Packet Tracer – Using File and Data Integrity Checks

Addressing Table

Device	Private IP Address	Public IP Address	Subnet Mask	Site
FTP/Web Server	10.44.1.254	209.165.201.3 http://www.cisco.corp	255.255.255.0	Metropolis Bank HQ
Backup File Server	N/A	209.165.201.10 https://www.cisco2.corp	255.255.255.248	Internet
Mike	10.44.2.101	N/A	255.255.255.0	Healthcare at Home
Sally	10.44.1.2	N/A	255.255.255.0	Metropolis Bank HQ
Bob	10.44.1.3	N/A	255.255.255.0	Metropolis Bank HQ

Objectives

Part 1: Download the Client Files to Mike's PC

Part 2: Download the Client Files from the Backup File Server to Mike's PC

Part 3: Verify the Integrity of the Client Files using Hashing

Part 4: Verify the Integrity of Critical Files using HMAC

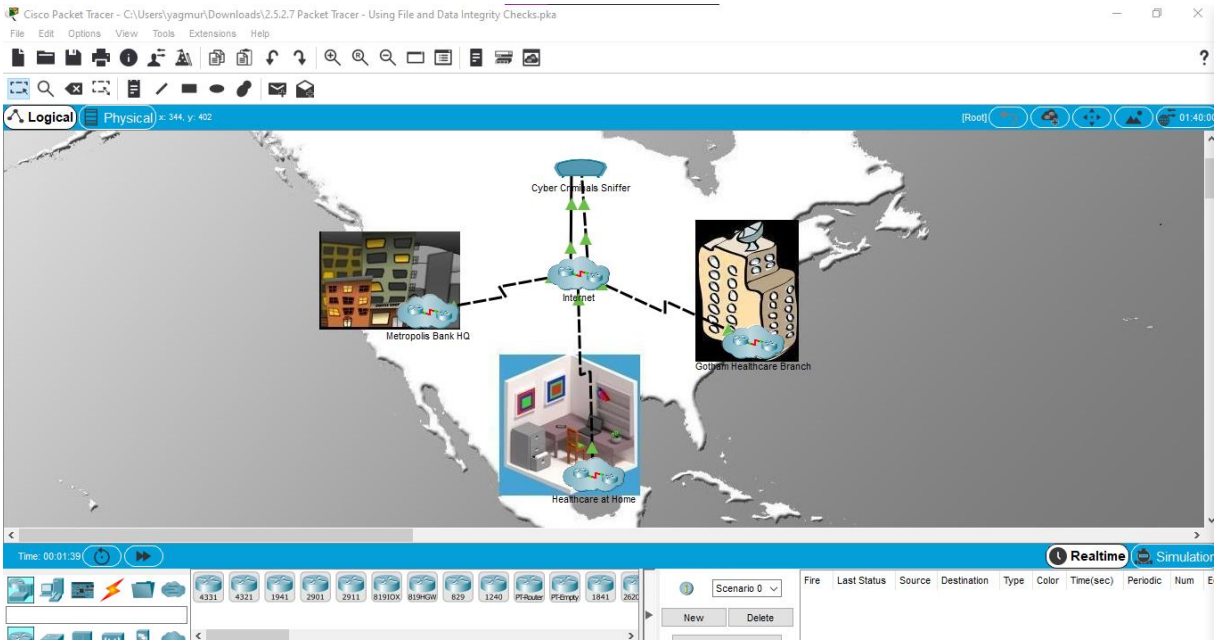
Background

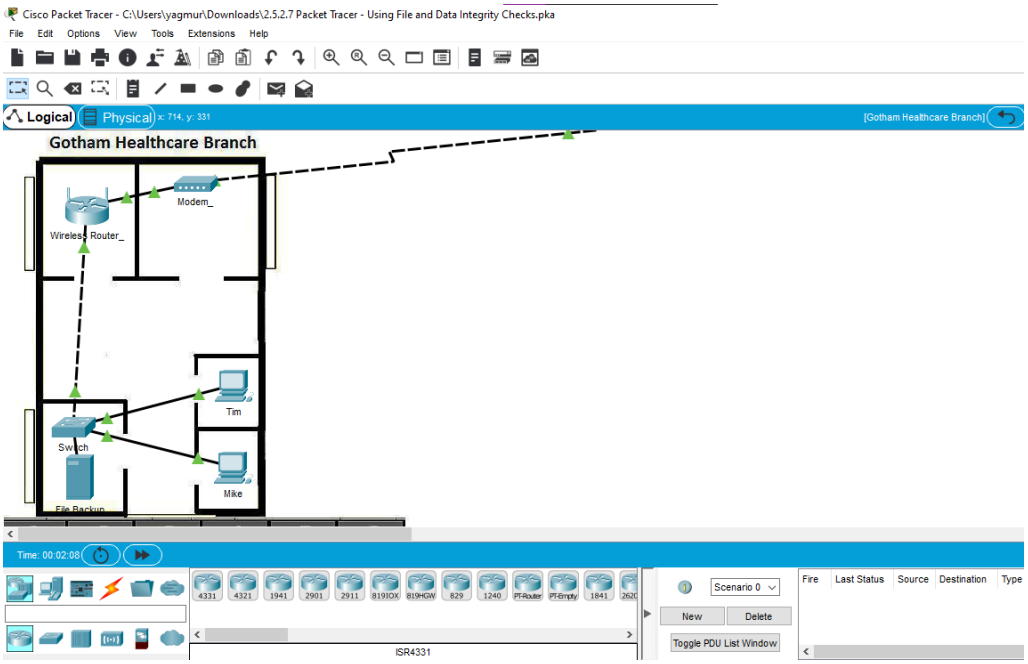
In this activity, you will verify the integrity of multiple files using hashes to ensure files have not been tampered with. If any files are suspected of being tampered with, they are to be sent to Sally's PC for further analysis. The IP addressing, network configuration, and service configurations are already complete. You will use the client devices in the differing geographic regions to verify and transfer any suspect files.

Part 1: Download the Client Files to Mike's PC

Step 1: Access the FTP server from Mike's PC.

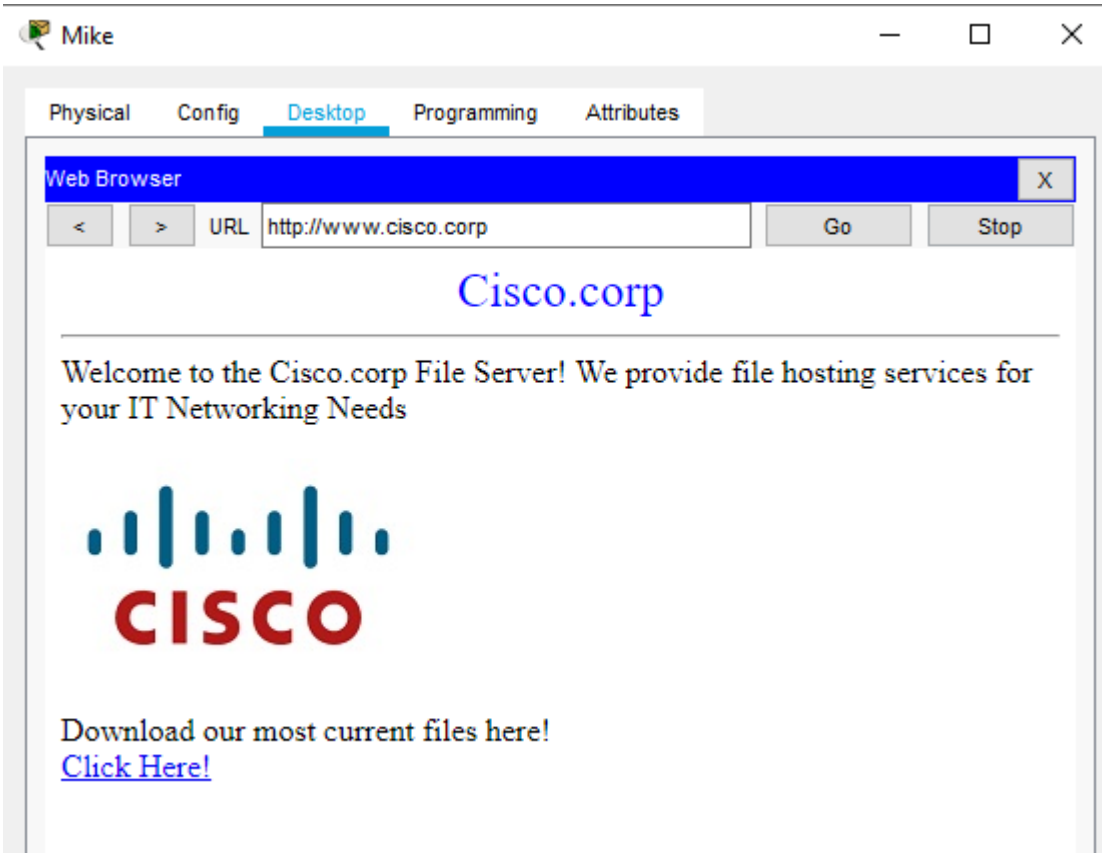
a. Click the **Gotham Healthcare Branch** site and then click the PC **Mike**.





b. Click the **Desktop** tab and then click **Web Browser**.

c. Enter the URL **http://www.cisco.corp** and click **Go**.



d. Click the link to download the most current files.

