Cisco Networking Academy Workshop 2007
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9 – 10 August 2007

Introduction to Eagle Server

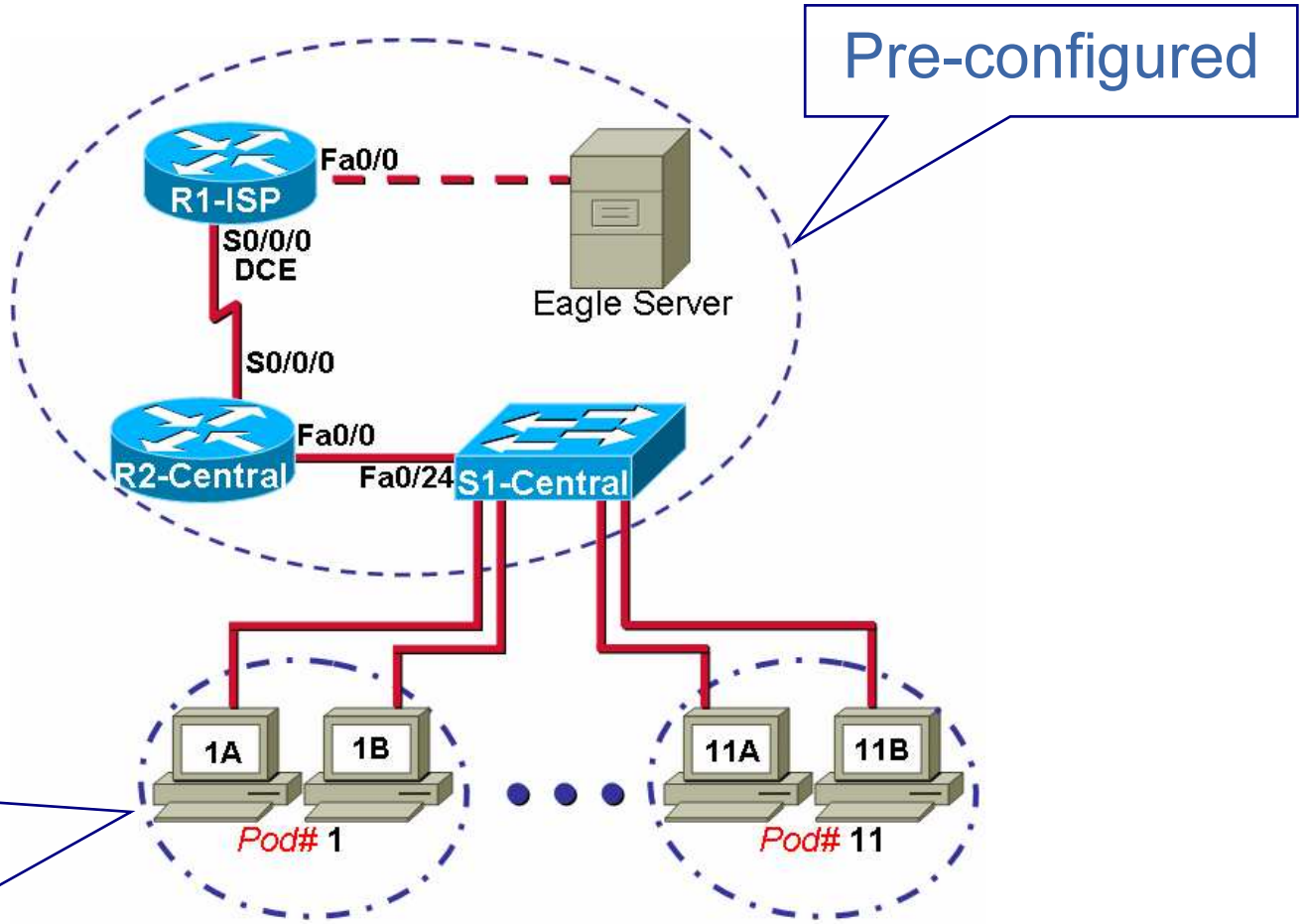
Eagle Server Introduction

- Concept & Overview
- Installation Options & Process
- Services & Software
- Documentation
- Labs

Eagle Server Concept

Students can access and use applications and services in the Lab as if on the Internet

Eagle Server Topology



Overview

Top-down approach in Exploration Network Fundamentals presents students with the opportunity to experience the setting up and implementing of Application layer services in a network lab environment.

A key part of the e-Doing in Exploration Network Fundamentals is basing Chapter 1 to 9 hands-on labs on a model Internet that uses a local server to provide a range of network services and applications that students can experience in the lab environment

Where to get Eagle Server

Eagle Server is available to Cisco Networking Academies from Tools on Academy Connection.

This is a downloadable an ISO image that is then written to a CD-ROM as an image (not data).

Four Options

1. Bootable CD-ROM downloadable as an ISO image

   1.1 Run from the CD

   1.2 Run as a permanently installed server on a PC

2. Downloadable VMware image

   2.3 Run from the image in RAM

   In the future -

   2.4 Run as a virtual server installed on a PC hard disk drive

Option 1

1.1 Bootable CD-ROM (ISO) - Run from the CD

The CD contains a bootable Linux file system.

Runs network services directly from RAM on the PC on which it boots.

Very Flexible:

- PC lab resources can be shared with non-CCNA classes or courses.
- Any available PC meeting the specifications can temporarily act as the server for the duration of the class.

But:

- Any modifications made to the Server are lost when the computer is rebooted.

Option 2

1.2 Permanent Server

The file system may be installed on a Linux or Windows FAT partition on the hard disk drive of a PC available to be permanently used as the server.

- A permanent installation enables any modifications made to the server to be retained when the computer is rebooted and re-used in later labs.
- Facilitates local server development and customization.
- Enables local backup copies of IOS images, configurations and class resources to be stored for future use.

But:

- Requires dedicated PC or partition on a PC hard drive.

Option 3

2.1 Run from the saved VMware image

Compressed VMware image (RAR file) of server ISO

Downloaded and deployed using VMware.

Enables use of different lab and classroom computer resources that are available at different times.

The server runs as virtual server on a PC running VMware Player.

Very flexible, but:

- Requires VMware Player to be installed and running on PC
- Changes made to the server do not persist when the virtual server is restarted.

Option 4

2.2 Run as a virtual server installed on a PC hard disk drive

FUTURE OPTION UNDER DEVELOPMENT

Download compressed VMware image of Eagle Server Development Environment.

Note: The compressed file size is approximately 2.75GB, and includes two VMware hard disk drives.

Any changes to the server are retained when it is restarted.

But:

- Requires dedicated PC or partition on a PC hard drive.

Eagle Server Minimum Requirements

CPU: Minimum Pentium 3 or equivalent
Pentium 4 or equivalent recommended

RAM: Minimum 512 MB
1 GB recommended

HDD: Minimum 15 GB
4 GB required to install Eagle-server on HDD.

CD-ROM: Minimum 10x CD-ROM
Minimum 30x CD-ROM to run from RAM

NIC: 1

OS: Minimum Microsoft Windows 2000

Before Starting

1. Eagle Server supports only 1 network interface card, **`eth0`**.

- Disable built-in wireless NICs in BIOS.
- Cable only **`eth0`** if multiple wired NICs exist.

2. Power sequencing is important

- Configure, at a minimum, router R1-ISP interface Fa0/0 with IP address 192.168.254.253, mask 255.255.255.0 and issue **`no shutdown`**.
- Connect a crossover cable between R1-ISP Fa0/0 and the server NIC.
- Power on the router first before starting Eagle Server.

Eagle Server Setup: Running from CD

- Ensure PC is set to boot from the CD-ROM first. Change BIOS settings if necessary.
- Place the Eagle Server CD into the tray of the PC.
- Restart the PC.
- At the Exploration Server prompt, press **<ENTER>** to boot.
- After the drivers and settings are loaded, select option "1” to run the Linux software program from the CD and RAM.
- Eagle server software has a pre-configured IP address of 192.168.254.254.

Eagle Server Setup: Dedicated Server

- Create and format a 4 GB FAT file system partition (not NTFS) on a MS Window PC hard drive.
- Reboot from the Eagle Server CD.
- At the opening screen press **<ENTER>** . This will load the Linux kernel.
- Type menu option **installonFAT**. Follow the instructions that are displayed. The installation will take approximately 15 minutes, depending on the speed of the CD.
- Leave the CD in the tray, required to access the server partition when the computer is rebooted.
- When the server is rebooted, press **<ENTER>** and type menu option **runondisk**.

Eagle Server Setup: VMware from Image

- Download and install the latest version of WMWare Player from URL: http://www.vmware.com/download/player/
- Download Eagle-Server-*version*.rar
- Open the file in Winrar or Winzip, and drag the Eagle-Server folder to the computer's desktop
- Double-click on folder Eagle-Server
- Double-click on the VMWare configuration file, Eagle_Server.vmx

  This will start Eagle Server inside VMWare.

