IT INFRASTRUCTURE AND NETWORKS

IPv6 Fundamentals Design and Deployment (IP6FD)

LENGTH	PRICE (Excl. GST)	VERSION
5 days	**NZD 5995**	**3.0**

WHY STUDY THIS COURSE

In this five-day course, network engineers and technicians working in the enterprise sector will gain the knowledge and skills needed to study and configure Cisco IOS software IPv6 v3.0 features. You will get an overview of IPv6 technologies, and you'll cover IPv6 design and implementation.

You will learn about IPv6 operations, addressing, routing, services, and transition, and you'll learn to deploy IPv6 in enterprise and service provider networks. Case studies provide useful deployment scenarios.

Digital courseware: Cisco provides students with electronic courseware for this course. Students who have a confirmed booking will be sent an email prior to the course start date, with a link to create an account via learningspace.cisco.com before they attend their first day of class. Please note that any electronic courseware or labs will not be available (visible) until the first day of the class.

CISCO AT LUMIFY WORK

Lumify Work is the largest provider of authorised Cisco training in Australia, offering a wider range of Cisco courses, run more often than any of our competitors. Lumify Work has won awards such as ANZ Learning Partner of the Year (twice!) and APJC Top Quality Learning Partner of the Year.

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WHAT YOU'LL LEARN

- Factors that led to the development of IPv6 and possible uses of this new IP structure
- Structure of the IPv6 address format, how IPv6 interacts with data link layer technologies and how IPv6 is supported in Cisco IOS software
- Implement IPv6 services and applications
- Updates to IPv4 routing protocols needed to support IPv6 topologies
- Multicast concepts and IPv6 multicast specifics
- The best transition mechanism for a given scenario
- Security issues, how security for IPv6 is different than for IPv4, and emerging practices for IPv6-enabled networks

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- Standards bodies that define IPv6 address allocation and one of the leading IPv6 deployment issues-multihoming
- Deployment strategies that service providers might consider when deploying IPv6
- Case studies for enterprise, service provider, and branch networks

My instructor was great being able to put scenarios into real world instances that related to my specific situation.

I was made to feel welcome from the moment I arrived and the ability to sit as a group outside the classroom to discuss our situations and our goals was extremely valuable.

I learnt a lot and felt it was important that my goals by attending this course were met.

Great job Lumify Work team.

AMANDA NICOL
IT SUPPORT SERVICES MANAGER - HEALTH WORLD LIMITED

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Lumify Work Customised Training

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COURSE SUBJECTS

Introduction to IPv6

- Rationale for IPv6
  - IP Address Allocation
  - History of IPv4
  - Next Generation of IP
  - IPv4 Workarounds
- Evaluating IPv6 Features and Benefits
  - Features and Benefits of IPv6
  - IPv6 Addresses
  - IPv6 Auto configuration and Aggregation
  - Advanced IPv6 Features
  - Transition Strategies to IPv6
- Market Drivers
  - Market Growth for IPv6
  - Native IPv6 Content
  - Drivers for Adoption

IPv6 Addressing Architecture

- IPv6 Address Formats and Types
- IPv6 Address Uses
- Required IPv6 Addresses

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- IPv6 Header Format
  - IPv6 Header Changes and Benefits
  - IPv6 Header Fields
  - IPv6 Extension Headers
- Enabling IPv6 on Hosts
  - Enabling IPv6 on Windows
  - Enabling IPv6 on Mac OS X
  - Enabling IPv6 on Linux
- Enabling IPv6 on Cisco Routers
  - IPv6 Address Configuration
  - Auto configuration
- Using ICMPv6 and Neighbour Discovery
  - ICMPv6
  - ICMP Errors
  - Echo
  - IPv6 over Data Link Layers
  - Neighbour Discovery
  - Stateless Auto configuration
  - Value of Auto configuration
  - Renumbering
  - Cisco IOS Neighbour Discovery Command Syntax
  - Cisco IOS Network Prefix Renumbering Scenario
  - ICMP MLD
  - IPv6 Mobility

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- Troubleshooting IPv6
  - Cisco IOS IPv6 Configuration Example
  - Cisco IOS show Commands
  - Cisco IOS debug Commands
  - Cisco IOS debug Command Example