What protocol was used to access this webpage on the backup file server?

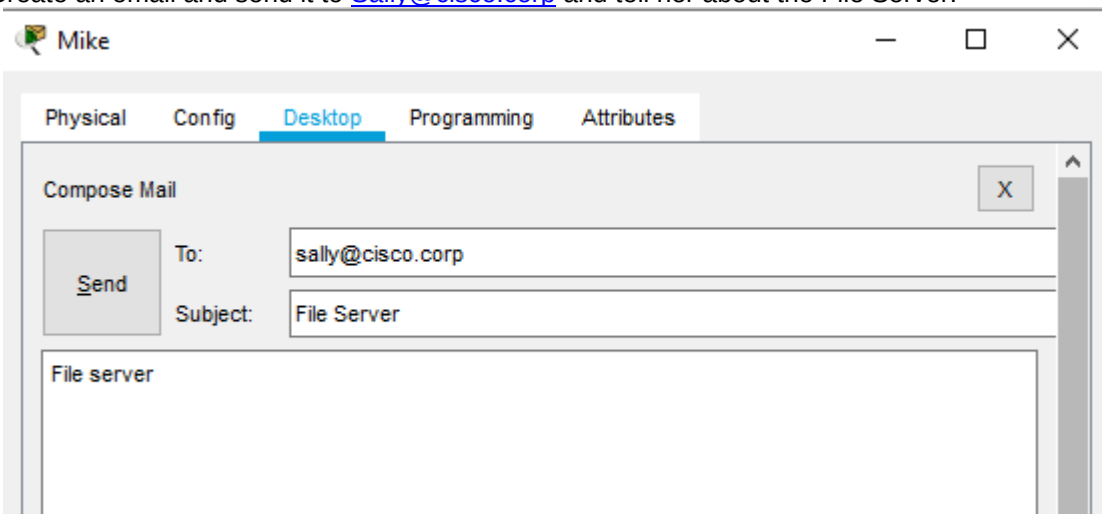
HTTP

Step 2: The file server has been hacked, notify Sally.

a. Within the **Gotham Healthcare Branch** site, click the PC **Mike**.

b. Click the **Desktop** tab and then click **Email**.

c. Create an email and send it to Sally@cisco.corp and tell her about the File Server.



Part 2: Download the Client Files from the Backup File Server to Mike's PC

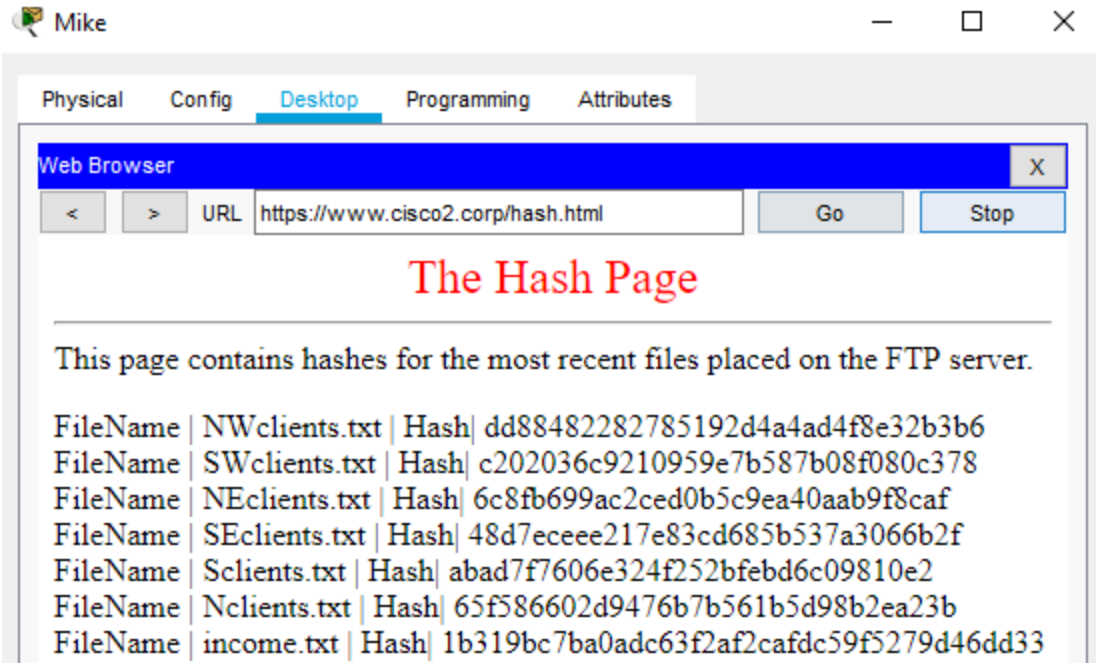
Step 1: Access the offsite FTP server from Mike's PC.

a. Within the **Gotham Healthcare Branch** site, click the PC **Mike**.

b. Click the **Desktop** tab and then click **Web Browser**.

c. Enter the URL **https://www.cisco2.corp** and click **Go**.

d. Click the link to view the most recent files and their hashes.



What protocol was used to access this webpage on the backup file server?

HTTPS

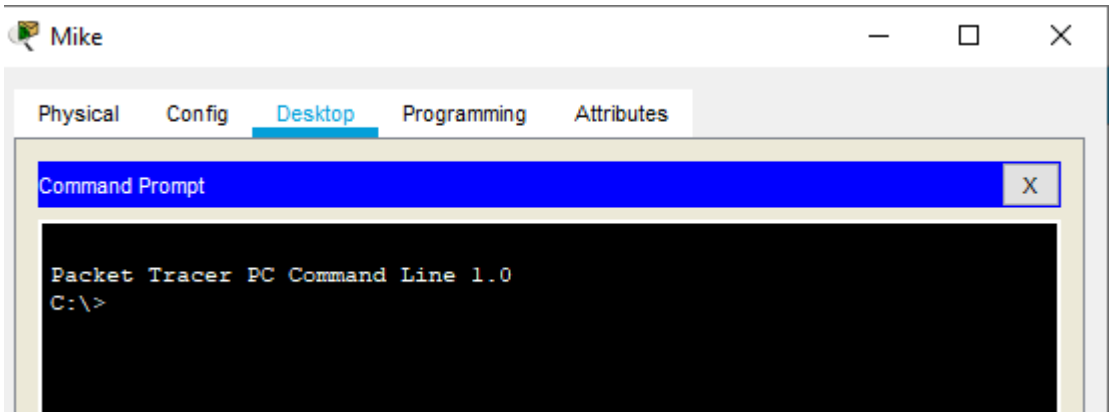
What are the file names and hashes of the client files on the backup server? (copy and paste them below)

FileName | NWclients.txt | Hash| dd88482282785192d4a4ad4f8e32b3b6
FileName | SWclients.txt | Hash| c202036c9210959e7b587b08f080c378
FileName | NEclients.txt | Hash| 6c8fb699ac2ced0b5c9ea40aab9f8caf
FileName | SEclients.txt | Hash| 48d7eceee217e83cd685b537a3066b2f
FileName | Sclients.txt | Hash| abad7f7606e324f252bfebd6c09810e2
FileName | Nclients.txt | Hash| 65f586602d9476b7b561b5d98b2ea23b
FileName | income.txt | Hash| 1b319bc7ba0adc63f2af2cafdc59f5279d46dd33

Step 2: Download the client files to Mike's PC.