Note: Changes will not be persistent because the VMWare image is in ISO format.

Services Provided

- Domain Name Service
- HTTP Web Server
- Wiki & Web logs (blogging)
- Instant Messaging / IRC
- Email
- FTP
- TFTP
- SSH

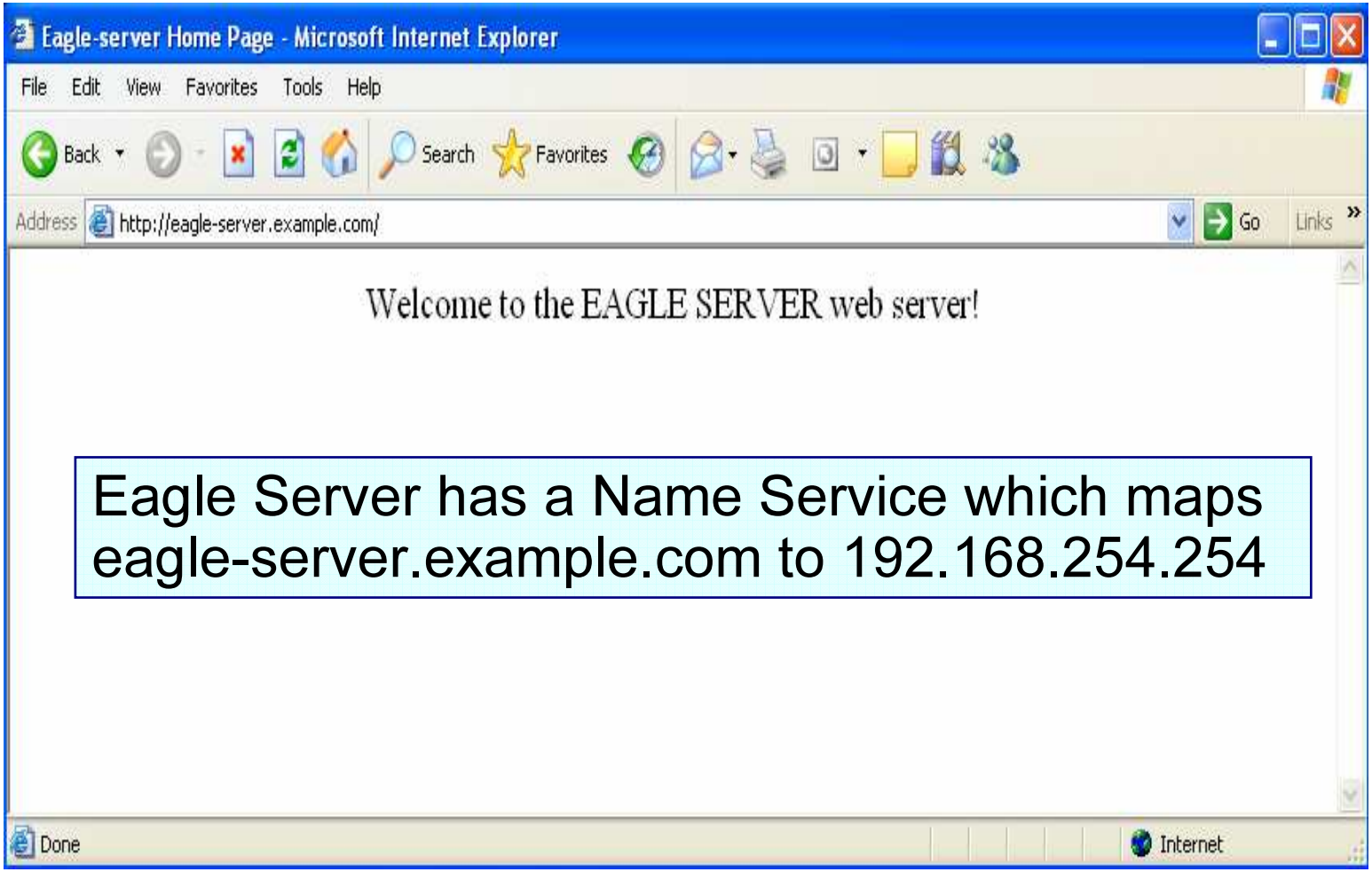
Eagle Server Name Service

Eagle Server primary network is 192.168.254.0 /24 on **`eth0`**

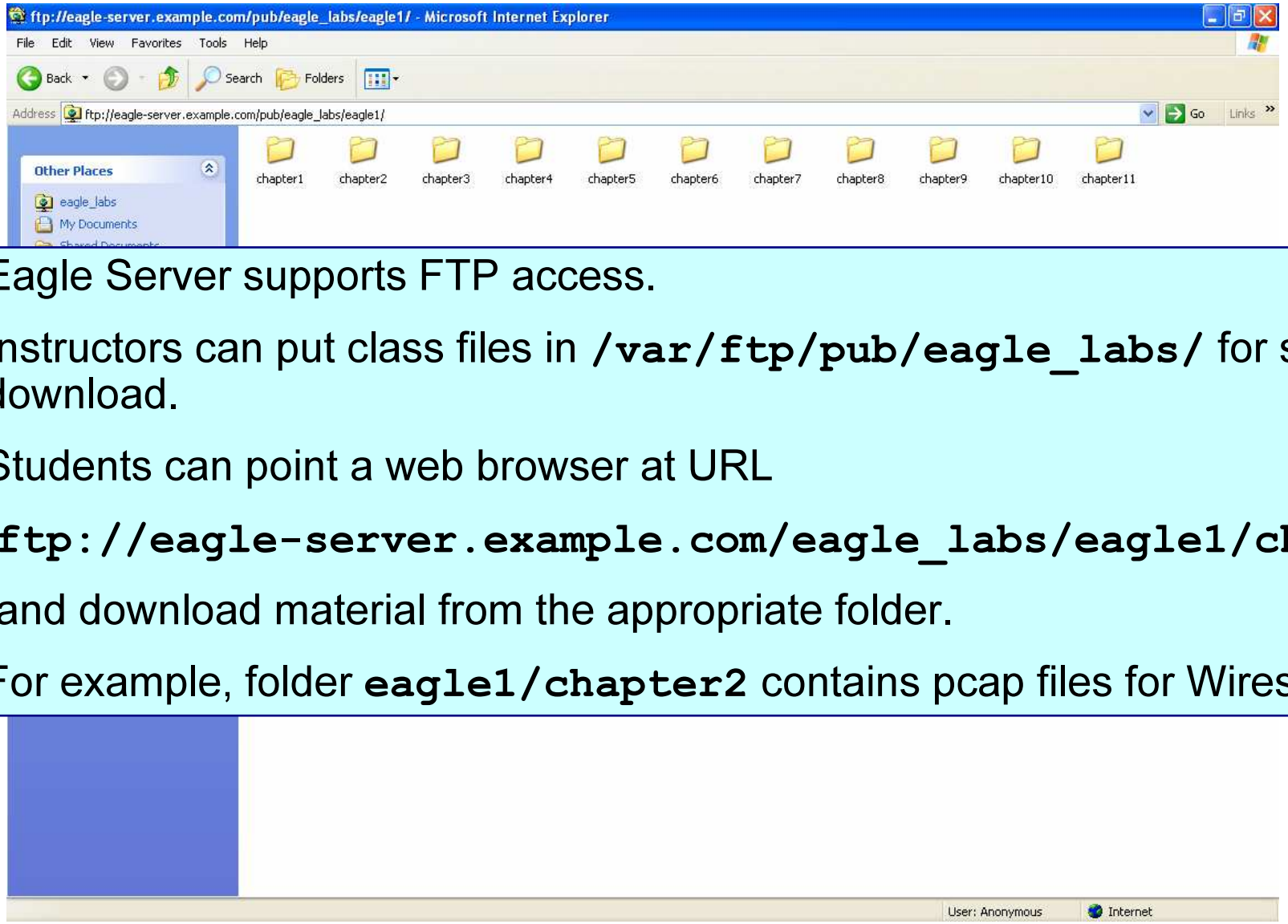
NAME	IP ADDRESS
eagle-server.example.com	192.168.254.254
r1-isp	192.168.254.253
r2-central	172.16.255.254
s1-central	172.16.254.1
host1a-example.com	172.16.1.1*
host1b-example.com	172.16.1.2*
host2a-example.com	172.16.2.1*
host2b-example.com	172.16.2.2*
etc, to	
host11b-example.com	172.16.11.2*

* provided the student lab computer is configured for this IP Address

Web Server Name Resolution



Chapter FTP Resources



Eagle Server supports FTP access.

Instructors can put class files in **`/var/ftp/pub/eagle_labs/`** for student download.

Students can point a web browser at URL

`ftp://eagle-server.example.com/eagle_labs/eagle1/chapterX`

and download material from the appropriate folder.

