In the name of Allah

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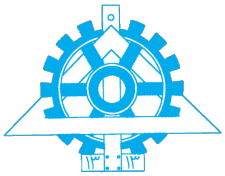
Network management and security Laboratory Manual



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1 Exercises on secure applications

1.1 Excercise One

In this excercise we will study security vulnerability of ftp and telnet protocol . To do so, wi will create mininet topology with single hub[1] connected to three hosts then we will connect from h1 to h2 through ftp and telnet connection and capture h1 password on h3. Let's do it.

- Start pox controller with below command to force mininet switches act like hub.

  $ python pox.py opeenflow.of_01 --address=127.0.0.1 --port=6337 forwarding.hub

- Run below command to start mininet with one single switch and three hosts and connect it to pox controller.

  $ sudo mn --topo single,3 --controller remote,ip=127.0.0.1,port=6633

- start ftp server on h2 with :

  # /usr/sbin/vsftpd

- Run **wireshark &** on h3
- Login to h2 ftp from h1
- Capture h1 password on wireshark output

Repeat the above experiment, but use telnet to connect from h1 to h2 and capture h1 password on h3. [2]

Lab Report

- Can you see the login ID and the password in the FTP experiment? Submit the two packets you captured.
- Can you see the login ID and the password in the TELNET experiment? Submit the packets you captured.
- What is the difference between FTP and TELNET in their transmission of user IDs and passwords? Which one is more secure?

1.2 Excercise Two

Lab Report

- In each experiment, can you extract the password from the tcpdump output? Can you read the IP, TCP, SSH headers? Can you read the TCP data?
- What is the client protocol (and version) used in both cases?
- What is the port number used by the ssh server? What is the port number used by the sftp server? Justify your answer using the wireshark output and the /etc/services file.

[1] hub forwards incoming packets to all of its ports, which means it always floods packets
[2] Don't foget to restart xinetd with '/etc/init.d/xinetd restart' on h2 to start telnet server.

2 Exercises on Firewalls and Iptables

Excercise Three

Start mininet with default topology and Execute iptables -L -v on h1 and h2 to list the existing rules in the filter table. Save the output for the lab report.

Append a rule to the end of the INPUT chain, by executing

h2> **iptables -A INPUT -v -p TCP --dport 23 -j DROP**

on h2. Run iptables -L -v again on both hosts to display the filter table. Save the output.

- Start telnet server on h2 with '/etc/init.d/xinetd restart'.
- Capture packets on both hosts with wireshark
- Try to login with telnet from h1 to h2

Lab Report

- Can you telnet to the host from the remote machine?
- From the wireshark output, how many retries did telnet make? Explain the exponential backoff algorithm of TCP timeout and retransmission.

Excercise Four

Keep previous mininet running and delete the rule created in the last exercise on h2, by:

h2> **iptables -D INPUT -v -p TCP --dport 23 -j DROP**

Then, append a new rule to the INPUT chain:

h2> **iptables -A INPUT -v -p TCP --dport 23 -j REJECT --reject-with tcp-reset**

Execute **iptables -L -v** to display the new rule. On both machines in your topology, restart wireshark output, and then telnet from h1 to h2. Save the wireshark output for the lab report.

Lab Report

- Explain the difference between the wireshark outputs of this exercise and the previous exercise. How many attempts did TCP make this time?