IPv6 Services

- IPv6 Mobility
  - Introduction to IP Mobility
  - Mobile IPv6
  - Network Mobility Examples
- DNS in an IPv6 Environment
  - DNS Objects and Records
  - DNS Tree Structure
  - Dynamic DNS
- DHCPv6 Operations
  - DHCPv6
  - DHCPv6 Operation
  - DHCPv6 Multicast Addresses
  - DHCPv6 Prefix Delegation Process
  - DHCPv6 Troubleshooting
- QoS Support in an IPv6 Environment
  - IPv6 Header Fields Used for QoS
  - IPv6 and the Flow Label Field
  - IPv6 QoS Configuration

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IPv6 Fundamentals Design and Deployment (IP6FD)

- Using Cisco IOS Software Features
  - Cisco IOS Software Features
  - Cisco IOS IPv6 Tools
  - IPv6 Support for Cisco Discovery Protocol
  - Cisco Express Forwarding IPv6
  - IP Service Level Agreements

IPv6-Enabled Routing Protocols

- Routing with RIPng
  - Introducing RIPng for IPv6
  - Examining RIPng Enhancements
  - Configuring RIPng
- Examining OSPFv3
  - OSPFv3 Key Characteristics
  - OSPFv3 Enhancements
  - OSPFv3 Configuration
  - OSPFv3 IPsec ESP Authentication and Encryption
  - OSPFv3 Advanced Functionalities
- Integrated IS-IS
  - Integrated IS-IS Characteristics
  - Changes Made to IS-IS to Support IPv6
  - Single SPF Architecture
  - Multitopology IS-IS for IPv6
  - IS-IS IPv6 Configuration on Cisco Routers

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- EIGRP for IPv6
  - Cisco IOS EIGRP for IPv6 Commands
  - MP-BGP
  - MP-BGP Support for IPv6
  - IPv6 as Payload and Transport Mechanism in MP-BGP
  - BGP Peering Over Link-Local Addresses
  - BGP Prefix Filtering
  - MP-BGP Configuration and Troubleshooting
- Configuring IPv6 Policy-Based Routing
  - Policy-Based Routing
  - Configure PBR
- Configuring FHRP for IPv6
  - First-Hop Redundancy Protocols and Concepts
  - HSRP for IPv6
  - GLBP for IPv6
- Configuring Route Redistribution
  - Route Redistribution
  - PE-CE Redistribution for Service Providers

IPv6 Multicast Services

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IPv6 Fundamentals Design and Deployment (IP6FD)

- Implementing Multicast in an IPv6 Network
  - IPv6 Multicast Addressing
  - PIM for IPv6
  - Rendezvous Points
  - MP-BGP for the IPv6 Multicast Address Family
  - How to Implement Multicasting in an IPv6 Network
  - IPv6 Multicast Application Example
- Using IPv MLD
  - Multicast Listener Discovery
  - MLD Snooping and MLD Group Limits
  - Multicast User Authentication and Group Range Support

IPv6 Transition Mechanisms

- Implementing Dual-Stack
  - Dual-Stack Applications
  - Dual-Stack Node
  - The Dual-Stack Approach
- IPv6 Tunneling Mechanisms
  - Overlay Tunnels
  - Manually Configured Tunnels
  - Automatic Tunnels

IPv6 Security

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IPv6 Fundamentals Design and Deployment (IP6FD)

- Configuring IPv6 ACLs
  - IPv6 ACLs
  - IPv6 ACL Configuration
  - Reflexive and Time-Based ACLs
  - Cisco IOS IPv6 Header Filtering
  - Cisco IOS New ICMPv6 Types
  - Editing ACLs
  - Configuring ACLs in an IPv6 Environment
- Using IPsec, IKE, and VPNs
  - IPsec, IKE, and VPNs Basics
  - IPsec and IKE
  - VPN Connections Using IPv6
- Security Issues in an IPv6 Transition Environment
  - Dual-Stack Issues
  - Tunnel Security Issues
  - NAT-PT Security Issues
  - ICMP Traffic Requirements

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IPv6 Fundamentals Design and Deployment (IP6FD)