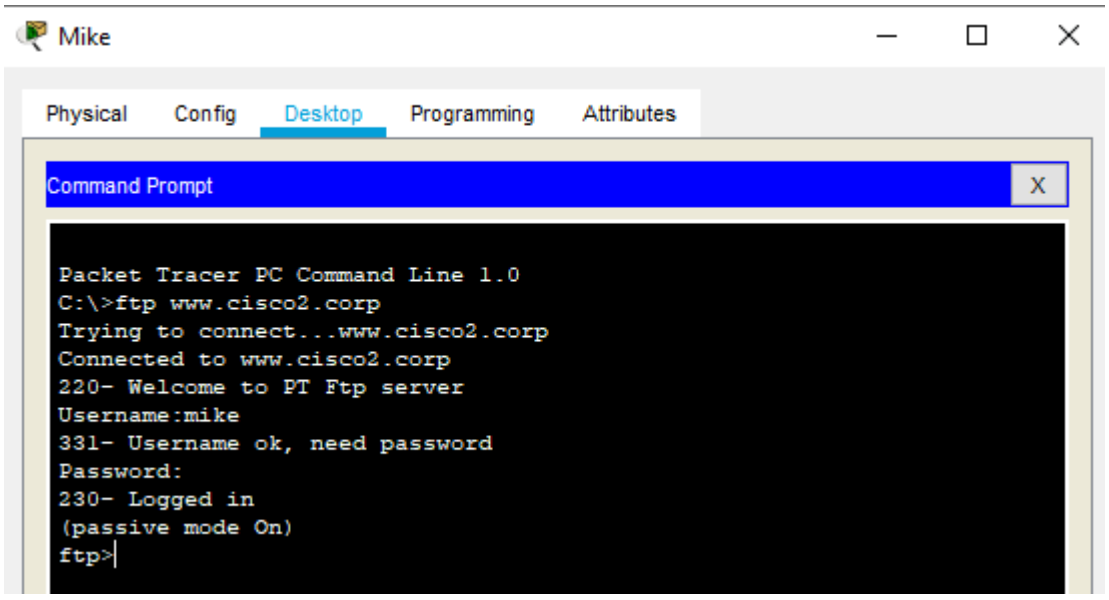
a. Within the **Gotham Healthcare Branch** site, click the PC **Mike**.

b. Click the **Desktop** tab and then click **Command Prompt**.



c. Connect to the **Backup File** server by entering **ftp www.cisco2.corp** in the command prompt.

d. Enter the username of **mike** and a password of **cisco123**.



e. At the **ftp>** prompt, enter the command **dir** to view the current files stored on the remote FTP server.

```
ftp>dir

Listing /ftp directory from www.cisco2.corp:
0    : NEclients.txt                                  584
1    : NWclients.txt                                  584
2    : Nclients.txt                                   698
3    : SEclients.txt                                  598
4    : SWclients.txt                                  650
5    : Sclients.txt                                   781
6    : asa842-k8.bin                                  5571584
7    : c1841-advipservicesk9-mz.124-15.T1.bin         33591768
8    : c1841-ipbase-mz.123-14.T7.bin                  13832032
9    : c1841-ipbasek9-mz.124-12.bin                   16599160
10   : c2600-advipservicesk9-mz.124-15.T1.bin         33591768
11   : c2600-i-mz.122-28.bin                          5571584
12   : c2600-ipbasek9-mz.124-8.bin                    13169700
13   : c2800nm-advipservicesk9-mz.124-15.T1.bin       50938004
14   : c2800nm-advipservicesk9-mz.151-4.M4.bin        33591768
15   : c2800nm-ipbase-mz.123-14.T7.bin                5571584
16   : c2800nm-ipbasek9-mz.124-8.bin                  15522644
17   : c2950-i6q412-mz.121-22.EA4.bin                 3058048
18   : c2950-i6q412-mz.121-22.EA8.bin                 3117390
19   : c2960-lanbase-mz.122-25.FX.bin                 4414921
20   : c2960-lanbase-mz.122-25.SEE1.bin               4670455
21   : c2960-lanbasek9-mz.150-2.SE4.bin               4670455
22   : c3560-advipservicesk9-mz.122-37.SE1.bin        8662192
23   : income.txt                                     203
24   : pt1000-i-mz.122-28.bin                         5571584
25   : pt3000-i6q412-mz.121-22.EA4.bin                3117390
ftp>
```

f. Download the six client files (NEclients.txt, NWclients.txt, Nclients.txt, SEclients.txt, SWclients.txt, and Sclients.txt) to Mike's PC by entering the command **get FILENAME.txt**, replace FILENAME with one of the six client filenames.

```
ftp> get NEclients.txt

Reading file NEclients.txt from www.cisco2.corp:
File transfer in progress...

[Transfer complete - 584 bytes]

584 bytes copied in 0.05 secs (11680 bytes/sec)
```

g. After downloading all the files, enter the command **quit** at the **ftp>** prompt.

h. At the **PC>** prompt, enter the command **dir** and verify the client files are now on Mike's PC.

```
ftp>get NEclients.txt

Reading file NEclients.txt from www.cisco2.corp:
File transfer in progress...

[Transfer complete - 584 bytes]

584 bytes copied in 0.053 secs (11018 bytes/sec)
ftp>quit

221- Service closing control connection.
C:\>dir

 Volume in drive C has no label.
 Volume Serial Number is 5E12-4AF3
 Directory of C:\

1/1/1970    3:0 PM             584       NEclients.txt
2/7/2106    9:28 PM            26        sampleFile.txt
                610 bytes           2 File(s)
C:\>
```

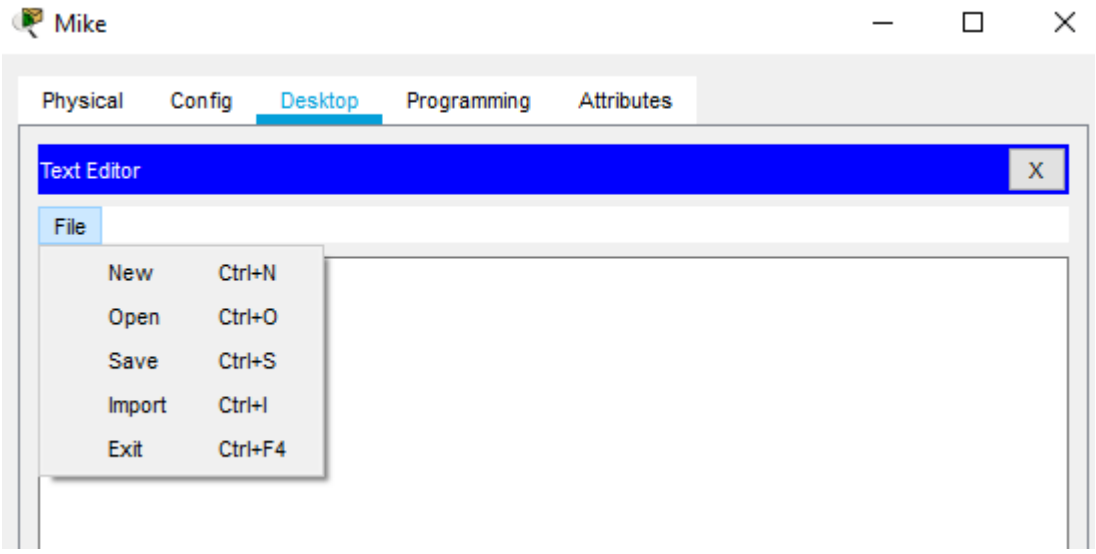
Part 3: Verify the Integrity of the Client Files using Hashing

Step 1: Check the hashes on the client files on Mike's PC.

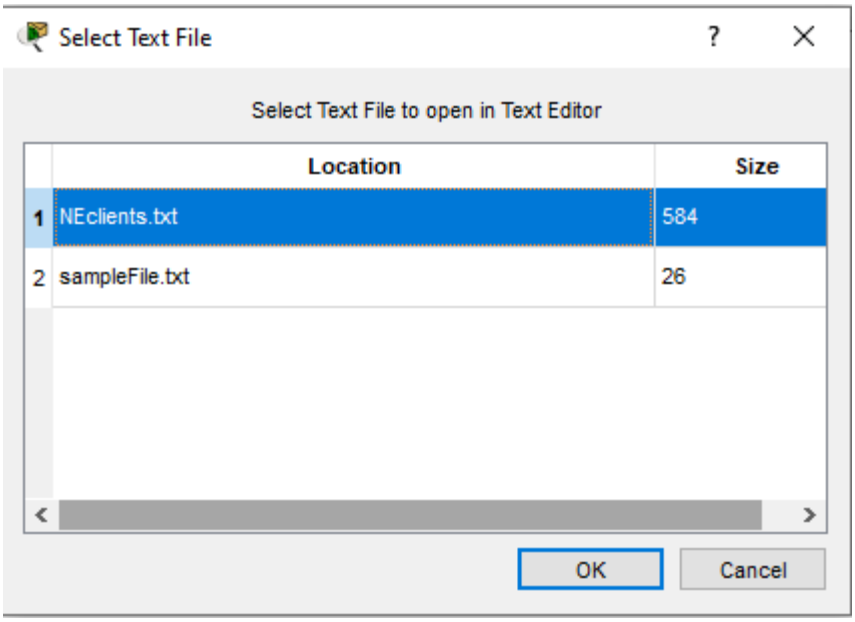
a. Within the **Gotham Healthcare Branch** site, click the PC **Mike**.

b. Click the **Desktop** tab and then click **Text Editor**.

