



# IPv6 Fundamentals: A Straightforward Approach to Understanding IPv6

*Rick Graziani*

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## **IPv6 Fundamentals: A Straightforward Approach to Understanding IPv6** Rick Graziani

To support future business continuity, growth, and innovation, organizations must transition to IPv6, the next generation protocol for defining how computers communicate over networks. *IPv6 Fundamentals* provides a thorough yet easy-to-understand introduction to the new knowledge and skills network professionals and students need to deploy and manage IPv6 networks.

Leading networking instructor Rick Graziani explains all the basics simply and clearly, one step at a time, providing all the details you'll need to succeed. Building on this introductory coverage, he then introduces more powerful techniques that involve multiple protocols and processes and provides hands-on resources you can rely on for years to come.

You'll begin by learning why IPv6 is necessary, how it was created, and how it works. Next, Graziani thoroughly introduces IPv6 addressing, configuration options, and routing protocols, including RIPv6, EIGRP for IPv6, and OSPFv3. You'll learn how to integrate IPv6 with IPv4, enabling both protocols to coexist smoothly as you move towards full reliance on IPv6.

Throughout, Graziani presents all the IOS command syntax you'll need, offering specific examples, diagrams, and Cisco-focused IPv6 configuration tips. You'll also find links to Cisco white papers and official IPv6 RFCs that support an even deeper understanding.

**Rick Graziani** teaches computer science and computer networking courses at Cabrillo College. He has worked and taught in the computer networking and IT field for nearly 30 years, and currently consults for Cisco and other leading clients. Graziani's recent Cisco Networking Academy Conference presentation on IPv6 Fundamentals and Routing drew a standing audience and the largest virtual audience for any session at the event. He previously worked for companies including Santa Cruz Operation, Tandem Computers, and Lockheed.

- Understand how IPv6 overcomes IPv4's key limitations
- Compare IPv6 with IPv4 to see what has changed and what hasn't
- Represent IPv6 addresses, including subnet addresses
- Enable IPv6 on router interfaces using static, dynamic, EUI-64, unnumbered, SLAAC, and DHCPv6 approaches
- Improve network operations with ICMPv6 and Neighbor Discovery Protocol
- Configure IPv6 addressing and Access Control Lists using a common topology
- Work with IPv6 routing tables and configure IPv6 static routes
- Compare, configure, and verify each IPv6 IGP routing protocol
- Implement stateful and stateless DHCPv6 services
- Integrate IPv6 with other upper-level protocols, including DNS, TCP, and UDP
- Use dual-stack techniques to run IPv4 and IPv6 on the same device
- Establish coexistence between IPv4 and IPv6 through manual, 6to4, or ISATAP tunneling
- Promote a smooth transition with NAT64 (Network Address Translation IPv6 to IPv4)
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This book is part of the **Cisco Press Fundamentals Series**. Books in this series introduce networking

professionals to new networking technologies, covering network topologies, sample deployment concepts, protocols, and management techniques.

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