For example, folder **`eagle1/chapter2`** contains pcap files for Wireshark.

TFTP & Configurations

Eagle Server is TFTP enabled.

- Instructors can use Eagle Server to backup IOS images or IOS configuration files for students to download to Cisco devices.
- As root, instructors can place files for TFTP transfer in /**`tftpboot`**
- Default device configurations include:
  - R1-ISP router connects to the Eagle server and has ip-name server configured to connect to allow access to the Eagle server via http.
  - R2-Central router has DHCP, DNS, usernames and passwords configured as well as privilege exec levels set for user access.
  - The S1-Central switch has usernames and passwords configured and privilege exec level settings.

Access to Devices

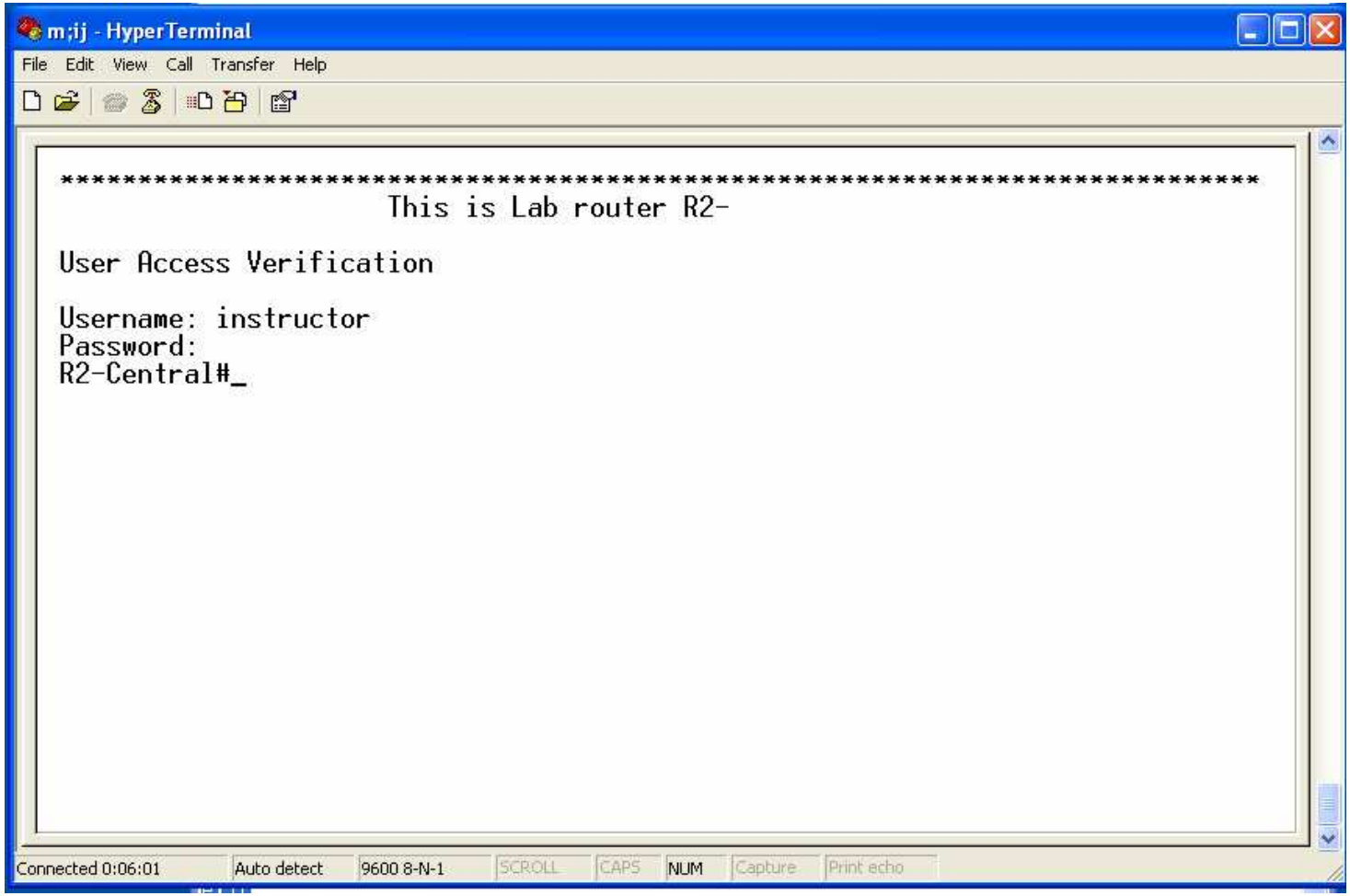
- Instructor access:

  Console prompt on R2-Central will appear and ask for a username and password. Default settings are **`instructor`** and **`cisco`**. (You are encouraged to change the instructor password to prevent unauthorized access to the devices by students.)

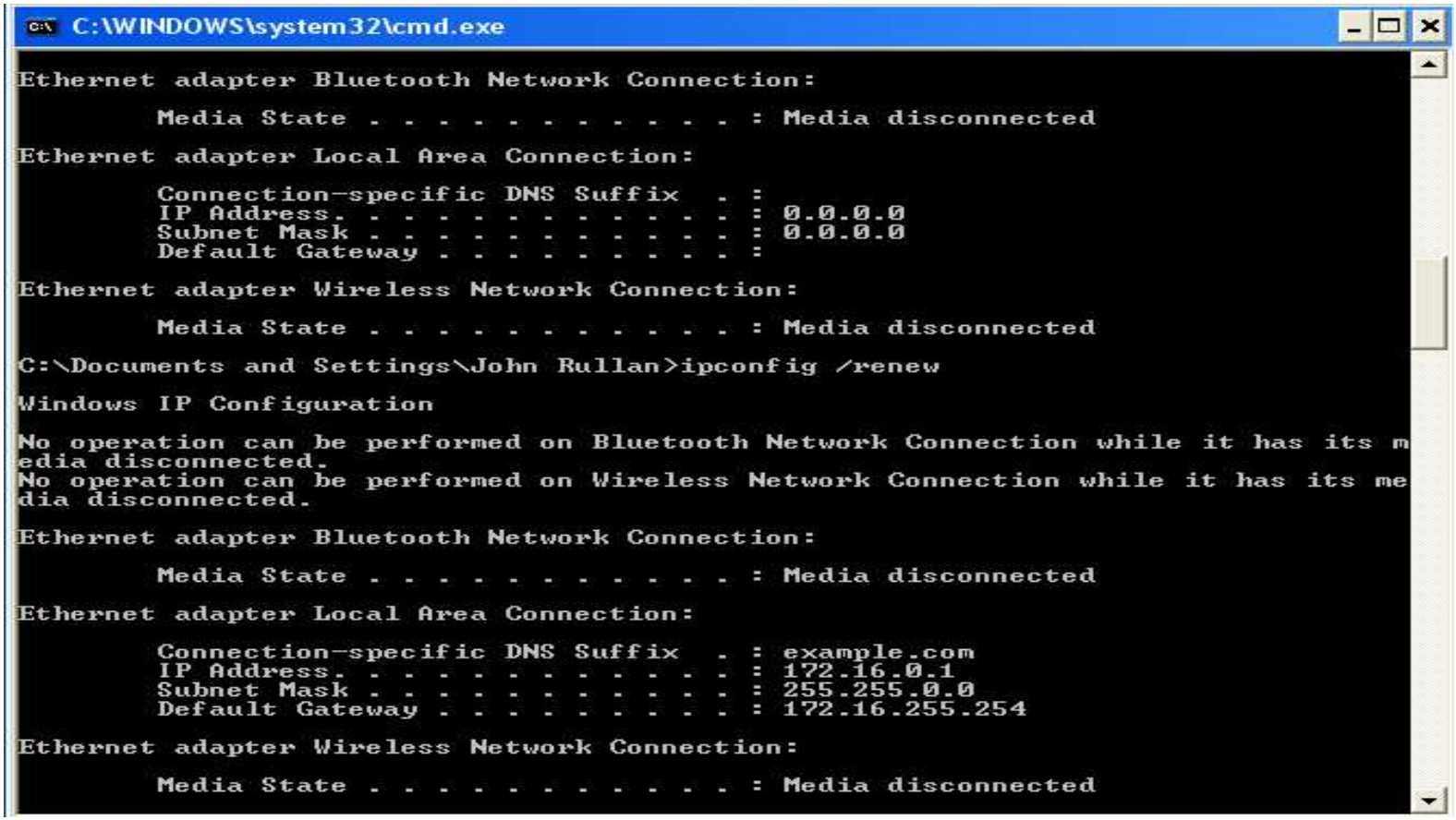
- Student access:

  Certain labs will direct students to telnet to the devices and access is granted using **`ccna`** (pod #) and password **`cisco`**. Privilege exec setting will limit the commands that they have access to.