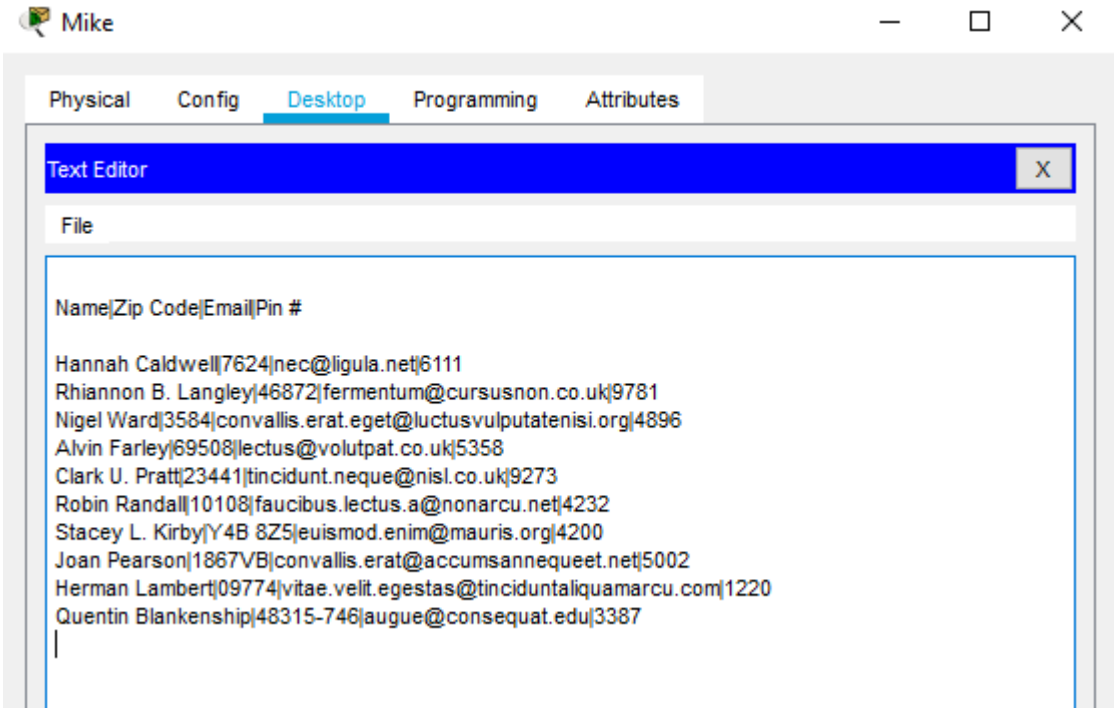
c. In the Text Editor window, click **File** > **Open**.



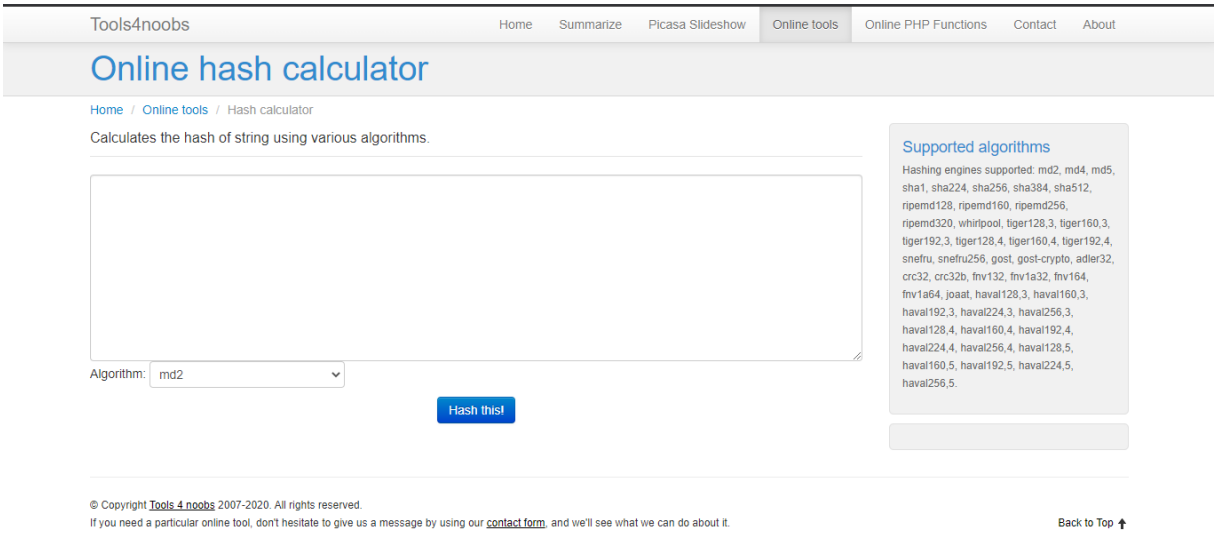
d. Click on the first document **NEclients.txt** and click **OK**.



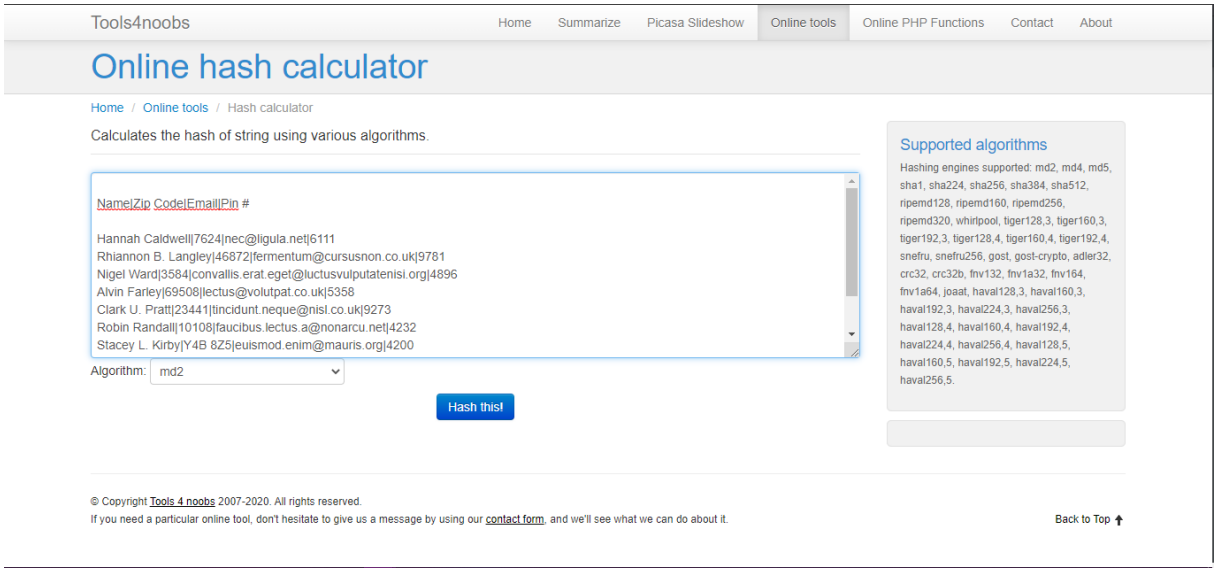
e. Copy the entire text document contents.



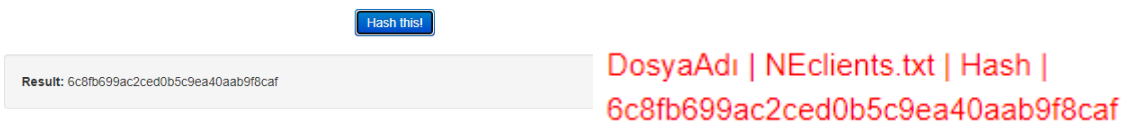
f. Open a web browser on your personal computer and browse to the website https://www.tools4noobs.com/online_tools/hash/



g. Click the whitespace and paste in the text document contents. Make sure the algorithm is set to md2. Click **Hash this!**.



h. To make sure a file has not been tampered with, you will compare the resulting hash with the filename/hash information you found in Part 2 Step 1.



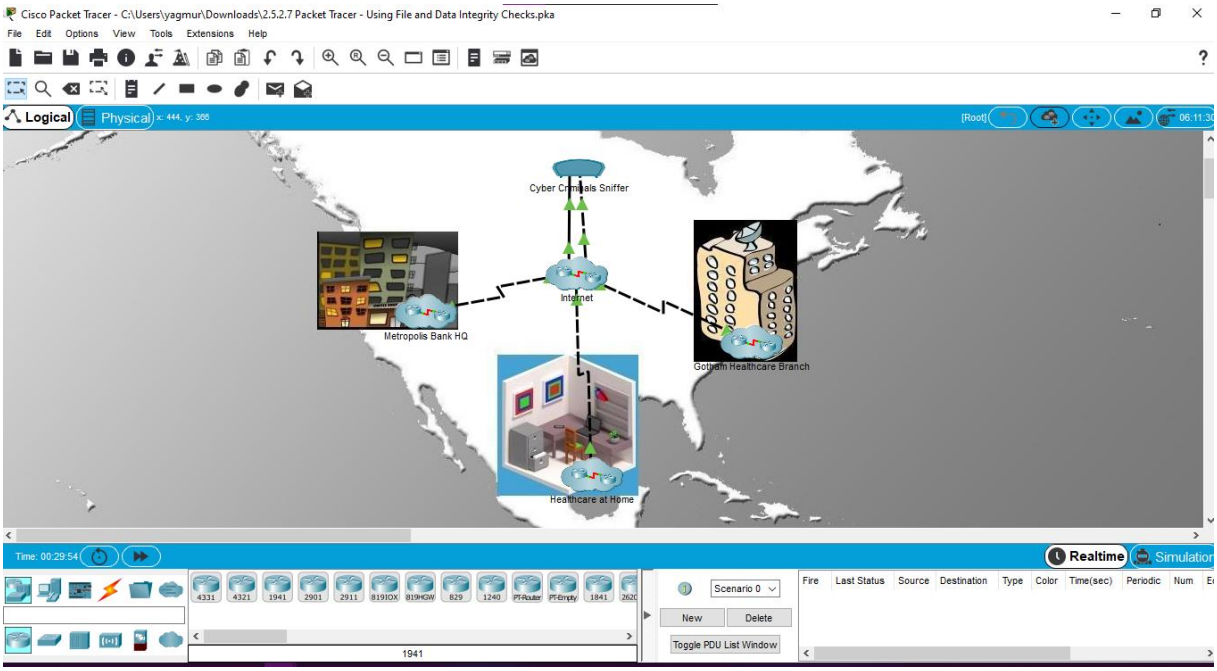
i. Repeat Steps d through h for each client file and compare the generated hash with the original hash shown in Part 2 Step 1.

