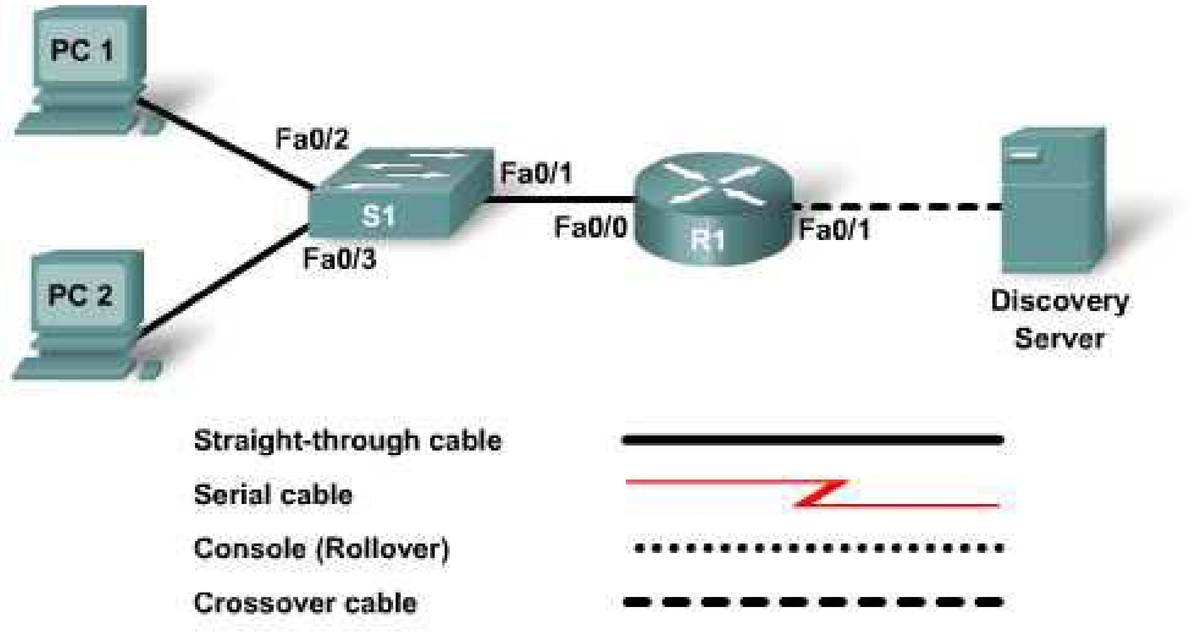
Lab 4.2.3 Analyzing Network Traffic



Device Designation	Device Name	Address	Subnet Mask
Discovery Server	Network Services	172.17.1.1	255.255.0.0
R1	FC-CPE-1	Fa0/1 172.17.0.1 Fa0/0 10.0.0.1	255.255.0.0 255.255.255.0
PC1	Host1	10.0.0.200	255.255.255.0
PC2	Host2	10.0.0.201	255.255.255.0

Objective

Upon completion of this activity, you will be able to:

- Identify and describe the network requirements to support file transfer and email applications.

640-802 CCNA Exam Objectives

This lab contains skills that relate to the following CCNA exam objectives:

- Select the components required to meet a network specification.
- Describe common networked applications, including web applications.

Expected Results and Success Criteria

Before starting this lab, read through the tasks that you are expected to perform. What do you expect the result of performing these tasks will be?

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What benefits are gained from designing a network to deliver services such as email and FTP before implementing it?

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What problems could arise if email and FTP services are provided without first planning and designing the network?

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Background / Preparation

FilmCompany is an expanding small advertising company moving into interactive advertising media, including video presentations. This company has just been awarded a large video support contract by the StadiumCompany. With this new contract, FilmCompany expects to see their business grow approximately 70 percent.

A part of this expansion requires consideration of the email and FTP services provided by the network. Users expect immediate access to their emails and to the files that they are sharing or updating.

In this lab, you will generate some FTP and email traffic on a network and use the Cisco IOS NBAR (Network-Based Application Recognition) feature to identify and examine that traffic.

Task 1: Design Network Access to FTP and Email Services

Step 1: FTP network considerations

File transfer traffic can put high-volume traffic onto the network. This traffic can have a greater effect on throughput than interactive end-to-end connections. Although file transfers are throughput-intensive, they typically have low response-time requirements.

As part of the initial characterization of the network, it is important to identify the level of FTP traffic that will be generated. From this information, the network designers can decide on throughput and redundancy requirements.

a. List possible file transfer applications that would generate traffic on the FilmCompany network.

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b. List these applications by priority based on response time.

1. ____

2. ____

3. ____

4. ____

5. ____

c. List these applications by priority based on bandwidth requirements.

1. ____

2. ____

3. ____

4. ____

5. ____

Step 2: Email network considerations

Although customers expect immediate access to their emails, they usually do not expect emails to have network priority over files that they are sharing or updating. Emails are expected to be delivered reliably and accurately. Generally, emails are not throughput-intensive, except when there are enterprise-wide mail-outs or there is a denial of service attack.