Instructor Device Login Screen



Student Connection to Topology



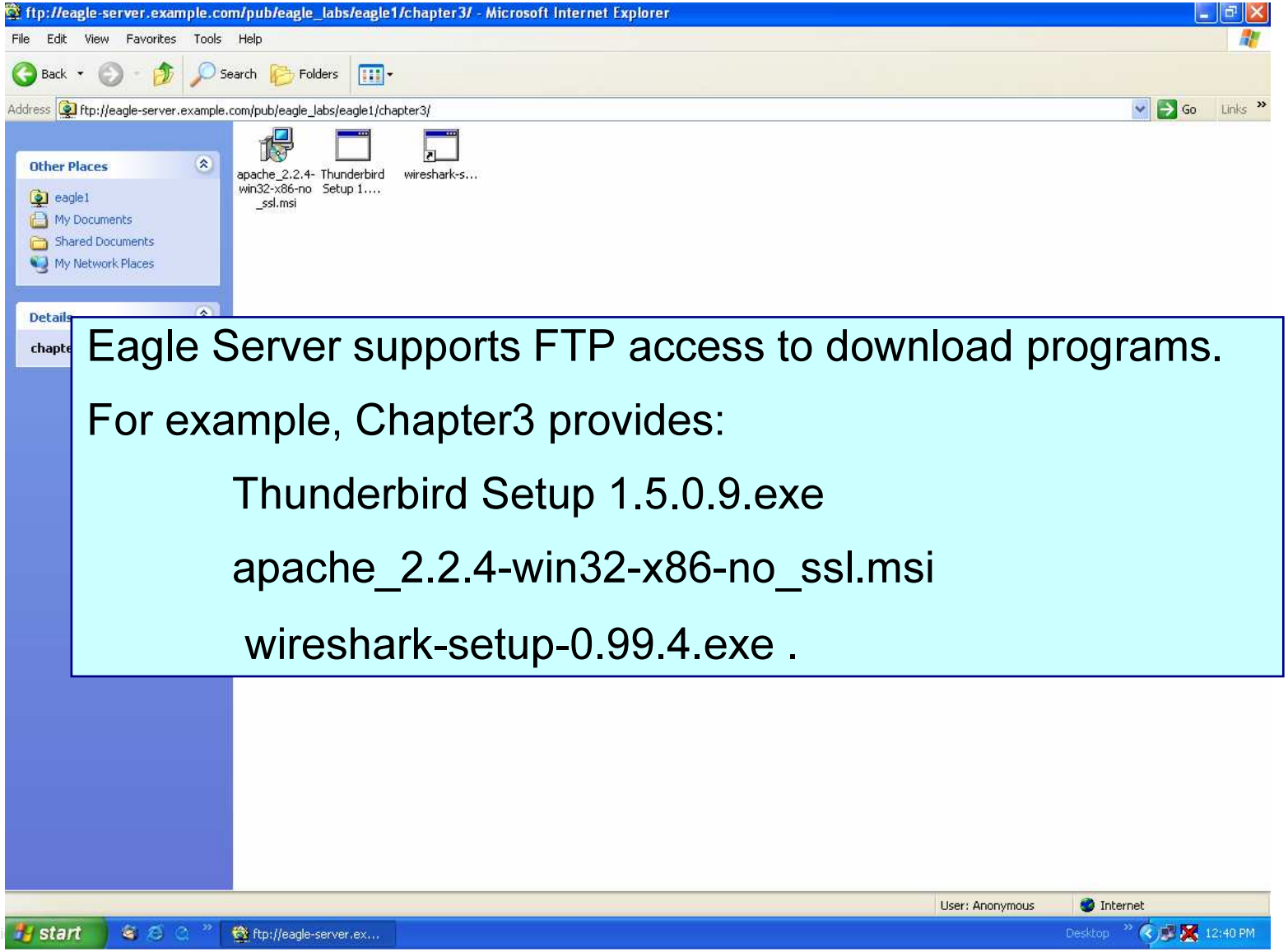
With DHCP enabled on the PC, at the command prompt students type **`ipconfig /release`**, then **`ipconfig /renew`** to pull an address from the R2-Central router.

Software Downloadable from Eagle Server

- Wireshark (formerly Ethereal)
- Apache Web Server
- TWiki
- Gaim (Internet Messenger)
- Mozilla Thunderbird
- *SolarWinds TFTP Server
- *TeraTerm

* Must be downloaded from Internet then uploaded to Eagle Server

Chapter Downloadable Programs



Eagle Server supports FTP access to download programs.

For example, Chapter3 provides:

Thunderbird Setup 1.5.0.9.exe

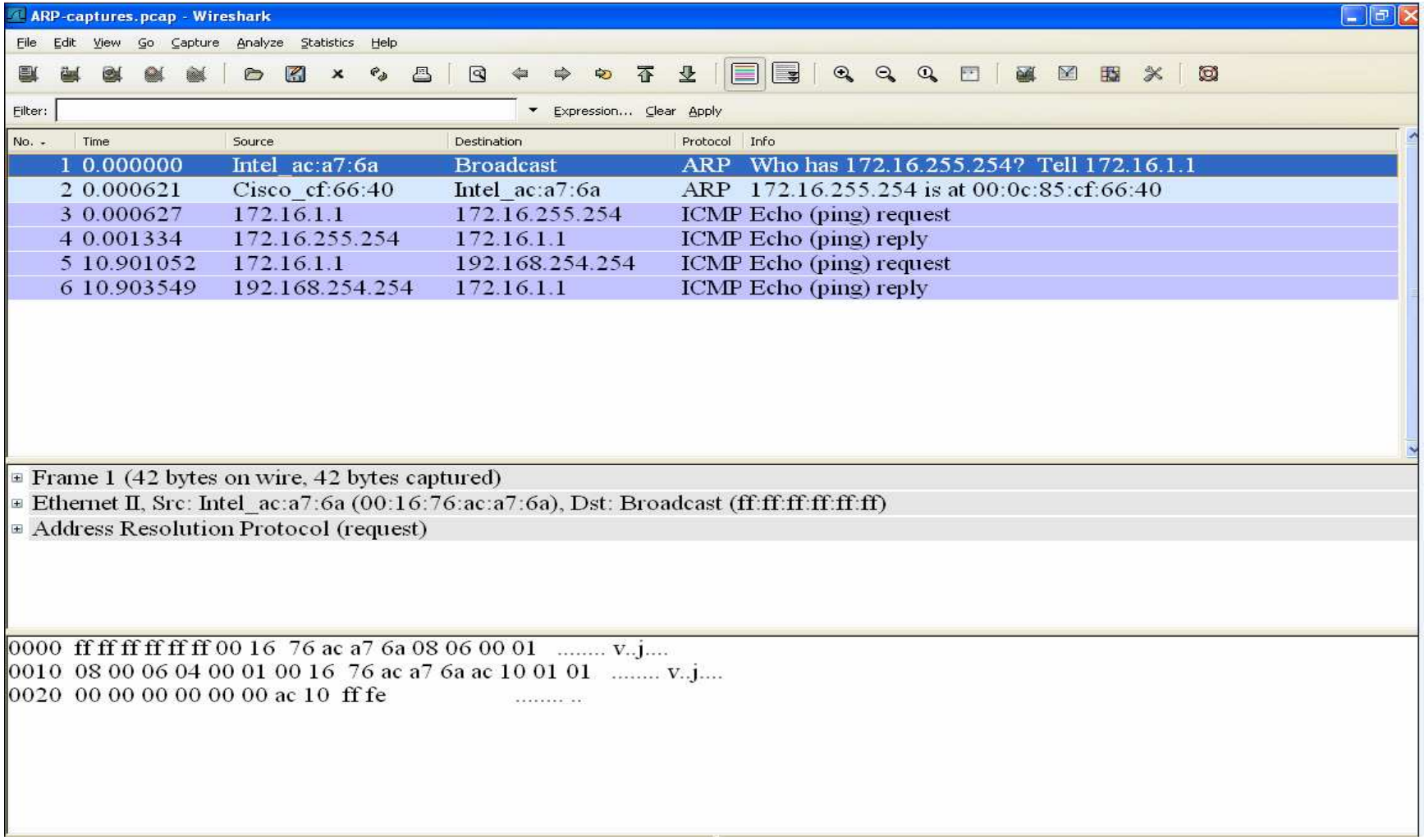
apache_2.2.4-win32-x86-no_ssl.msi

wireshark-setup-0.99.4.exe .

