Industrial Control Systems Security

Assignment 1: scanning Modbus server

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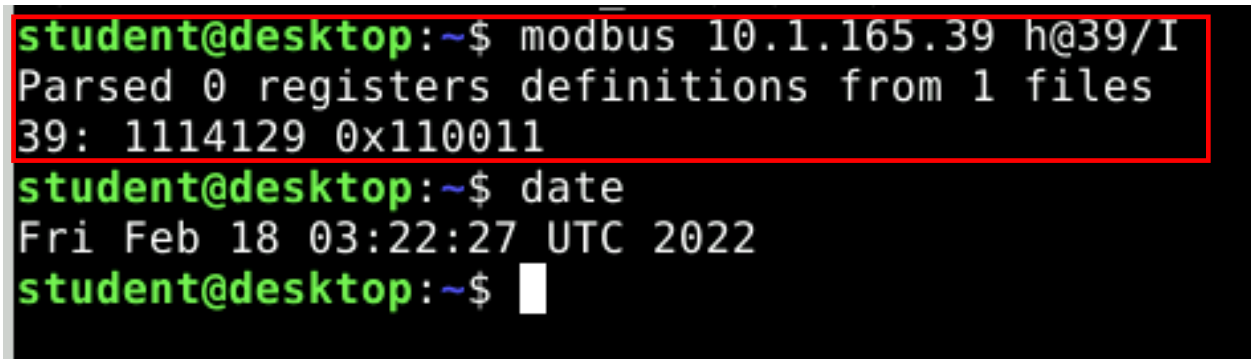
1. Verbally explain the steps you have taken to make the Modbus run. Add a screenshot indicating you are running the Modbus server on **terminal.example.com**, which must include:
    a. The date and time when you run it (use the `date` command to show the date).
    b. The command you use to run the Modbus server.
    c. The output indicating the server is successfully running.

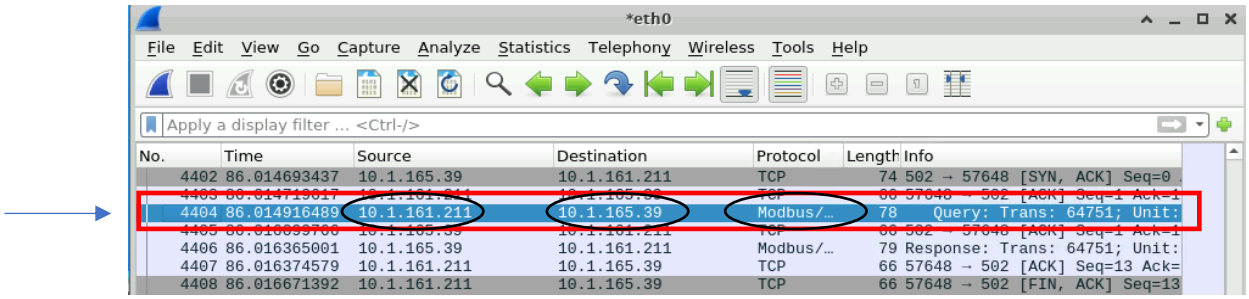
```
student@terminal:~$ date
Fri Feb 18 02:00:11 UTC 2022
student@terminal:~$ sudo python3 script.py
Starting Modbus server...
```

I used the “date” command to show the date and time. After, I used the “Vi” text editor command to copy and paste the script given to us and saved it in a file called “script.py.” I used the “sudo python3 script.py” command to run the script and the output started running the Modbus server successfully.