List some email policies that could control the volume of email data and the bandwidth used.

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Step 3: Configure and connect the host PCs

NOTE: If the PCs used in this lab are also connected to your Academy LAN or to the Internet, ensure that you record the cable connections and TCP/IP settings so that these can be restored at the conclusion of the lab.

a. Set the IP addresses for PC1 and PC2 as shown in the configuration table.

b. Establish a terminal session to router R1 from one of the PCs, and configure the interfaces and hostname as shown in the configuration table.

Task 2: Configure NBAR to Examine Network Traffic

Step 1: Enable NBAR Protocol Discovery

NBAR can determine which protocols and applications are currently running on a network. NBAR includes the Protocol Discovery feature, which identifies the application protocols operating on an interface so that appropriate QoS policies can be developed and applied. To enable Protocol Discovery to monitor selected protocols on a router interface, issue the following commands from the global configuration mode:

```
FC-CPE-1(config)#interface fastethernet 0/0
FC-CPE-1(config-if)#ip nbar protocol-discovery
```

Step 2: Confirm that Protocol Discovery is configured

From the privileged EXEC mode, issue the **`show running-config`** command and confirm that the following output appears under interface FastEthernet 0/0:

```
interface FastEthernet0/0
 ip address 10.0.0.1 255.255.255.0
 ip nbar protocol-discovery
```

If `protocol-discovery` is not confirmed, reissue the configuration commands for interface FastEthernet 0/0.

Task 3: Generate and Identify Network Traffic

Step 1: Generate FTP traffic

The Mozilla Thunderbird email client program will be downloaded from Discovery Server as an example of FTP.

a. On PC1, launch a web browser and enter the URL **`ftp://server.discovery.ccna`**, Alternatively, from the command line, enter **`ftp server.discovery.ccna`**. If DNS is not configured the IP address 172.17.1.1 must be used instead of the domain name.

b. Locate the file **thunderbird_setup.exe** in the **pub** directory, download the file, and save it on PC1.

Repeat this step for PC2.

Step 2: Generate Email traffic

If the Thunderbird email client has been installed and email accounts set up on both PC1 and PC2, proceed to Step 2d. Otherwise, install and set up the email client on PC1 and PC2 as described in Steps 2a through 2c.

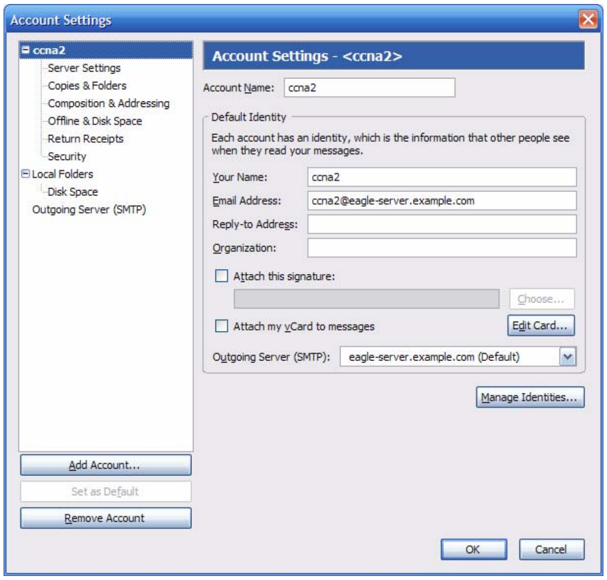
a. Install the Thunderbird email client on PC1 and PC2 by double-clicking the downloaded **thunderbird_setup.exe** file and accepting the default settings.

b. When the installation has completed, launch the program.

c. Configure email account settings as shown in this table.

Field	Value
Account Name	*The account name is based on the pod and host computer. There are a total of 20 accounts configured on Discovery Server, labeled user[1..20].The password for each account is cheetah[1..20].*
Your Name	*Use the same name as above.*
E-mail address	*`username@server.discovery.ccna`*
Type of incoming server you are using	*`POP`*
Incoming Server (SMTP)	*`172.17.1.1`*
Outgoing Server (SMTP)	*`172.17.1.1`*

1) On the **Tools** menu, click **Account Settings**.



Account Settings - <ccna2>

Account Name: ccna2

Default Identity

Each account has an identity, which is the information that other people see when they read your messages.