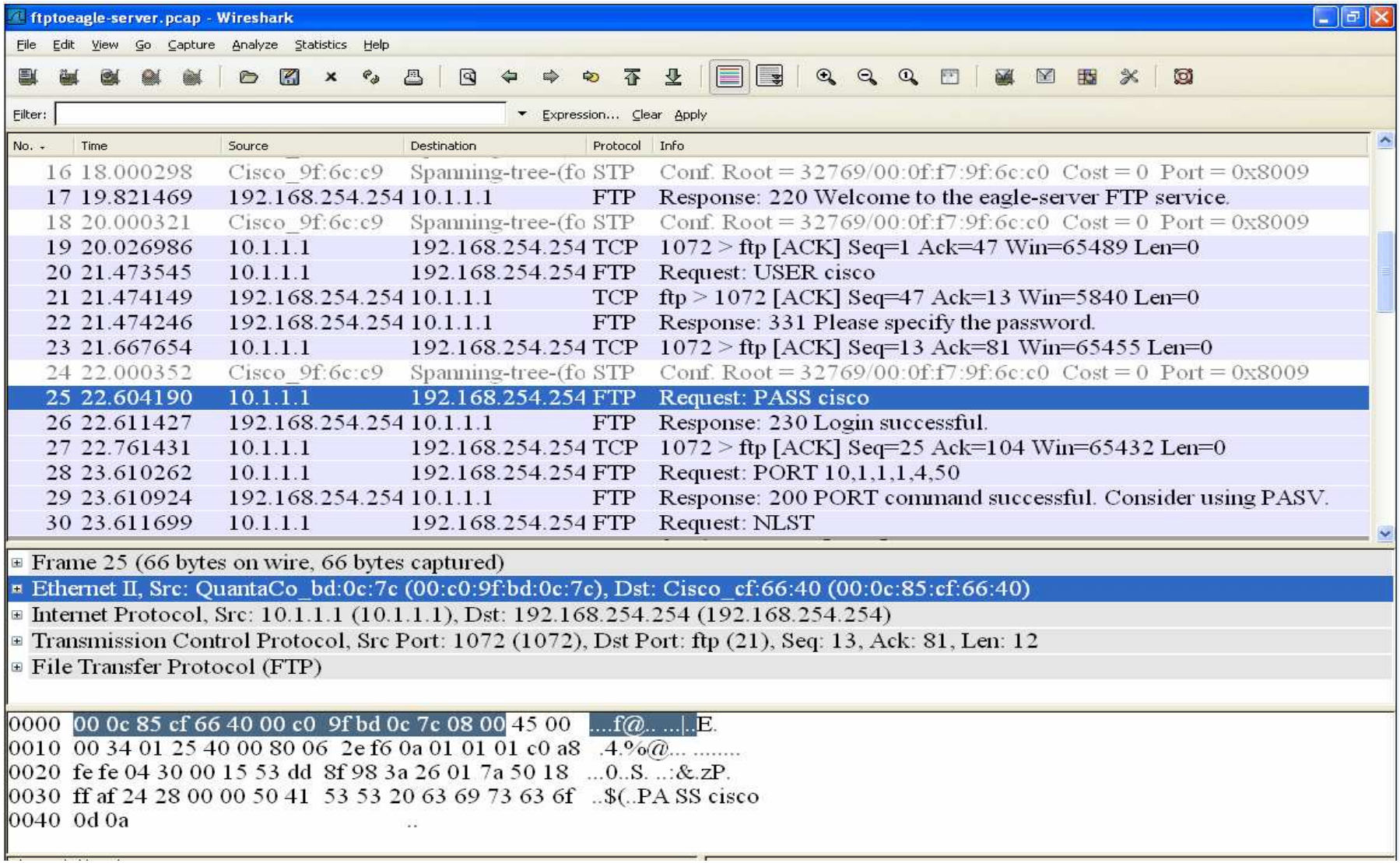
Wireshark

- Formerly known as Ethereal
- Packet sniffing software.
- Demonstrates TCP and UDP port numbers.
- Source and destination IP and MAC addresses.
- Displays FTP, HTTP, DNS, ICMP and ARP transactions.