Which file has been tampered with and has an incorrect hash?

SEclients.txt

Step 2: Download the suspected file to Sally's PC.

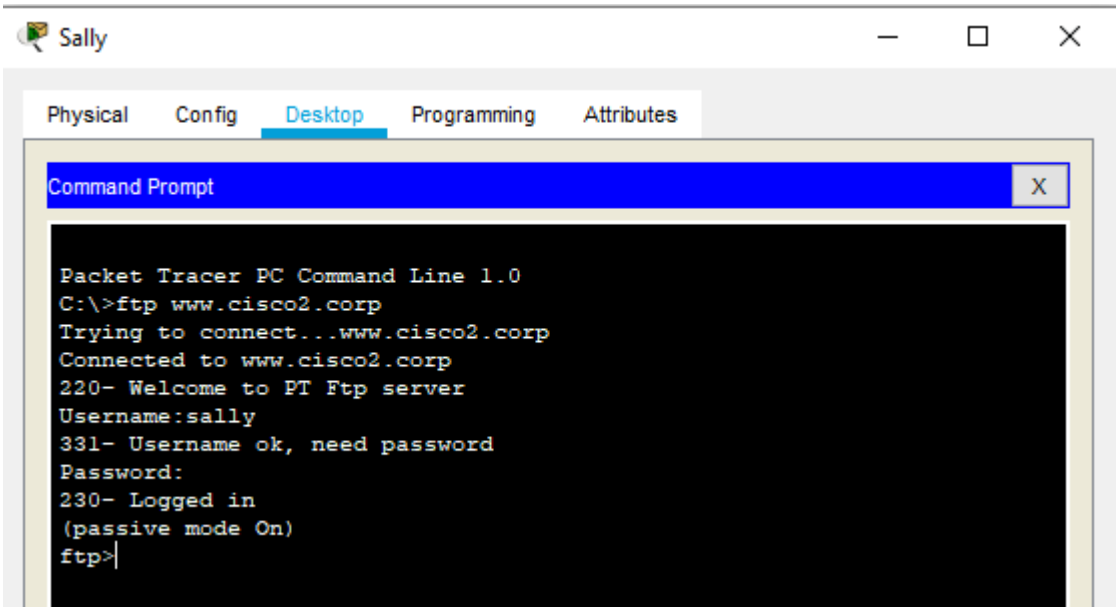
a. Click the **Metropolis Bank HQ** site, and then click the PC **Sally**.



b. Click the **Desktop** tab and then click **Command Prompt**.

c. Connect to the **Backup File** server by entering **ftp www.cisco2.corp** in the command prompt.

d. Enter the username of **sally** and a password of **cisco123**.



e. At the **ftp>** prompt, enter the command **dir** to view the current files stored on the remote FTP server.

```
ftp>dir

Listing /ftp directory from www.cisco2.corp:
0    : NEclients.txt                                    584
1    : NWclients.txt                                    584
2    : Nclients.txt                                     698
3    : SEclients.txt                                    598
4    : SWclients.txt                                    650
5    : Sclients.txt                                     781
6    : asa842-k8.bin                                    5571584
7    : c1841-advipservicesk9-mz.124-15.T1.bin           33591768
8    : c1841-ipbase-mz.123-14.T7.bin                    13832032
9    : c1841-ipbasek9-mz.124-12.bin                     16599160
10   : c2600-advipservicesk9-mz.124-15.T1.bin           33591768
11   : c2600-i-mz.122-28.bin                            5571584
12   : c2600-ipbasek9-mz.124-8.bin                      13169700
13   : c2800nm-advipservicesk9-mz.124-15.T1.bin         50938004
14   : c2800nm-advipservicesk9-mz.151-4.M4.bin          33591768
15   : c2800nm-ipbase-mz.123-14.T7.bin                  5571584
16   : c2800nm-ipbasek9-mz.124-8.bin                    15522644
17   : c2950-i6q412-mz.121-22.EA4.bin                   3058048
18   : c2950-i6q412-mz.121-22.EA8.bin                   3117390
19   : c2960-lanbase-mz.122-25.FX.bin                   4414921
20   : c2960-lanbase-mz.122-25.SEE1.bin                 4670455
21   : c2960-lanbasek9-mz.150-2.SE4.bin                 4670455
22   : c3560-advipservicesk9-mz.122-37.SE1.bin          8662192
23   : income.txt                                       203
24   : pt1000-i-mz.122-28.bin                           5571584
25   : pt3000-i6q412-mz.121-22.EA4.bin                  3117390
ftp>
```

f. Download the file that was found to have been tampered with in Part 3 Step 1.

g. At the **ftp>** prompt, enter the command **quit**.

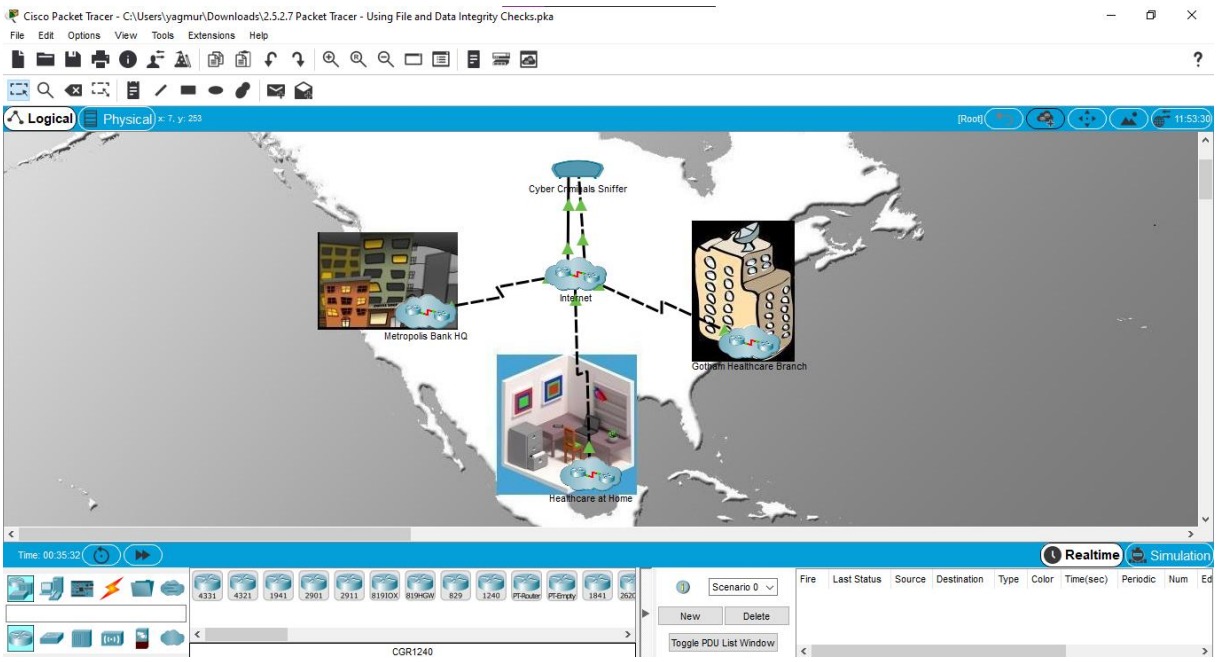
h. At the **PC>** prompt, enter the command **dir** and verify the tampered client file is now on Sally's PC for analysis at a later time.

