



Router Security Strategies: Securing IP Network Traffic Planes

By Gregg Schudel, David Smith

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Router Security Strategies: Securing IP Network Traffic Planes provides a comprehensive approach to understand and implement IP traffic plane separation and protection on IP routers. This book details the distinct traffic planes of IP networks and the advanced techniques necessary to operationally secure them. This includes the data, control, management, and services planes that provide the infrastructure for IP networking.

The first section provides a brief overview of the essential components of the Internet Protocol and IP networking. At the end of this section, you will understand the fundamental principles of defense in depth and breadth security as applied to IP traffic planes. Techniques to secure the IP data plane, IP control plane, IP management plane, and IP services plane are covered in detail in the second section.

The final section provides case studies from both the enterprise network and the service provider network perspectives. In this way, the individual IP traffic plane security techniques reviewed in the second section of the book are brought together to help you create an integrated, comprehensive defense in depth and breadth security architecture.

“Understanding and securing IP traffic planes are critical to the overall security posture of the IP infrastructure. The techniques detailed in this book provide protection and instrumentation enabling operators to understand and defend against attacks. As the vulnerability economy continues to mature, it is critical for both vendors and network providers to collaboratively deliver these protections to the IP infrastructure.”

—Russell Smoak, Director, Technical Services, Security Intelligence Engineering, Cisco

Gregg Schudel, CCIE® No. 9591, joined Cisco in 2000 as a consulting system engineer supporting the U.S. service provider organization. Gregg focuses on IP core network security architectures and technology for interexchange carriers and

web services providers.

David J. Smith, CCIE No. 1986, joined Cisco in 1995 and is a consulting system engineer supporting the service provider organization. David focuses on IP core and edge architectures including IP routing, MPLS technologies, QoS, infrastructure security, and network telemetry.

- Understand the operation of IP networks and routers
- Learn about the many threat models facing IP networks, Layer 2 Ethernet switching environments, and IPsec and MPLS VPN services
- Learn how to segment and protect each IP traffic plane by applying defense in depth and breadth principles
- Use security techniques such as ACLs, rate limiting, IP Options filtering, uRPF, QoS, RTBH, QPPB, and many others to protect the data plane of IP and switched Ethernet networks
- Secure the IP control plane with rACL, CoPP, GTSM, MD5, BGP and ICMP techniques and Layer 2 switched Ethernet-specific techniques
- Protect the IP management plane with password management, SNMP, SSH, NTP, AAA, as well as other VPN management, out-of-band management, and remote access management techniques
- Secure the IP services plane using recoloring, IP fragmentation control, MPLS label control, and other traffic classification and process control techniques

This security book is part of the Cisco Press® Networking Technology Series. Security titles from Cisco Press help networking professionals secure critical data and resources, prevent and mitigate network attacks, and build end-to-end self-defending networks.



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Editorial Review

From the Back Cover

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About the Author

Gregg Schudel, CCIE No. 9591 (Security), joined Cisco in 2000 as a consulting system engineer supporting the U.S. Service Provider Organization. Gregg focuses on IP core network and services security architectures and technology for inter-exchange carriers, web services providers, and mobile providers. Gregg is also part of a team of Corporate and Field resources focused on driving Cisco Service Provider Security Strategy. Prior to joining Cisco, Gregg worked for many years with BBN Technologies, where he supported network security research and development, most notably in conjunction with DARPA and other federal agencies involved in security research. Gregg holds an MS in engineering from George Washington University, and a BS in engineering from Florida Institute of Technology. Gregg can be contacted through e-mail at gschudel@cisco.com.

David J. Smith, CCIE No. 1986 (Routing and Switching), joined Cisco in 1995 and is a consulting system engineer supporting the Service Provider Organization. Since 1999 David has focused on service provider IP core and edge architectures, including IP routing, MPLS technologies, QoS, infrastructure security, and network telemetry. Between 1995 and 1999, David supported enterprise customers designing campus and global WANs. Prior to joining Cisco, David worked at Bellcore developing systems software and experimental ATM switches. David holds an MS in information networking from Carnegie Mellon University, and a BS in computer engineering from Lehigh University. David can be contacted through e-mail at dasmith@cisco.com.

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