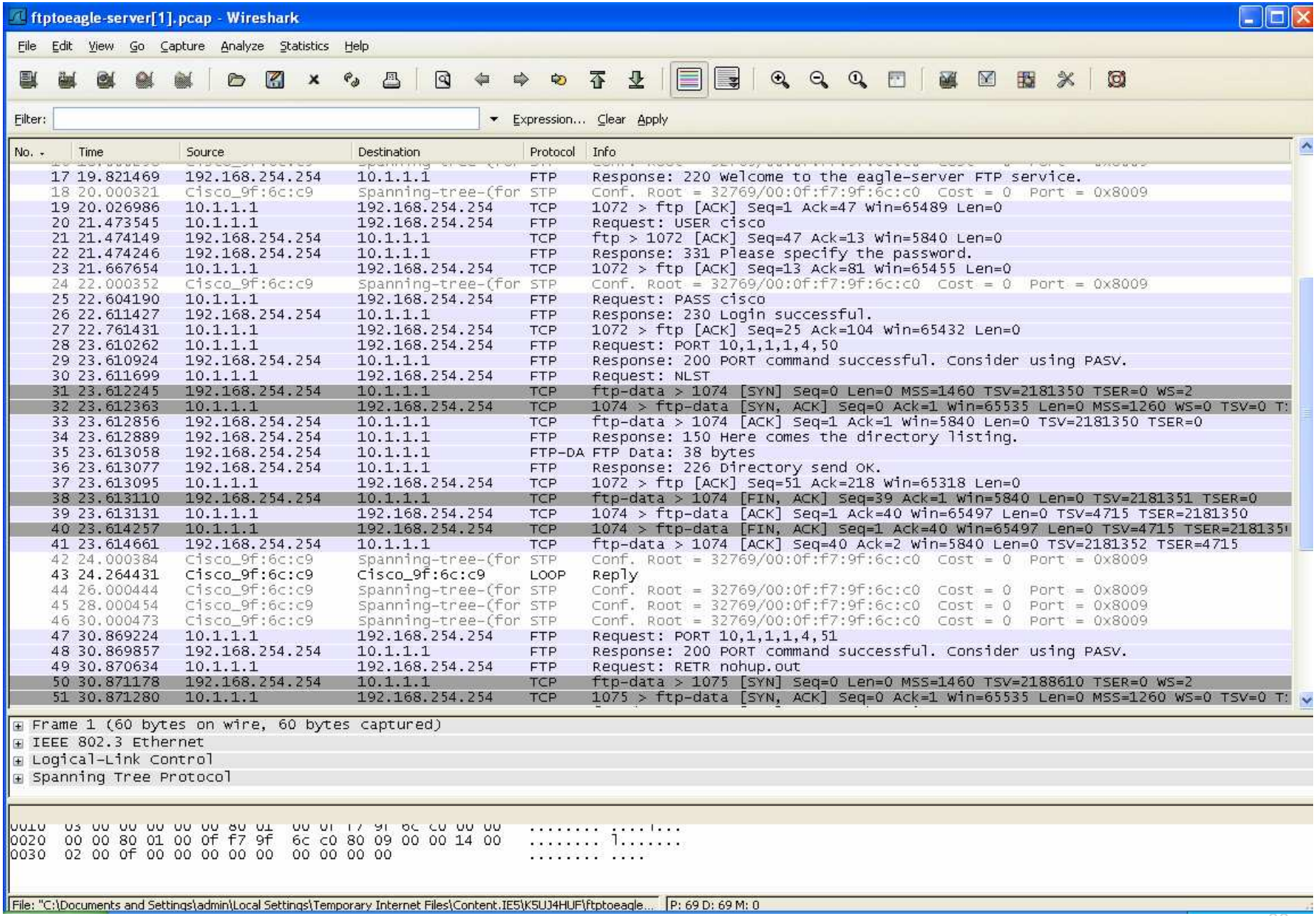
PING/ARP Captures



STP/FTP/TCP Captures



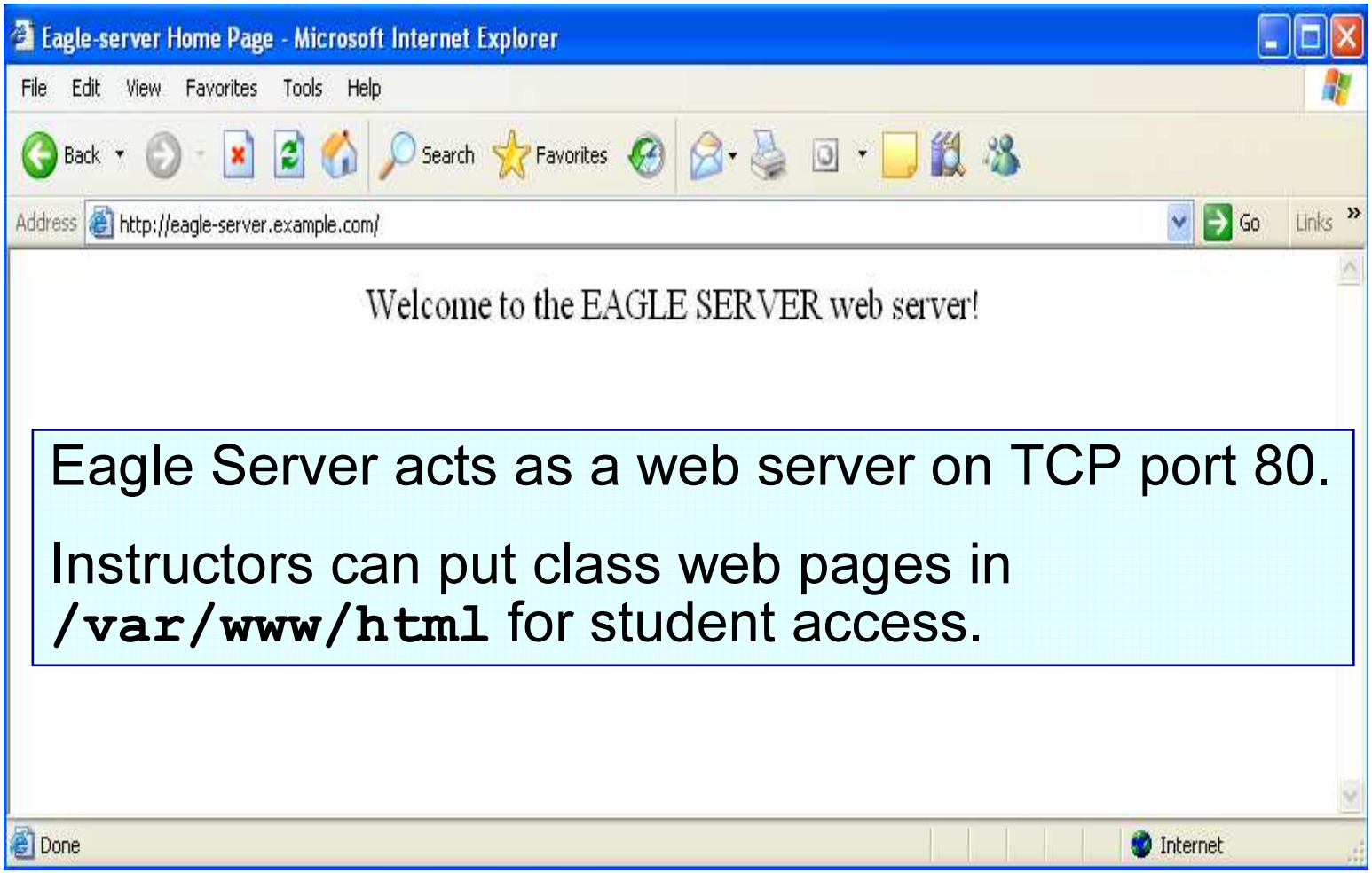
Detailed Capture



Apache Web Server

Apache is used with Wireshark to capture communications between a host and web server.

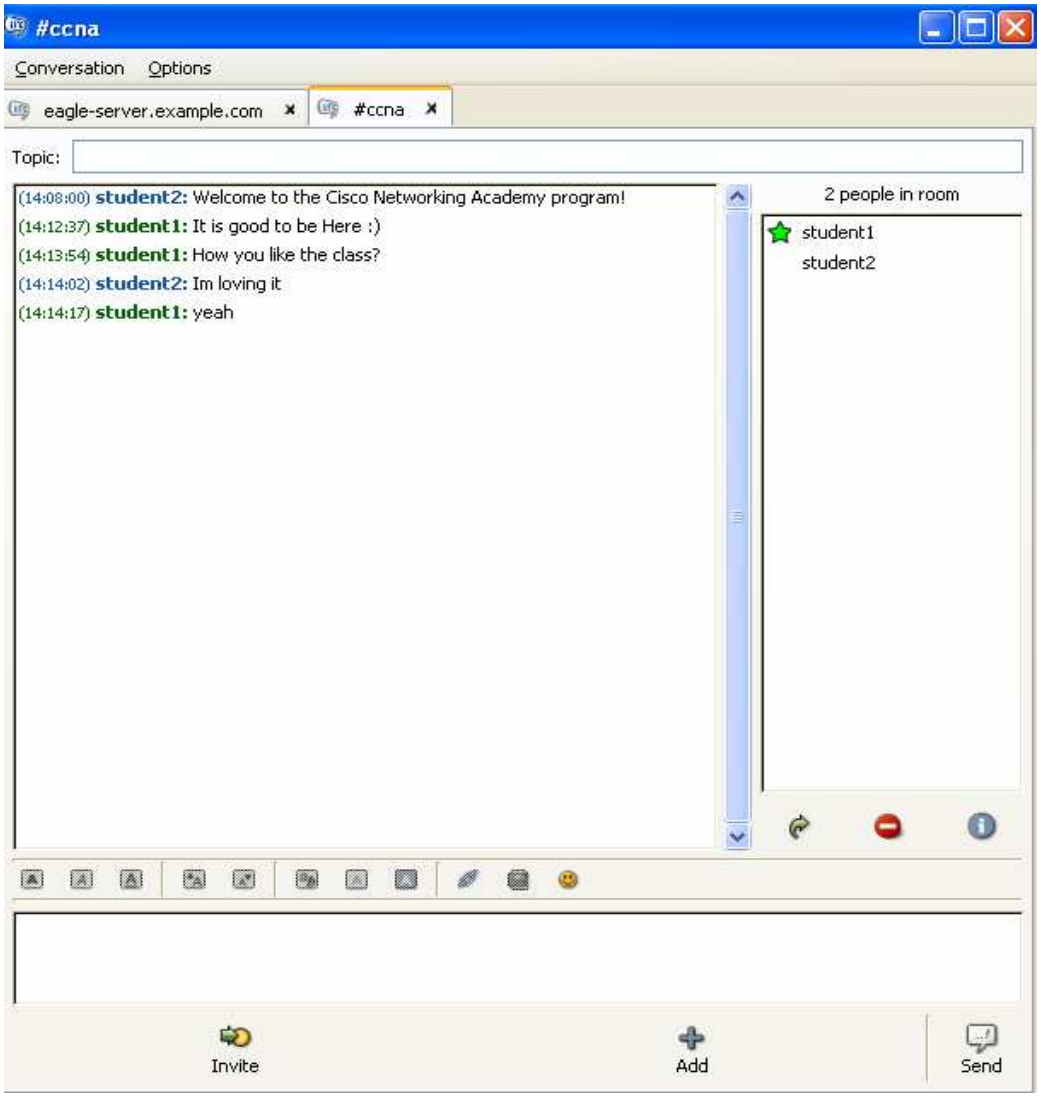
Web Server Access to Eagle Server



Eagle Server acts as a web server on TCP port 80.

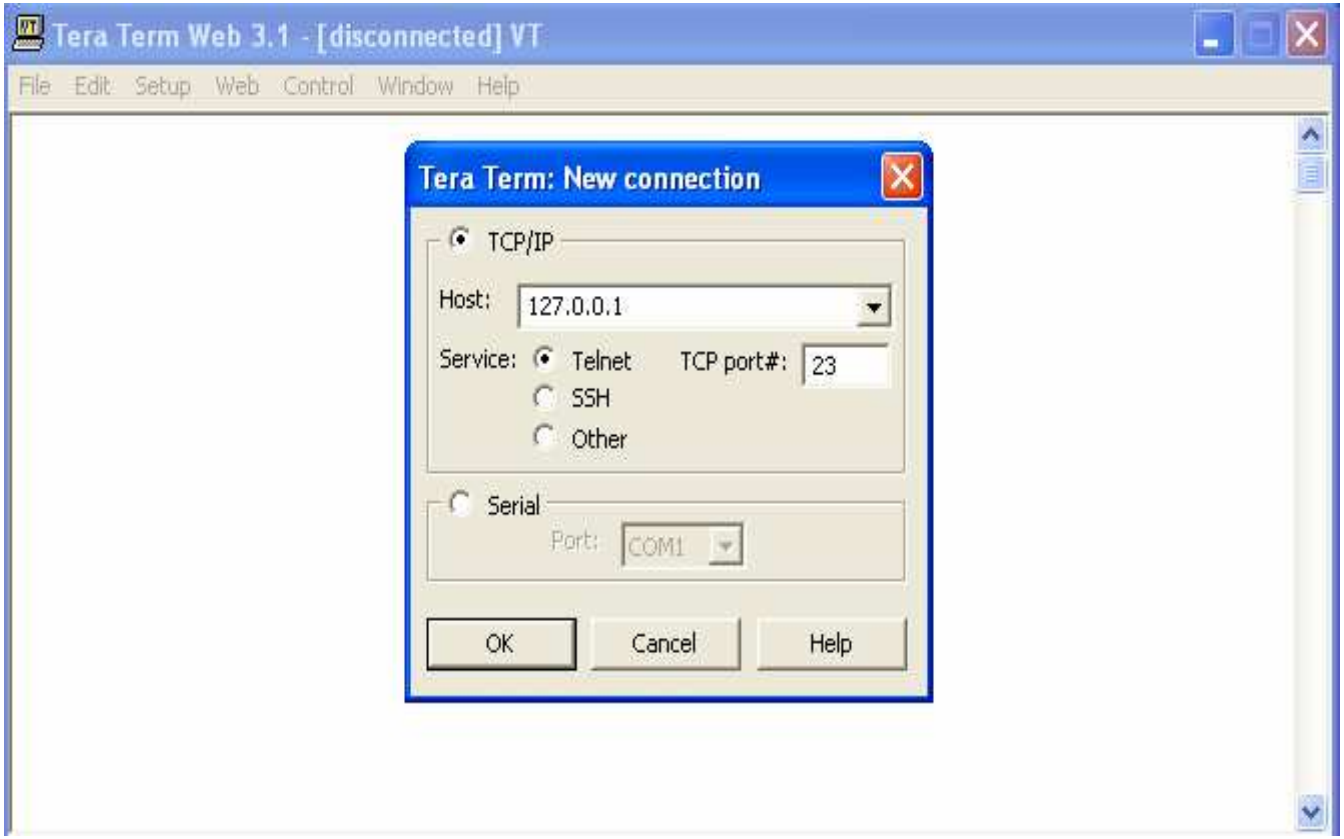
Instructors can put class web pages in **`/var/www/html`** for student access.