Your Name: ccna2

Email Address: ccna2@eagle-server.example.com

Reply-to Address:

Organization:

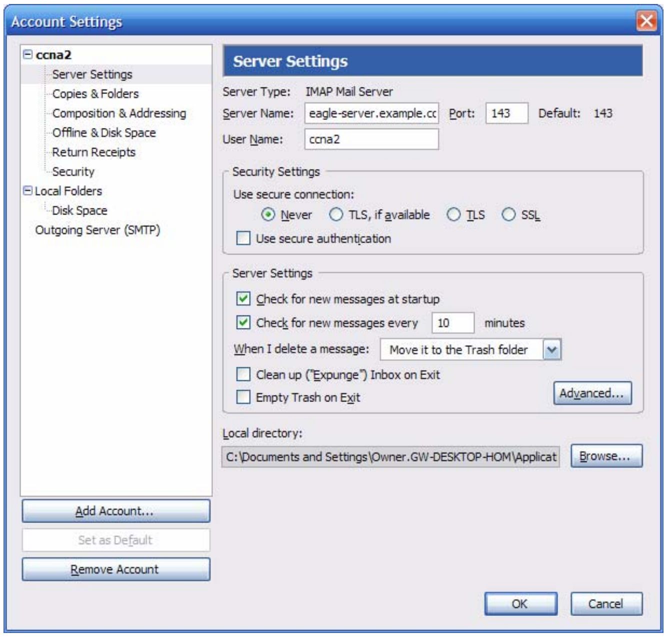
□ Attach this signature:

□ Attach my vCard to messages

Outgoing Server (SMTP): eagle-server.example.com (Default)

2) Complete the required Thunderbird Account Settings.

3) In the left pane of the Account Settings screen, click **Server Settings** and complete the necessary details.



Server Settings

Server Type: IMAP Mail Server

Server Name: eagle-server.example.cc Port: 143 Default: 143

User Name: ccna2

Security Settings

Use secure connection:

● Never ○ TLS, if available ○ TLS ○ SSL

□ Use secure authentication

Server Settings

☑ Check for new messages at startup

☑ Check for new messages every 10 minutes

When I delete a message: Move it to the Trash folder

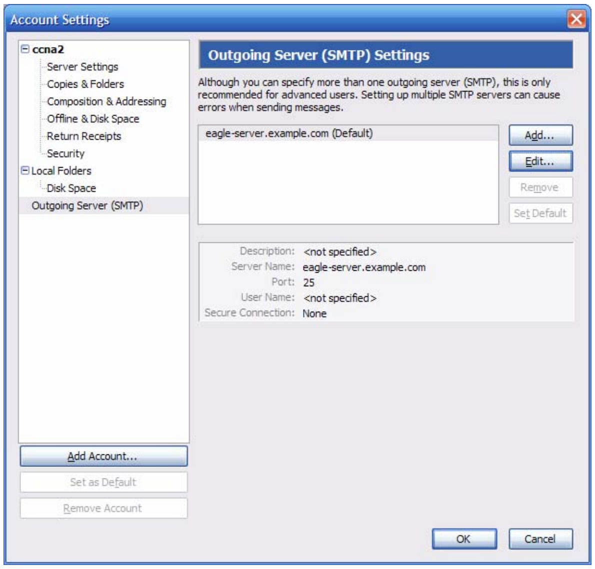
□ Clean up ("Expunge") Inbox on Exit

□ Empty Trash on Exit

Local directory:

C:\Documents and Settings\Owner.GW-DESKTOP-HOM\Applicat

4) In the left pane, click **Outgoing Server (SMTP)** and complete the proper configuration for the Outgoing Server (SMTP).



Outgoing Server (SMTP) Settings

Although you can specify more than one outgoing server (SMTP), this is only recommended for advanced users. Setting up multiple SMTP servers can cause errors when sending messages.

eagle-server.example.com (Default)

Description: <not specified>
Server Name: eagle-server.example.com
Port: 25
User Name: <not specified>
Secure Connection: None

d. Send and receive two emails between accounts on each PC.

Step 3: Display the NBAR results

With Protocol Discovery enabled, any protocol traffic supported by NBAR, as well as the statistics associated with that protocol, can be discovered.

a. To display the traffic identified by NBAR, issue the **show ip nbar protocol-discovery** command from the privileged EXEC mode.

```
FC-CPE-1#show ip nbar protocol-discovery
```

The output will have the following headings:

```
FastEthernet0/0
                        Input                    Output
                        -----                    ------
  Protocol              Packet Count             Packet Count
                        Byte Count               Byte Count
                        5min Bit Rate (bps)      5min Bit Rate (bps)
                        5min Max Bit Rate (bps)  5min Max Bit Rate (bps)
  --------------------- ------------------------ ------------------------
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b. List each protocol identified and the Input and Output information.

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c. Although the data traffic in this lab may not be sufficient to generate values for the **5min Bit rate (bps)** and **5min Max Bit Rate (bps)** fields, consider and discuss how these values would be applied to designing an FTP and email network.

Step 4: Use NBAR to monitor other data traffic

NBAR can identify and monitor a range of network application traffic protocols.

From the privileged EXEC mode of the router, issue the command **`show ip nbar port-map`** and note the output displayed.

```
FC-CPE-1#show ip nbar port-map
```

List some protocols that you consider should be monitored and policies applied to.

Step 5: Clean up

Erase the configurations and reload the routers and switches. Disconnect and store the cabling. For PC hosts that are normally connected to other networks (such as the school LAN or to the Internet), reconnect the appropriate cabling and restore the TCP/IP settings.

Challenge

This lab considered only the volume of FTP and email data traffic and its impact on network design. Reliable access to servers is also important. In the space below, sketch a revised topology for this lab that would provide redundancy for these services.