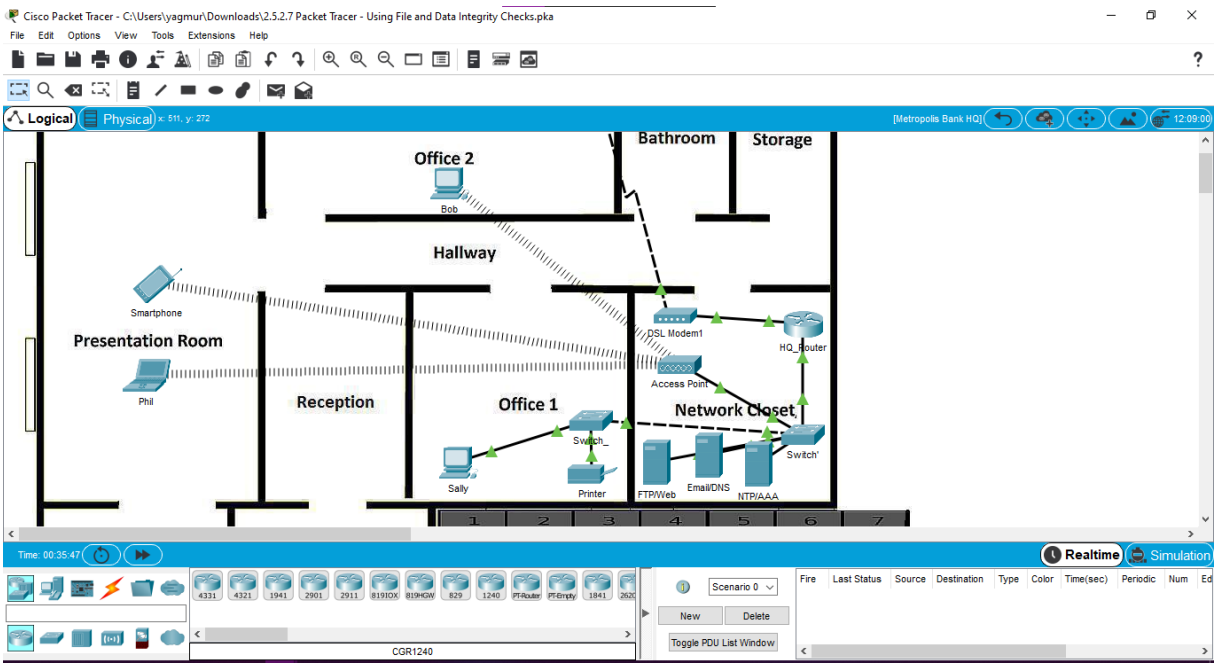
```
ftp>get NEclients.txt

Reading file NEclients.txt from www.cisco2.corp:
File transfer in progress...

[Transfer complete - 584 bytes]

584 bytes copied in 0.053 secs (11018 bytes/sec)
ftp>quit

221- Service closing control connection.
C:\>dir

 Volume in drive C has no label.
 Volume Serial Number is 5E12-4AF3
 Directory of C:\

1/1/1970    3:0 PM             584       NEclients.txt
               584 bytes           1 File(s)
C:\>
```

Part 4: Verify the Integrity of Critical Files using HMAC

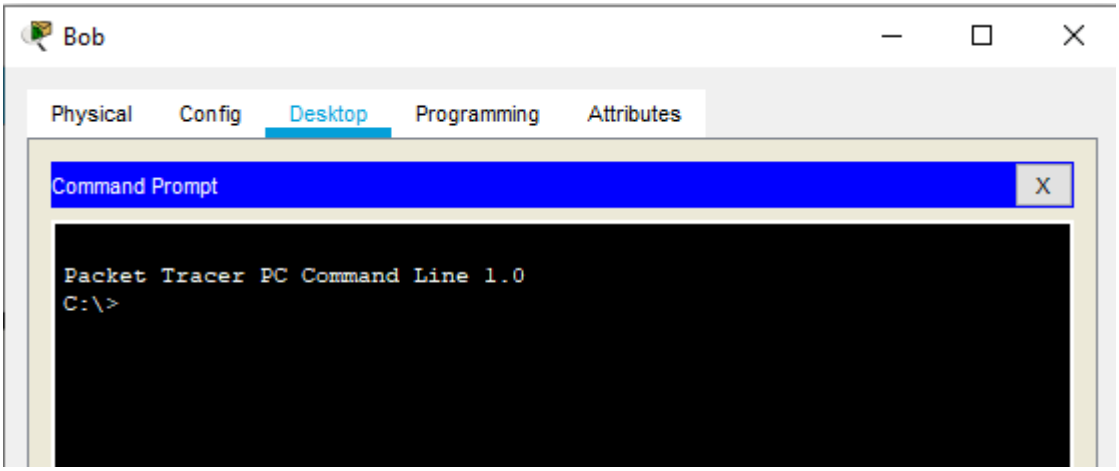
Step 1: Compute the HMAC of a critical file.

a. Within the **Metropolis Bank HQ** site, click the PC **Bob**.

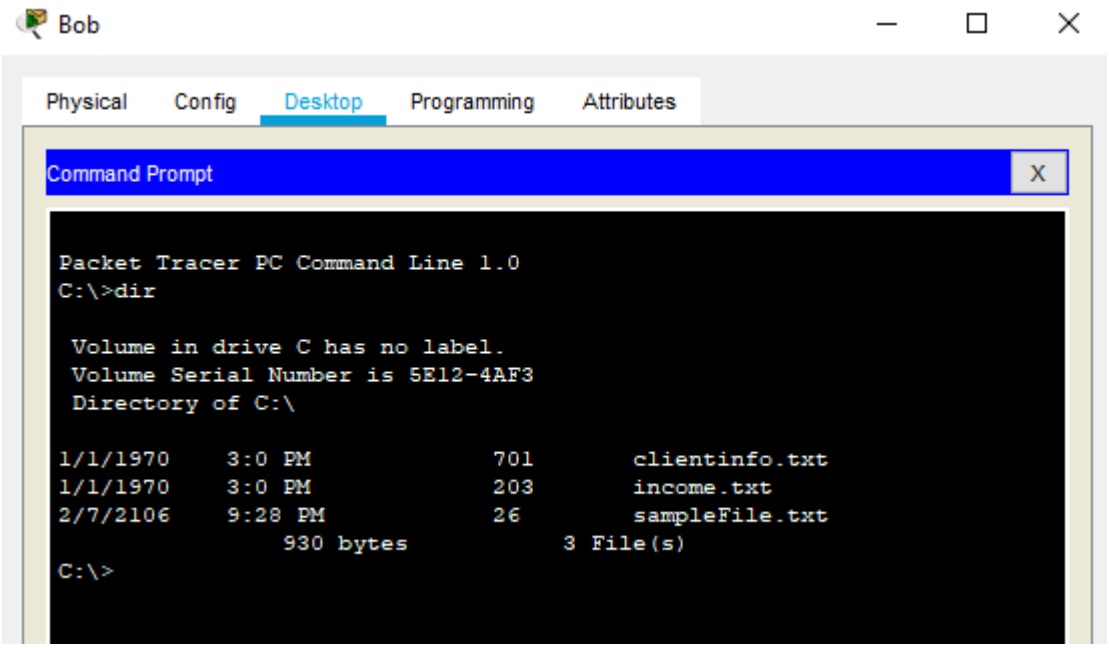




b. Click the **Desktop** tab and then click **Command Prompt**.

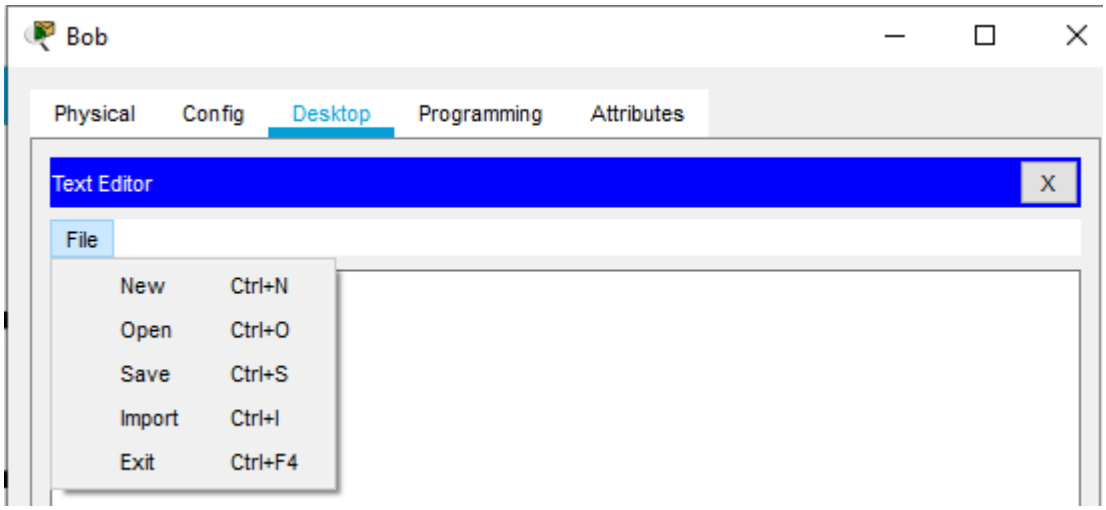


c. At the **PC>** prompt, enter the command **dir** and verify the critical file named **income.txt** is on Bob's PC.

