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Sign up

IPv6 Fundamentals & Transition

3 days (21 hours)

Overview

IPv6 is the new version of the Internet Protocol, designed to replace IPv4, which is on the verge of exhaustion. Thanks to its virtually unlimited address space and built-in security and automation mechanisms, IPv6 has become an essential pillar of modern network and DevOps architectures.

Our IPv6 Fundamentals & Transition training course will give you an in-depth understanding of IPv6 addressing concepts, how routing protocols work, IPv4 ? IPv6 transition mechanisms (dual-stack, tunneling, NAT64), as well as security and supervision aspects.

You'll learn how to deploy IPv6 in a DevOps environment, automate its configuration using modern tools (Terraform, Ansible, Kubernetes), and support the gradual migration of your systems and applications.

Like all our training courses, this one is based on the latest stable version of IPv6 standards, and favors a practical, operational approach.

Objectives

- Understand the fundamentals of IPv6 and how it differs from IPv4
- Master IPv6 addressing and routing
- Set up IPv4/IPv6 transition mechanisms
- Automate deployment with DevOps and IaC tools
- Diagnose and supervise an IPv6 environment
- Define a progressive and secure migration strategy

Target audience

- DevOps engineers and developers
- System and network administrators

Prerequisites

- Basic network knowledge (TCP/IP, routing, DNS)
- Linux/Windows system administration
- General understanding of DevOps practices

IPv6 Fundamentals & Transition training program

Introduction to IPv6 and transition issues

- IPv4 history and address exhaustion issues
- Introduction to IPv6 fundamentals
- Major differences between IPv4 and IPv6
- Operational and strategic benefits of IPv6
- Challenges for DevOps and cloud-native infrastructures

IPv6 structure and fundamental concepts

- IPv6 address format: unicast, multicast, anycast
- Notation, abbreviation and address grouping
- Prefix types and scope (link-local, global, unique-local)
- How Stateless auto-configuration (SLAAC) works
- Use of DHCPv6 and comparison with DHCPv4

Routing and internal operation

- IPv6 routing principles
- Differences from IPv4 routing
- Introduction to routing protocols supporting IPv6 (OSPFv3, BGP, RIPng)
- Role of ICMPv6 in connectivity and error handling
- Routing table management and impact on performance

IPv6 services and security

- Integrated features: QoS, IPsec, mobility
- IPv6-native encryption and authentication
- Exchange security and firewalling best practices
- Risks specific to IPv6 and IPv4/IPv6 coexistence
- Impact on DevOps and system administrators

Transition strategies: dual-stack and tunneling

- IPv4 to IPv6 transition scenarios
- Dual-stack: cohabitation of the two protocols
- IPv6 tunneling in IPv4 (6to4, ISATAP, GRE, etc.)
- Translation protocols (NAT64, DNS64, 464XLAT)
- Limits and pitfalls to avoid

Tools and network diagnostics

- CLI commands for IPv6 (Linux, Windows, Cisco)
- Checking connectivity and troubleshooting IPv6
- Flow analysis with Wireshark and other tools
- Supervision and collection of IPv6 logs in a DevOps environment
- Workshop: diagnosing an IPv6 network in a simulated environment

Implementation in a DevOps environment

- IPv6 integration in CI/CD pipelines
- IPv6 support in Docker, Kubernetes and cloud environments
- Infrastructure as Code (IaC) network configuration
- Automation via Ansible, Terraform, etc.
- Workshop: deployment of an automated dual-stack infrastructure

Migration case studies

- Stages of IPv4 migration ? IPv6 in the enterprise
- Application compatibility and validation tests
- Progressive deployment and rollback in the event of failure
- Good governance practices and documentation
- Workshop: implementing a migration plan in a test environment

Optimization and feedback

- Monitoring and optimizing implementation costs
- Feedback from companies that have migrated to IPv6
- Impact on resilience, performance and security
- Checklist of best practices for IPv6 industrialization
- Conclusion and preparation of concrete projects

Companies concerned

This course is aimed at both individuals and companies, large or small, wishing to train their teams in a new advanced IT technology, or to acquire specific business knowledge or modern methods.

Positioning on entry to training

Positioning at the start of training complies with Qualiopi quality criteria. As soon as registration is finalized, the learner receives a self-assessment questionnaire which enables us to assess his or her estimated level of proficiency in different types of technology, as well as his or her expectations and personal objectives for the forthcoming course, within the limits imposed by the selected format. This questionnaire also enables us to anticipate any connection or security difficulties within the company (intra-company or virtual classroom) which could be problematic for the follow-up and smooth running of the training session.

Teaching methods

Practical training: 60% hands-on, 40% theory. Training material distributed in digital format to all participants.

Organization

The course alternates theoretical input from the trainer, supported by examples, with brainstorming sessions and group work.

Validation

At the end of the session, a multiple-choice questionnaire verifies the correct acquisition of skills.

Certification

A certificate will be awarded to each trainee who has completed the entire course.