Network Design Workshop

NPNOG::1

Instructor Team

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Organization

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Housekeeping

- This is a 3 Days Workshop
 - Completion certificates will be given to those who attend all 3 days
 - Have fun !
 - Please Ask Questions
 - No Skype, IM, Facebook, Twitter, etc
 - Mobile Phones OFF or on Silence.
 - If you must take calls, Please do so OUTSIDE the room.

Agenda

Day1

Introductions & Workshop Objectives Introduction to networking Layar1, 2 and 3 Refresher Network Design Principles and Best Practices Network Cabling Cabling Installation Introduction to Linux Linux Lab

Agenda

Day2

Routing Basics IPv4 and IPV6 Building an IP Address Plan TCP/IP Lab Cisco and Juniper Configuration Essentials Layer 2 Network Design Switching Architectures: Spanning Tree Spanning Tree Lab

Agenda

Day3

Introduction to OSPF OSPF Lab Introduction to NAT NAT/PAT lab Network Migration and Planning Network Security IPsec VPN lab

Introduction to Networking

Introduction Globally Connected LANs, WANs, and the Internet The Network as a Platform The Changing Network Environment Summary

Globally Connected

Upon completion of this section, you should be able to:

- Explain how networks affect the way we interact, learn, work, and play.
- Explain how host devices can be used as clients, servers, or both.

Networking Today



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Networks in Our Daily Lives



Technology Then and Now



No Boundaries

Networks support the way we:

- Learn
- Communicate
- Work
- Play







Providing Resources in a Network



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Networks of Many Sizes



Small Home Networks



Medium to Large Networks



Small Office/Home Office Networks



World Wide Networks

Clients and Servers



Peer-to-Peer



The advantages of peer-to-peer networking:

- · Easy to set up
- Less complexity
- · Lower cost since network devices and dedicated servers may not be required
- · Can be used for simple tasks such as transferring files and sharing printers

The disadvantages of peer-to-peer networking:

- No centralized administration
- Not as secure
- Not scalable
- · All devices may act as both clients and servers which can slow their performance

LANs, WANs, and the Internet

Upon completion of this section, you should be able to:

- Explain the use of network devices.
- Compare the devices and topologies of a LAN to the devices and topologies of a WAN.
- Describe the basic structure of the Internet.
- Explain how LANs and WANs interconnect to the Internet.

Network Components



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Overview of Network Components

Overview of Network Components (cont.)



Processes and Services Services (Software) Rule 1, Rule 2, Rule 3 Internetwork LAN LAN Devices Media Services

Overview of Network Components (cont.)

End Devices



Intermediary Network Devices



Intermediary network devices perform some or all of these functions:

- Regenerate and retransmit data signals
- Maintain information about what pathways exist through the network and internetwork
- Notify other devices of errors and communication failures
- Direct data along alternate pathways when there is a link failure
- Classify and direct messages according to priorities
- Permit or deny the flow of data, based on security settings

Network Media



Network Media (cont.)



Network Representations



Network Representations (Cont.)

Network Interface Card



Topology Diagrams



Topology Diagrams (Cont.)



LANs and WANs



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Types of Networks



Types of Networks

The two most common types of network infrastructures are:

- Local Area Network (LAN)
- Wide Area Network (WAN)

Other types of networks include:

- Metropolitan Area Network (MAN)
- Wireless LAN (WLAN)
- Storage Area Network (SAN)

Local Area Networks



Wide Area Networks

LANs separated by geographic distance are connected by a network known as a WAN.

The Internet, Intranets, and Extranets

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The Internet

Intranets and Extranets

Internet Connections

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Internet Access Technologies

Home and Small Office Internet Connections

Business Internet Connections

The Network as a Platform

Upon completion of this section, you should be able to:

- Explain the concept of a converged network.
- Describe the four basic requirements of a reliable network.

Converged Networks

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Traditional Separate Networks

Multiple services are running on multiple networks.

The Converging Networks Rule Agreement Standard Message Devices Medium Message Medium Devices Message Medium Devices One Network-Multiple Devices

Converged data networks carry multiple services on one network.

Reliable Networks

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Network Architecture

Fault Tolerance

Scalability

Additional users and whole networks can be connected to the Internet without degrading performance for existing users.

Quality of Service

Security

Security (cont.)

The Changing Network Environment

Upon completion of this section, you should be able to:

- Explain how trends such as BYOD, online collaboration, video, and cloud computing are changing the way we interact.
- Explain how networking technologies are changing the home environment.
- Identify basic security threats and solutions for both small and large networks.
- Describe the importance of understanding the underlying switching and routing infrastructure of a network.

Network Trends

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New Trends

Top trends include:

- Bring Your Own Device (BYOD)
- Online collaboration
- Video communications
- Cloud computing

Bring Your Own Device

Online Collaboration

Video Communication

Cloud Computing

Networking Technologies for the Home

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Technology Trends in the Home

Powerline Networking

Wireless Broadband

Network Security

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Security Threats

Security Threats

The most common external threats to networks include:

- Viruses, worms, and Trojan horses
- Spyware and adware
- Zero-day attacks, also called zero-hour attacks
- Hacker attacks
- Denial of service attacks
- Data interception and theft
- Identity theft

Security Solutions

Minimum solutions:

- Antivirus and antispyware
- Firewall filtering

Additional solutions:

- Dedicated firewall systems
- Access control lists (ACL)
- Intrusion prevention systems (IPS)
- Virtual Private Networks (VPNs)

Network Architecture

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Cisco Network Architecture

Summary

Chapter Objectives:

- Explain how multiple networks are used in everyday life.
- Describe the topologies and devices used in a small to medium-sized business network.
- Explain the basic characteristics of a network that supports communication in a small to medium-sized business.
- Explain trends in networking that will affect the use of networks in small to mediumsized businesses.

Thank you