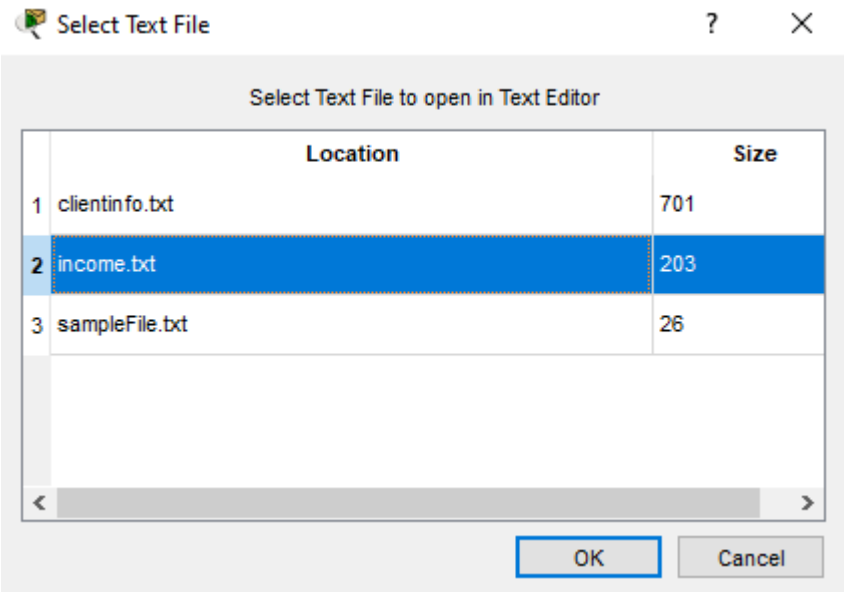


d. Within the **Desktop** tab, click **Text Editor**.

e. In the Text Editor window, click **File** > **Open**.

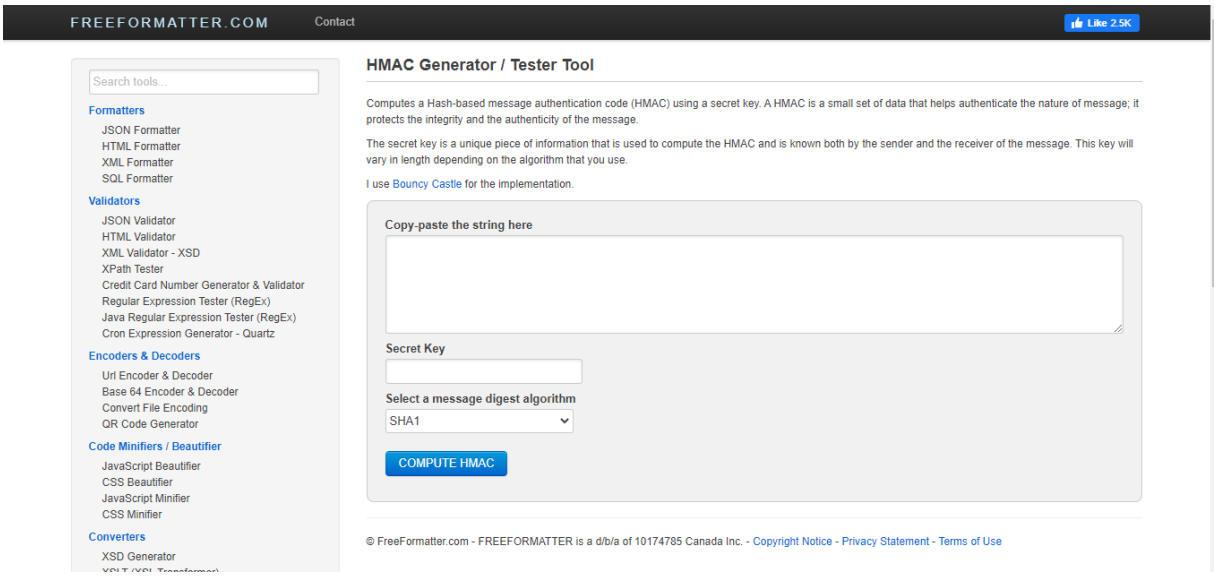


f. Click the document **income.txt** and click **OK**.

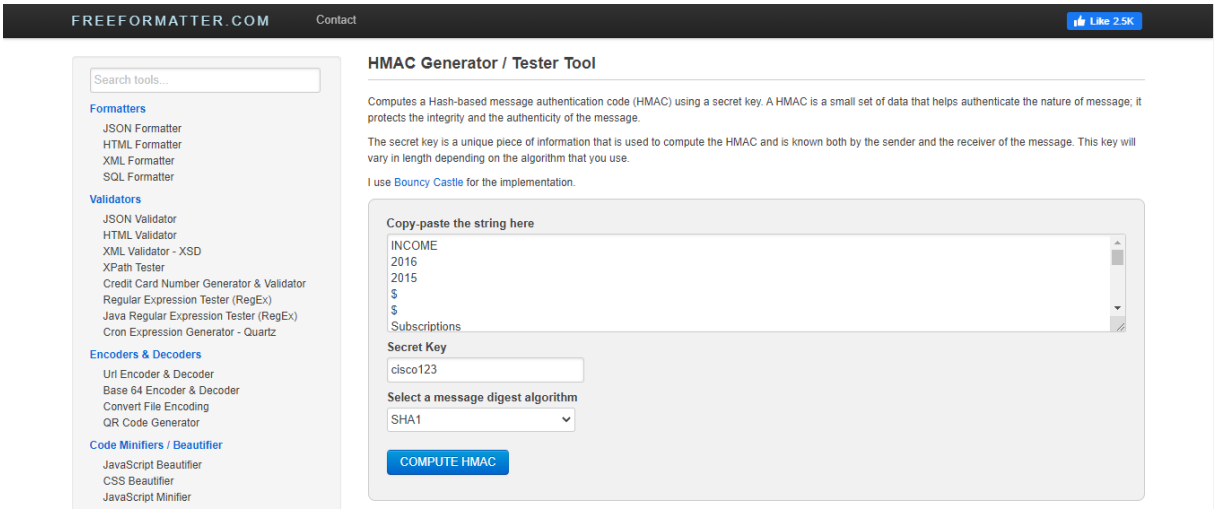


g. Copy the entire text document contents.

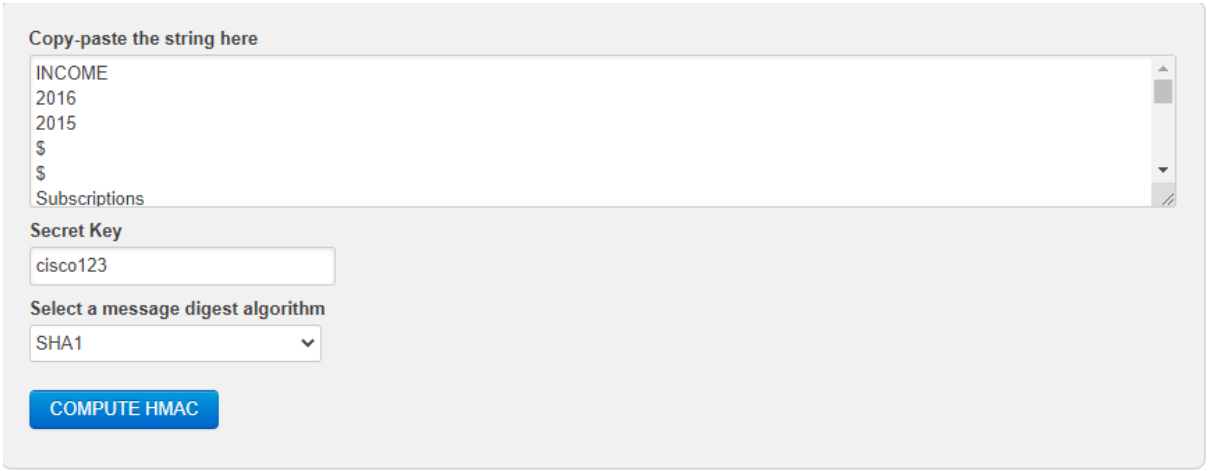
h. Open a web browser on your personal computer and browse to the website http://www.freeformatter.com/hmac-generator.html



i. Click the whitespace and paste in the text document contents. Enter the secret key of **cisco123**. Make sure the algorithm is set to **SHA1**. Click **Compute HMAC**.



What is the computed HMAC for the contents of the file?