- IPv6 Security Practices
  - Threats in IPv6 Networks
  - Build Distributed Security Capability
  - Hide Topology when Possible
  - Secure the Local Link
  - ICMPv6 at Edge: Manage ICMPv6 Traffic
  - Develop Mobility Support Plan
  - Use Transition Mechanisms as Transport
  - Secure the Routing Plane
  - Deploy an Early-Warning System
- Configuring Cisco IOS Firewall for IPv6
  - Cisco IOS Firewall for IPv6
  - IPv6 Inspection on ISRs
  - Implement IPv6 Inspection on ISRs
  - Zone-Based Policy Firewall for IPv6 on ISRs
  - Configuring Zones and Zone Pairs
  - Configuring a Basic OSI Layer 3 to 4 Interzone Access Policy
  - Troubleshooting the Zone-Based Policy Firewall

Deploying IPv6

- IPv6 Address Allocation
  - IPv6 Internet
  - IPv6 Address Allocation
  - Connecting to the IPv6 Internet

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IPv6 Fundamentals Design and Deployment (IP6FD)

- IPv6 Multihoming Issue
  - IPv6 Multihoming Aspects and Issues
  - IPv6 Multihoming Status
- IPv6 Enterprise Deployment Strategies
  - Enterprise Networks
  - Impacts of Network Services
  - WAN Networks
  - Dual Stack: Advantages and Disadvantages
  - Tunnelling: Advantages and Disadvantages

IPv6 and Service Providers

- IPv6 Service Provider Deployment
  - Dual-Stack Deployment
  - IPv6-Only Deployment
  - Encapsulation
  - IPv6 Services
  - Key Service Provider Strategies
  - Service Layer Address Allocation
  - Encapsulation Support

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IPv6 Fundamentals Design and Deployment (IP6FD)

- Support for IPv6 in MPLS
  - MPLS Operations
  - IPv6 over MPLS Deployment Scenarios
  - IPv6 Tunnels Configured on CE Routers
  - IPv6 over Layer 2 MPLS VPN
  - Cisco 6PE
  - How to Deploy Cisco 6PE on MPLS Networks
- 6VPE
  - Cisco 6VPE Basics
  - Configuring 6VPE
- IPv6 Broadband Access Services
  - IPv6 Rapid Deployment
  - Customer Link Encapsulations
  - FTTH Access Architecture
  - Cable Access Architecture
  - Wireless Access Architecture
  - DSL Access Architecture

IPv6 Case Studies

- Planning and Implementing IPv6 in Enterprise Networks
  - Enterprise Network Definition
  - Implementing IPv6 in an Enterprise Campus Network
  - IPv6 in an Enterprise WAN Network

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WHO IS THE COURSE FOR?

- Employee
- Channel Partner / Reseller
- Customer

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PREREQUISITES

It is recommended, but not required, to have the following skills and knowledge before attending this course:

- Implementing and Administering Cisco Solutions (CCNA)
- Understanding of networking and routing (at the CCNP Enterprise certification level, but no formal certification is required)
- Working knowledge of the Microsoft Windows operating system

- Planning and Implementing IPv6 in Service Provider Networks
  - Service Provider Network Design
  - Native IPv6 Deployment in Service Provider Access Networks
  - Native IPv6 Deployment in the Service Provider Core Network
  - 6PE Deployment in the Service Provider Core Network
- Planning and Implementing IPv6 in Branch Networks
  - Branch Deployment Overview
  - Branch Deployment Profiles: Single-Tier Profile Implementation

Labs

Lab 2-1: Enabling IPv6 on Hosts
Lab 2-2: Using Neighbour Discovery
Lab 3-1: Using Prefix Delegation
Lab 4-1: Routing with OSPFv3
Lab 4-2: Routing with IS-IS
Lab 4-3: Routing with EIGRP
Lab 4-4: Routing with BGP and MP-BGP
Lab 5-1: Multicasting
Lab 6-1: Implementing Tunnels for IPv6
Lab 7-1: Configuring Advanced ACLs
Lab 7-2: Implementing IPsec and IKE
Lab 7-3: Configuring Cisco IOS Firewall
Lab 9-1: Configuring 6PE and 6VPE

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