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Cisco® Network Security

Second Edition

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- Step-by-Step Instructions for Security Management, Including PIX Device Manager, and Secure Policy Manager
- Hundreds of Designing & Planning and Configuring & Implementing Sidebars, Security Alerts, and Cisco Security FAQs

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Remote Dial-in User System

Remote Dial-in User System (RADIUS) is an open standard and available from many vendors:

- RADIUS uses UDP, so it only offers best effort delivery at a lower overhead.
- RADIUS encrypts only the password sent between the Cisco access client and RADIUS server. RADIUS does not provide encryption between the workstation and the Cisco access client.
- RADIUS does not support multiple protocols, and only works on IP networks.
- RADIUS does not provide the ability to control the commands that can be executed on a router: It provides authentication, but not authorization to Cisco devices.

Foreword

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**Answers to Your
Frequently Asked
Questions**

Q: Is a vulnerability assessment program expensive?

A: Not necessarily. The Cisco product is not terribly expensive, and there exist open source solutions which are free to use. The actual assessment program is probably less expensive than the remediation efforts: Maintaining all your hosts on an ongoing basis is a steep maintenance requirement, and one that not all enterprises have accepted. But ever since the summer of 2001, there has been clear evidence that you have to manage your hosts and keep their patch levels up-to-date just to stay in business.

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NOTE

Make sure the COM port properties in the terminal emulation program match the following values:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit
- Hardware flow control

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Logging Commands

There are also eight different levels of messages, which will be listed from most severe (Emergency - Level 0) to least severe (Debugging - Level 7):

- Emergency – Level 0
- Alerts – Level 1
- Critical – Level 2
- Errors – Level 3
- Warning – Level 4
- Notification – Level 5
- Informational – Level 6
- Debugging – Level 7

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**Configuration
Commands**

Before NAT can be implemented, the “inside” and “outside” networks must be defined. To define the “inside” and “outside” networks, use the *ip nat* command.

```
ip nat inside |
  outside
```

- **Inside** Indicates the interface is connected to the inside network (the network is subject to NAT translation).
- **Outside** Indicates the interface is connected to the outside network.

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Encryption Key Types

Cryptography uses two types of keys: *symmetric* and *asymmetric*. Symmetric keys have been around the longest; they utilize a single key for both the encryption and decryption of the ciphertext. This type of key is called a *secret key*, because you must keep it secret. Otherwise, anyone in possession of the key can decrypt messages that have been encrypted with it. The algorithms used in symmetric key encryption have, for the most part, been around for many years and are well known, so the only thing that is secret is the key being used. Indeed, all of the really useful algorithms in use today are completely open to the public.

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LocalDirector Product Overview

The LocalDirector product is available in three different ranges:

- **LocalDirector 416**
This is both the entry-level product as well as the medium-size product. It supports up to 90 Mbps throughput and 7,000 connections per second.
- **LocalDirector 430**
This is the high-end product. It supports up to 400 Mbps throughput and 30,000 connections per second.
- **LocalDirector 417**
Newer platform with different mounting features. It is even more productive than 430 series and has more memory—two Fast Ethernet and one Gigabit Ethernet interfaces.

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Overview of the Different VPN Technologies

- A *peer* VPN model is one in which the path determination at the network layer is done on a hop-by-hop basis.
- An *overlay* VPN model is one in which path determination at the network layer is done on a “cut-through” basis to another edge node (customer site).
- Link Layer VPNs are implemented at link layer (Layer 2) of the OSI Reference model.

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WARNING

The SRVTAB is the core of Kerberos security. Using TFTP to transfer this key is an IMPORTANT security risk! Be very careful about the networks in which this file crosses when transferred from the server to the router. To minimize the security risk, use a cross-over cable that is directly connected from a PC to the router's Ethernet interface. Configure both interfaces with IP addresses in the same subnet. By doing this, it is physically impossible for anyone to capture the packets as they are transferred from the Kerberos server to the router.

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FlowWall Security

FlowWall provides intelligent flow inspection technology that screens for all common DoS attacks, such as SYN floods, ping floods, smurfs, and abnormal or malicious connection attempts. It does this by discarding packets that have the following characteristics:

- Frame length is too short.
- Frame is fragmented.
- Source IP address = IP destination (LAND attack).
- Source address = Cisco address, or the source is a subnet broadcast.
- Source address is not a unicast address.
- Source IP address is a loop-back address.
- Destination IP address is a loop-back address.
- Destination address is not a valid unicast or multicast address.