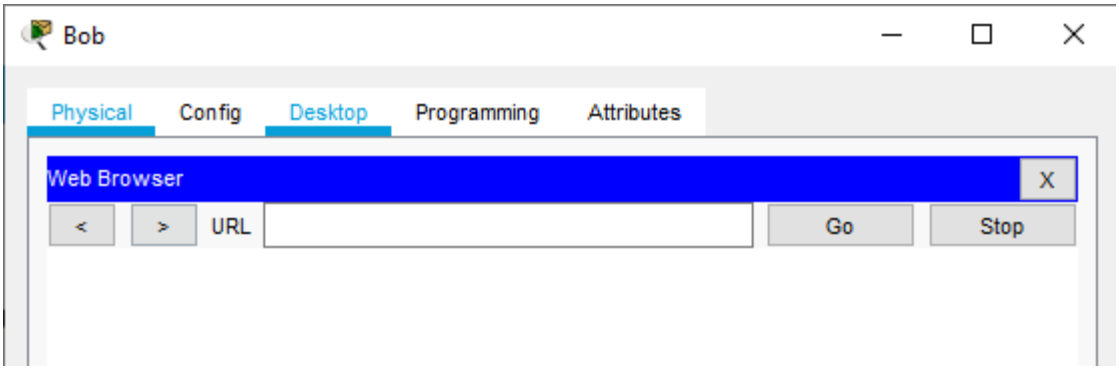
How is using HMAC more secure than general hashing?

To produce a specific hash you need both the original message and a secret key.

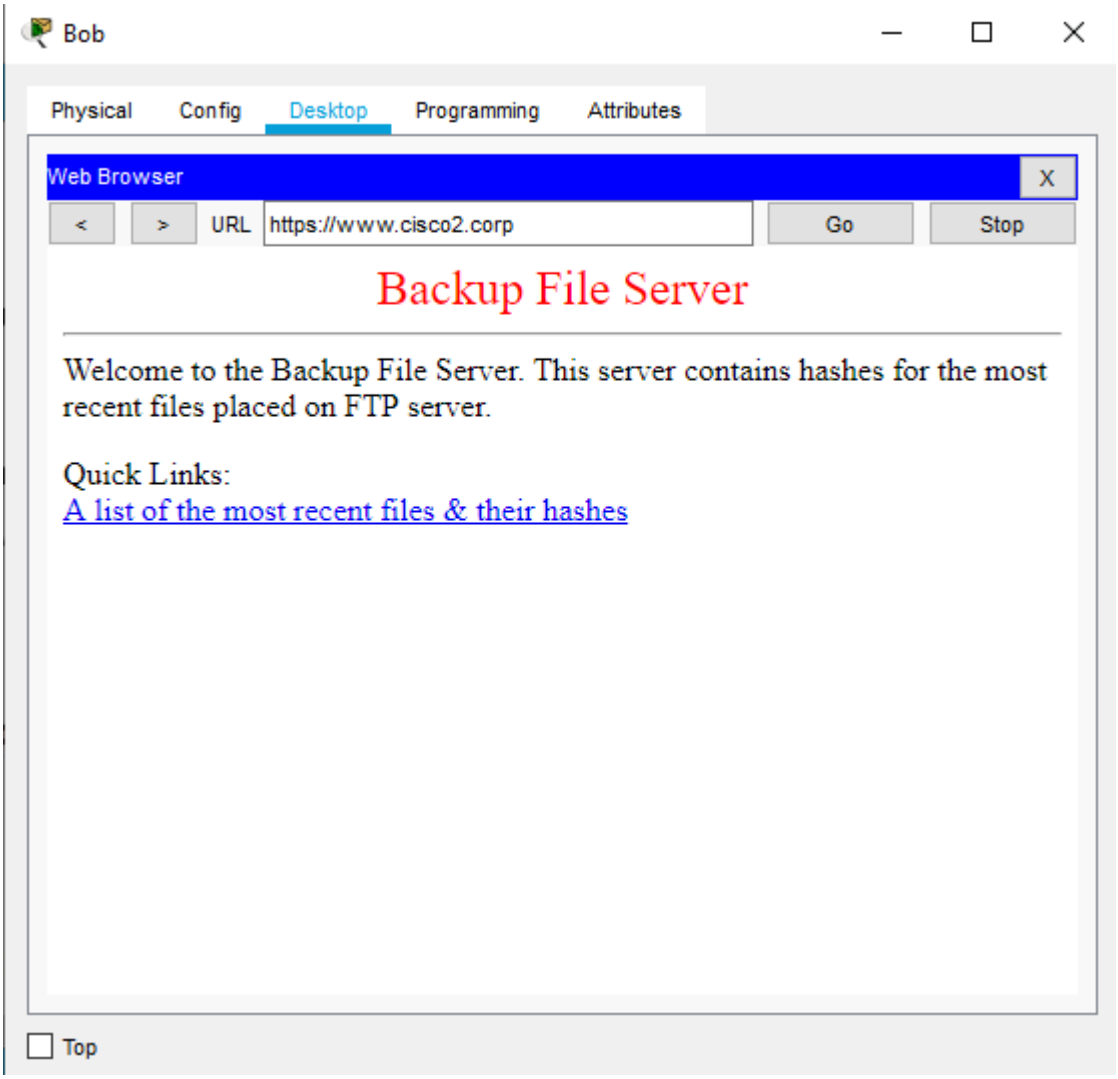
Step 2: Verify the computed HMAC.

a. Within the **Metropolis Bank HQ** site, click the PC **Bob**.

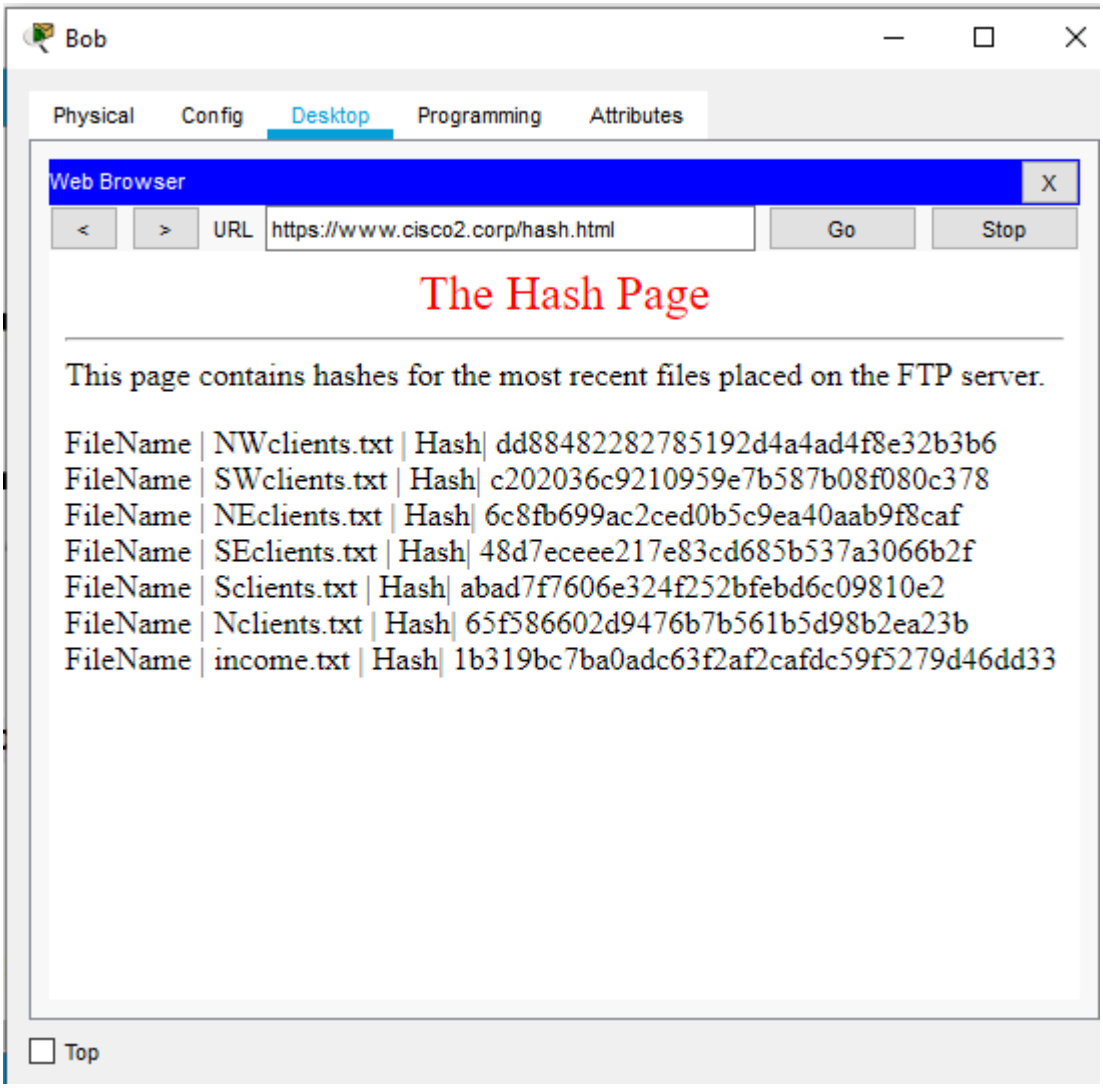
b. Click the **Desktop** tab and then click **Web Browser**.



c. Enter the URL **https://www.cisco2.corp** and click **Go**.



d. Click on the link to view the most recent files and their hashes.



Does the HMAC hash for the income.txt file match?

Yes.