Gaim



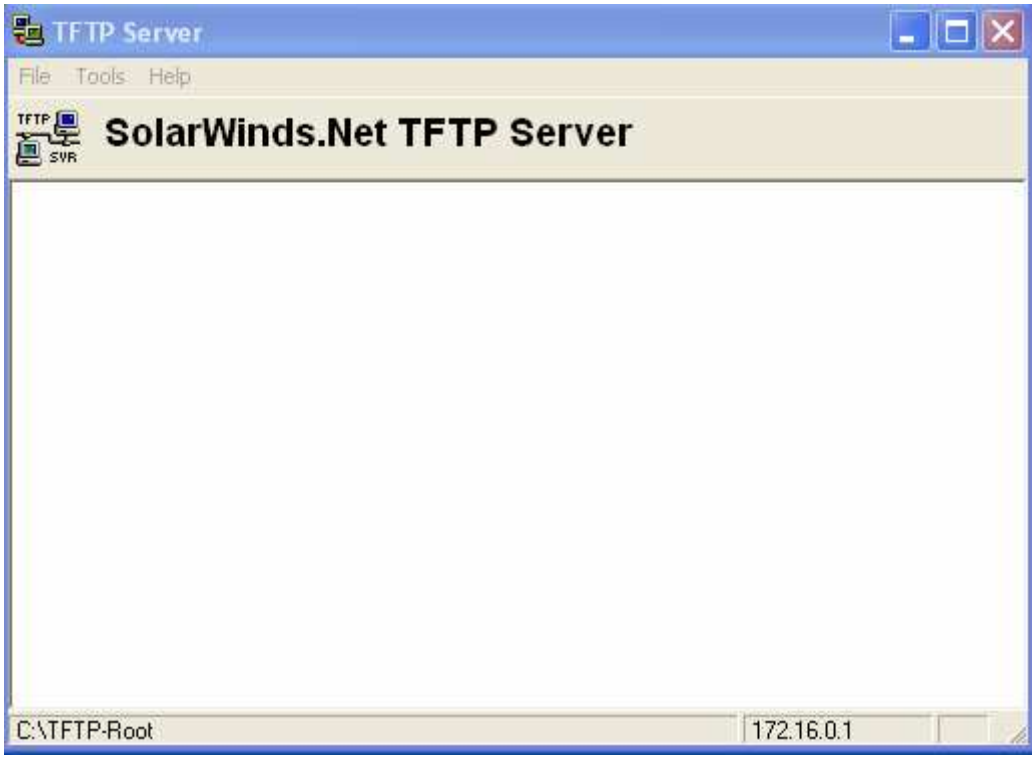
Instant Messaging

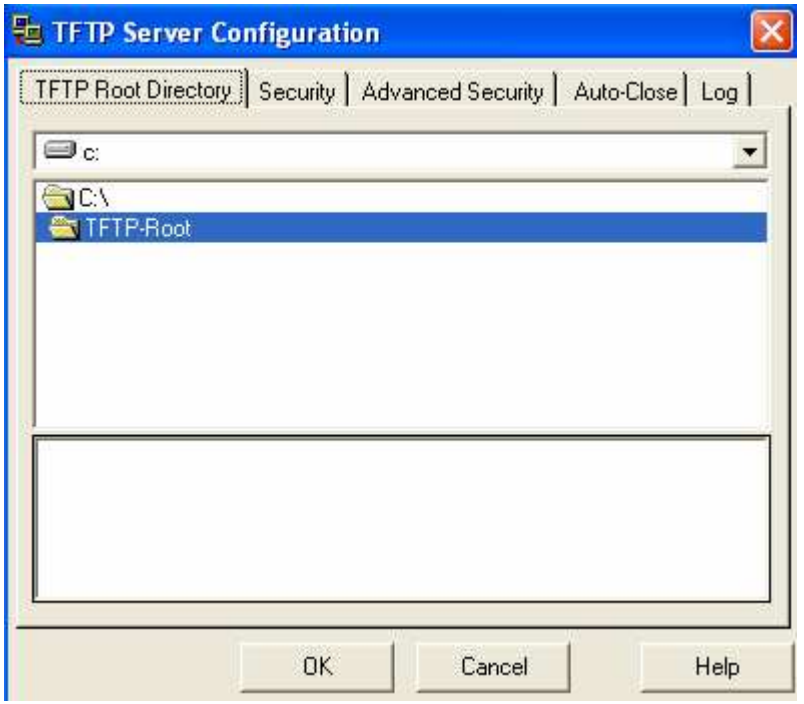
TeraTerm



TeraTerm is an alternate terminal program to HyperTerminal.