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Searching the Network for Vulnerabilities

There are three primary steps in creating a session to search your network for vulnerabilities:

1. Identifying the network addresses to scan
2. Identifying vulnerabilities to scan by specifying the TCP and UDP ports (and any active probe settings)
3. Scheduling the session

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Q: Which IDS platforms are supported in CSPM?		
A: Only Cisco Secure IDS sensors (former NetRanger sensors) are supported, either in standalone configuration or as Catalyst 6000 blades. Embedded IDS features of Cisco PIX firewalls and Cisco IOS routers are not supported.		

Distributed Denial of Service Attacks

Recently, distributed denial of service (DDoS) attacks have become more common. Typical tools used by attackers are Trinoo, TFN, TFN2K and Stacheldraht (“barbed wire” in German). How does a DDoS attack work? The attacker gains access to a Client PC. From there, the cracker can use tools to send commands to the nodes. These nodes then flood or send malformed packets to the victim. Coordinated traceroutes from several sources are used to probe the same target to construct a table of routes for the network. This information is then used as the basis for further attacks.

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Network Security Management

To overcome security management issues, Cisco has developed several security management applications including these:

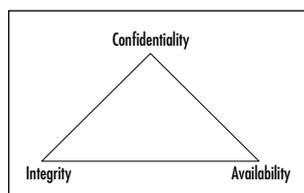
- PIX Device Manager
- CiscoWorks2000 Access Control Lists Manager
- Cisco Secure Policy Manager
- Cisco Secure Access Control Server

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Understanding Security Fundamentals and Principles of Protection

Security protection starts with the preservation of the *confidentiality, integrity, and availability* (CIA) of data and computing resources. These three tenets of information security, often referred to as “The Big Three,” are sometimes represented by the CIA triad.



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Foreword

Today's Security Environment

Information security has become an extremely important topic for everyone over the past few years. In today's environment the number of touch points between an organization's information assets and the outside world has drastically increased: millions of customers can interact via a Web site, thousands of employees and partners may connect using Virtual Private Networks (VPNs), and dozens of critical applications may be completely outsourced to application service providers (ASPs). The deployment of wireless LANs also means that users no longer even need a physical connection to the network to gain access.

In addition to an explosion of touch points, we are faced with an infinitively complex and rapidly changing web of networks, applications, systems, client software, and service providers. Under these circumstances, absolute security cannot be guaranteed since it's impossible to test the security implications of every configuration combination of hardware and software under every set of conditions.

A critical strategy for reducing security risk is to practice defense-in-depth. The essence of defense-in-depth is to create an architecture that incorporates multiple layers of security protection. Recognizing this requirement, Cisco Systems has placed a high priority on security and offers a wide range of stand-alone and integrated security products. *Managing Cisco Network Security, Second Edition* is important to anyone involved with Cisco networks, as it provides practical information on using a broad spectrum of Cisco's security products. Security is not just for "security geeks" anymore. It is an absolute requirement of all network engineers, system administrators, and other technical staff to understand how best to implement security.

About This Book

In addition to providing a general understanding of IP network security and the threat environment, this book offers detailed and practical information on how to use Cisco's suite of security products. Callisma's contributing authors are industry experts with real world implementation experience. Each chapter will guide you through a particular aspect of security, from the family of PIX firewalls, to the Cisco Secure Intrusion Detection System (IDS), to traffic filtering in IOS, to the Cisco Secure Policy Manager (CSPM). In reading this book, you will obtain a firm understanding of how to secure your Cisco network.

About Callisma

Callisma is setting a new standard for network consulting, helping today's enterprises and service providers design and deploy networks that deliver strategic business value. By providing its clients with a broad base of technical practices, a flexible, results-oriented engagement style, and the highest quality documentation and communication, Callisma delivers superior solutions—on time and on budget. Callisma practices include IP Telephony, Internetworking, Optical Networking, Operations Management, Project Management, and Security and Storage Networking. Callisma is headquartered in Silicon Valley, with offices located throughout the United States. For more information, visit the Callisma Web site at www.callisma.com or call 888-805-7075

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