How network switches operate
- Network Protocol Analysers
- Ethernet, Fast Ethernet, Gigabit Ethernet, and 10 Gigabit Ethernet
- Ethernet transmission over copper cabling
- Fibre Optic media
- Wireless Local Area Networking
- Virtual Local Area Networks (VLANs)
- Port-based VLANs
- Inter-VLAN Communication

Module 2 – Internet Architecture and Internet Protocol

- The Internet Protocol
- How the Internet is structured
- Internet Standards Bodies
- TCP/IP Architecture
- The TCP/IP Protocol Suite
- ISO standards
- The ISO OSI 7-Layer Model
- Network layers and Protocol Encapsulation
- Internet Protocol Addressing
- Internet Protocol Routing
- Original IPv4 Address Classes

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- Multicast Addresses
- Reserved IPv4 Addresses
- IPv4 Address Assignment
- Private IPv4 Network Addressing

Module 3 – IP Address Resolution

- Address Resolution Protocol (ARP)
- The relationship between IP and MAC addresses
- The Default Gateway (DGW)
- Communication between hosts on the same network
- Communication between hosts on different networks
- Forwarding traffic from the local network to a router

Module 4 – IPv4 Addressing and Subnetting Fundamentals

- Limitations of Classful Addressing
- Subnet Extensions
- Understanding Subnet Masks
- Applying subnet masks to IPv4 addresses
- Applying the 255.0.0.0 subnet mask
- Applying the 255.255.0.0 subnet mask
- Applying the 255.255.255.0 subnet mask
- Default Subnet Masks
- Identifying network and host portions of an address

Module 5 – IP Address Allocation

- IP Address Allocation methods
- Static and Dynamic IP configuration
- Dynamic Host Configuration Protocol (DHCP)
- Automatic IP address allocation
- Windows DHCP Commands
- Viewing and checking IP configuration

Module 6 – Internet Control Message Protocol

- The role of ICMP in network communications
- Basic network diagnostics
- Using Ping
- Interpreting Ping results
- Traceroute / Tracert
- Examining the route taken by network traffic
- Investigating basic connectivity issues

Module 7 – IP Routing

- Routers and Routing
- How routers connect different networks
- Routing Tables
- Static Routing
- Dynamic Routing
- Dynamic Routing Protocols

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- Forwarding packets towards their destination networks

Module 8 – Host-to-Host Communication

- TCP concepts
- TCP and UDP Ports
- Port Numbers
- TCP Connection Setup
- Basic TCP reliability mechanisms
- User Datagram Protocol (UDP)
- Key differences between TCP and UDP
- How applications communicate with network services

Module 9 – IPv4 Network Address Translation

- Network Address Translation concepts
- The relationship between private and public addressing
- Address Translation
- Dynamic NAT
- Port Address Translation
- Full Cone NAT
- Restricted Cone NAT
- Port Restricted Cone NAT
- Symmetric NAT
- The role of NAT in Internet connectivity

Module 10 – The Application Layer and DNS

- The role of the Application Layer
- Domain Name System (DNS)
- The Domain Name Space
- Global DNS Structure
- Resolving names to IP addresses
- Windows DNS Configuration
- Reviewing DNS settings
- Testing DNS
- Investigating basic DNS problems