

Network Administration

Module 7

Module Objectives

1. Review common networking components and introduce the firewall.
2. Discuss need for routing and common configuration activities.
3. Discuss the concept of tunneling and the purpose.
4. Briefly describe VPNs
5. Discuss public and private address space
6. Discuss the concept and purpose of NAT
7. Discuss firewall operations and policy
8. Discuss VMWare networking

Module Guidance

1. Video	Introduces the module and addresses module objectives 1, 2	Duration: 10 minutes
2. Activity 1	Routing	Duration: 15 minutes +
3. Video	.Address module objectives 3, 4, 5, 6,7,8	Duration: 15 minutes
4. Activity 2	Firewall installation	Duration: 15 minutes +

Total Duration: 55 minutes +

All activities designed for this module are hands-on. The speed at which the activities can be completed will vary. Each activity has a milestone that should be attainable within the budgeted time. Additional milestones are provided in order to further enrich the services being developed.

Supplemental Materials

1. Handout: Routing Administration
2. Handout: Pfsense Firewall Construction, Installation and Configuration

Module 7– Objectives and Key Instruction Points

This module will rely heavily on a network concepts handout provided in Module 3. The conceptual foundations needed for this module cannot be absent. This module will need to be redesigned if the handout is not written.

Objectives:

The focus of this module is to provide advanced concept topics and information useful for network administration. This module will include an activity that has students install a firewall.

Video Segment

1. Network Components
 - a. Review
 - i. NIC
 - ii. Bridge
 - iii. Hub
 - iv. Switch
 - v. Router
2. Routing administration
 - a. Local vs remote delivery
 - b. Routing rules
 - c. Routing protocols

Video Segment

3. Tunneling
 - a. Concept
 - i. Encapsulation
 - b. HTTP + SSL
 - c. RDP
 - d. VPN
 - e. Malicious uses
4. Private Address Ranges
5. Network Address Translation
6. Introduce Firewall
 - a. Layer 3
 - b. Layer 7
 - c. Pfsense
 - d. Keyhole
7. VMWare Networking

Activities

Name	Objectives	Content ideas
Activity1	Routing activity	Have students construct a dual homed unix system and configure it for packet forwarding. Using the VMs from the previous

		module, have the students construct a multi-tiered network placing the previous VMs in the various tiers. The newly constructed routers will interconnect the tiered subnets. The activity design should be modular. Not knowing how many 2 or 3 person groups may be participating, the activity should attempt accommodate an arbitrary number of groups.
Activity 2	Install a firewall	Have student groups create pfsense firewall VMs. The team needs in the long run only one, but it would be good if more than small group had the opportunity to build and manage a firewall. The firewalls could be put in place in parallel with the routers built in the previous activity. This is insecure, but it raises interesting routing considerations. At the end of the activity only one pfsense firewall will be needed. The others should be turned off and possibly discarded. A detailed pfsense construction handout will be needed.
Activity 3	N/A	-

Activity design

Activity1 Considerations:

Handouts

Title:

Objectives:

Length: X pages

Notes:

Title: Routing Administration

Objectives: Identify and describe routing related commands and utilities for Windows and Unix.

Length: X pages

Notes:

Title: Pfsense Firewall Construction, Installation and Configuration

Objectives: Give students sufficient information to build and manage a pfsense firewall.

Length: X pages

Notes: This document should be designed to be more how-to rather than conceptual. The concepts of good firewall policy will need to be learned elsewhere in the program.