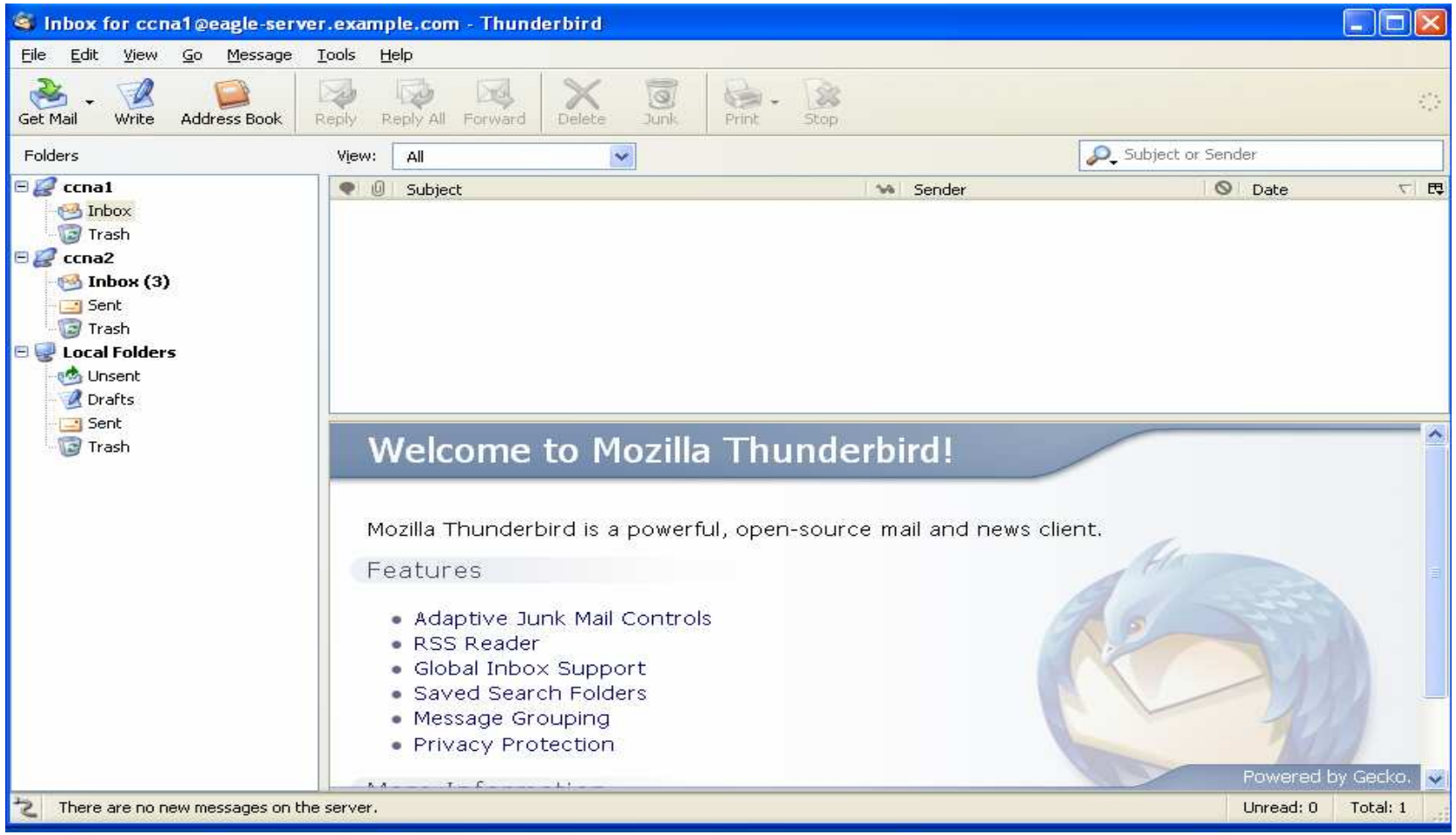
Solarwinds





TFTP Server Software

Mozilla Thunderbird

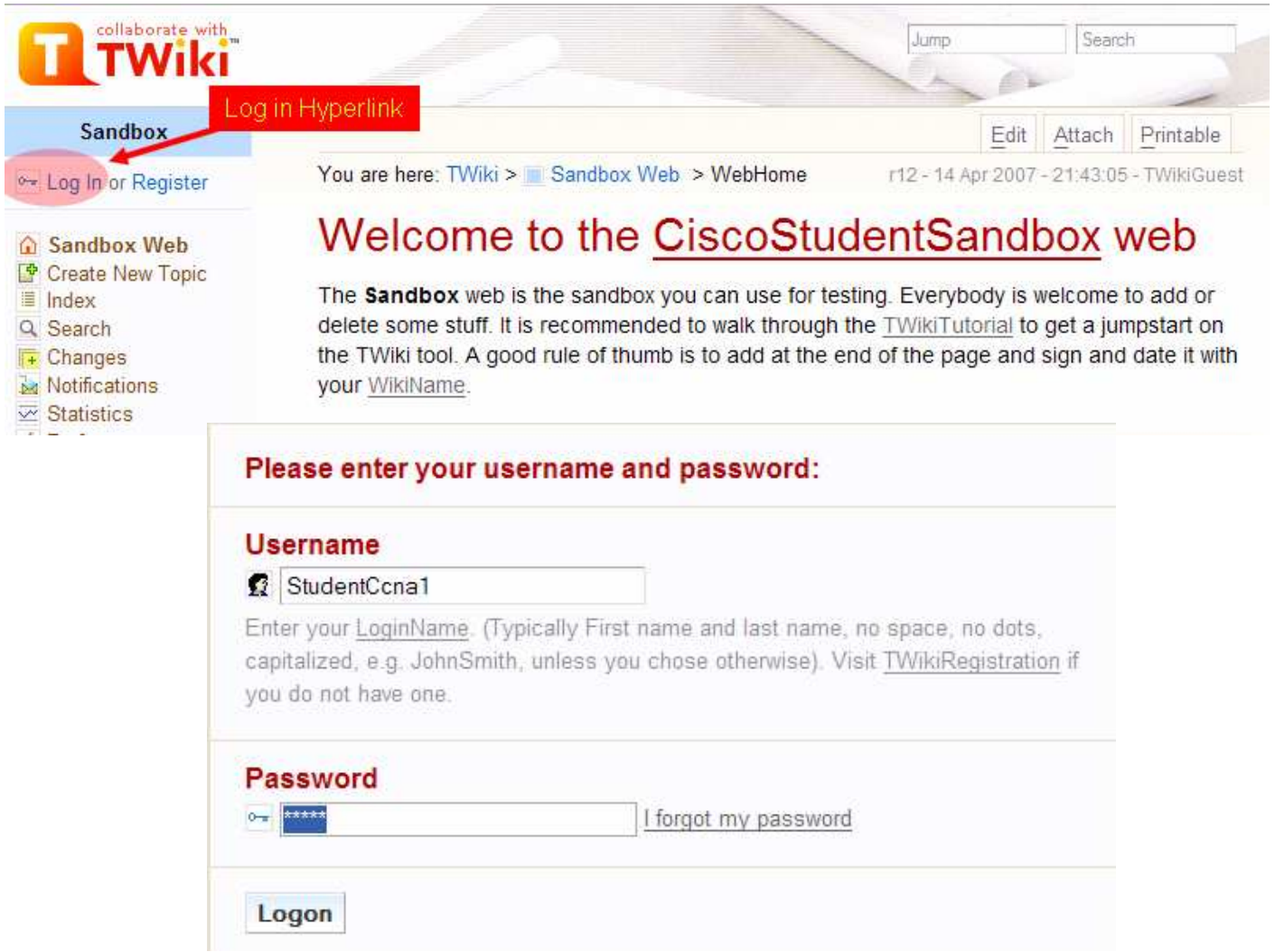


Mozilla Thunderbird is an email and news client used with Wireshark to analyze and understand the flow of traffic of the SMTP protocol.

Thunderbird with Wireshark

No.	Time	Source	Destination	Protocol	Info
1	0.000000	172.16.1.1	172.16.255.255	NBNS	Name query NB WORKGROUP<1b>
2	0.741371	172.16.1.1	172.16.255.255	NBNS	Name query NB WORKGROUP<1b>
3	1.492443	172.16.1.1	172.16.255.255	NBNS	Name query NB WORKGROUP<1b>
4	3.306445	172.16.1.1	192.168.254.254	TCP	1250 > smtp [SYN] Seq=0 Len=0 MSS=1460
5	3.306968	192.168.254.254	172.16.1.1	TCP	smtp > 1250 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460
6	3.307012	172.16.1.1	192.168.254.254	TCP	1250 > smtp [ACK] Seq=1 Ack=1 Win=64240 Len=0
7	3.313519	192.168.254.254	172.16.1.1	SMTP	Response: 220 localhost.localdomain ESMTP Sendmail 8.13.1/8.13.1; Sun, 28 Jan 2007 18:39:18 +1000
8	3.353004	172.16.1.1	192.168.254.254	SMTP	Command: EHLO [172.16.1.1]
9	3.353436	192.168.254.254	172.16.1.1	TCP	smtp > 1250 [ACK] Seq=90 Ack=20 Win=5840 Len=0
10	3.353657	192.168.254.254	172.16.1.1	SMTP	Response: 250-localhost.localdomain Hello host-1.example.com [172.16.1.1], pleased to meet you
11	3.356823	172.16.1.1	192.168.254.254	SMTP	Command: MAIL FROM:<ccna1@example.com> SIZE=398
12	3.359743	192.168.254.254	172.16.1.1	SMTP	Response: 250 2.1.0 <ccna1@example.com>... Sender ok
13	3.363127	172.16.1.1	192.168.254.254	SMTP	Command: RCPT TO:<ccna2@example.com>
14	3.365007	192.168.254.254	172.16.1.1	SMTP	Response: 250 2.1.5 <ccna2@example.com>... Recipient ok
15	3.367680	172.16.1.1	192.168.254.254	SMTP	Command: DATA
16	3.368230	192.168.254.254	172.16.1.1	SMTP	Response: 354 Enter mail, end with "." on a line by itself
17	3.376881	172.16.1.1	192.168.254.254	SMTP	Message Body
18	3.387830	192.168.254.254	172.16.1.1	SMTP	Response: 250 2.0.0 l0S8dIOY005299 Message accepted for delivery
19	3.395347	172.16.1.1	192.168.254.254	SMTP	Message Body
20	3.395855	192.168.254.254	172.16.1.1	SMTP	Response: 221 2.0.0 localhost.localdomain closing connection
21	3.395897	192.168.254.254	172.16.1.1	TCP	smtp > 1250 [FIN, ACK] Seq=564 Ack=502 Win=6432 Len=0
22	3.395929	172.16.1.1	192.168.254.254	TCP	1250 > smtp [ACK] Seq=502 Ack=565 Win=63677 Len=0
23	3.405772	172.16.1.1	192.168.254.254	TCP	1250 > smtp [FIN, ACK] Seq=502 Ack=565 Win=63677 Len=0
24	3.406204	192.168.254.254	172.16.1.1	TCP	smtp > 1250 [ACK] Seq=565 Ack=503 Win=6432 Len=0

TWiki



Wiki creation

Ejecting Eagle Server CD

- Place mouse over the “K” at bottom left of desktop.
- Click on logout
- Another box will appear with the following choices:

End current session.

Turn off computer.

Restart computer.

- Select turn off computer and CD will eject from PC.

Documentation

On Academy Connection Tools:

- Eagle Server FAQ
- Eagle Server Info
- Orientation Lab

Q and A

Hands-On Orientation Lab

Lab 3.4.3: E-mail Services and Protocols

Lab 9.8.1: Address Resolution Protocol (ARP)