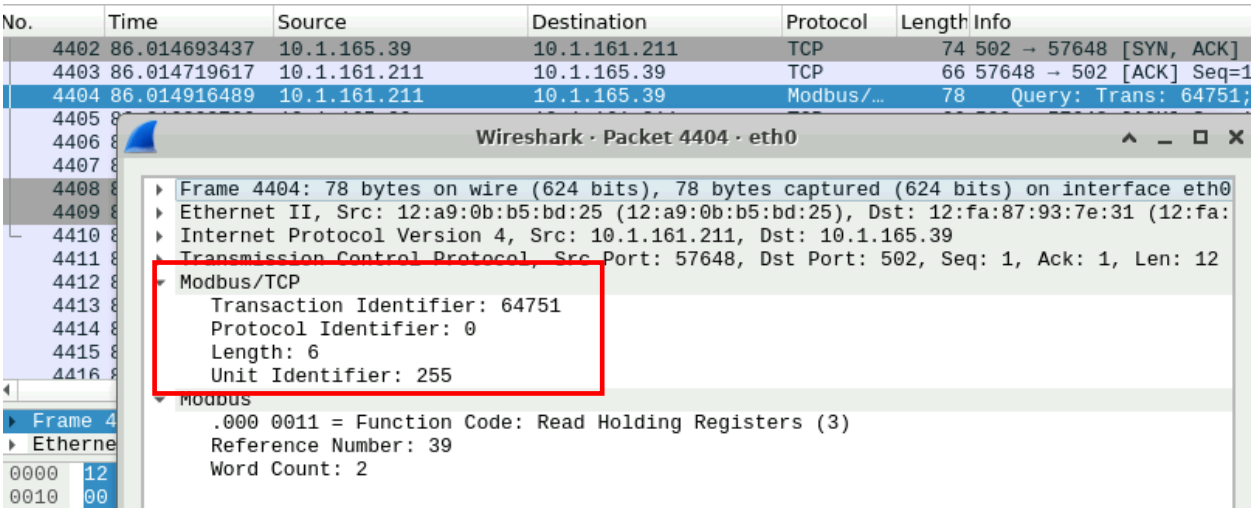
2. A screenshot that shows you have successfully used the `modbus-cli` to communicate with the Modbus server. The screenshot must include:
    a. The command you have typed
    b. The output of the command.



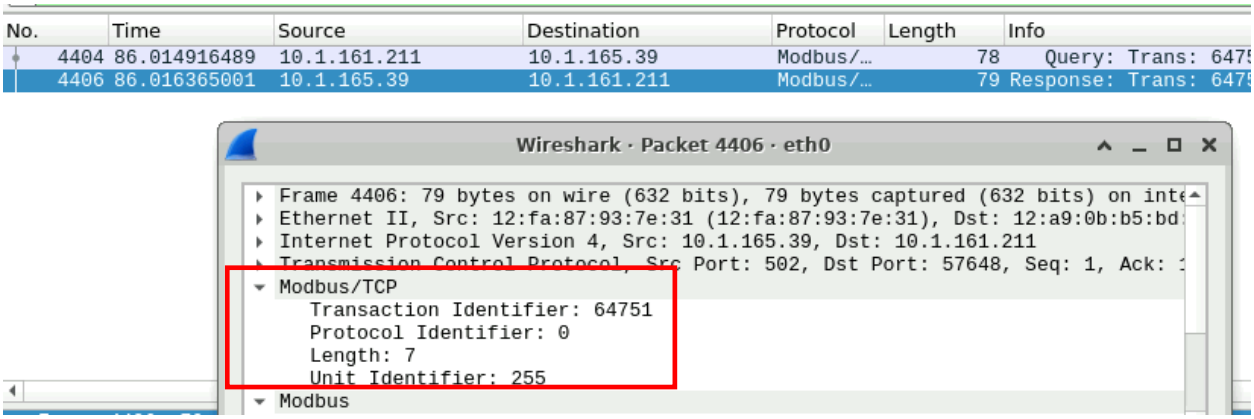
3. A screenshot of the captured packet (one packet is suffice) in Wireshark, which must include:
    a. The source and destination IP addresses of the packet.
    b. The protocol must show it is a Modbus packet.



4. Inspect the captured packet in Wireshark, and answer the following questions.
    a. What are the values of: Transaction Identifier, Protocol Identifier, Length, and Unit Identifier? Attach a screenshot to support your answer.



The value of this modbus protocol is:
Transaction Identifier: 64751
Protocol Identified: 0
Length: 6
Unit Identifier: 255



The value of this modbus protocol is:
Transaction Identifier: 64751
Protocol Identified: 0
Length: 7
Unit Identifier: 255

b. Is Modbus using TCP or UDP? What port number is used? Attach a screenshot to support your answer.

```
▾ Transmission Control Protocol, Src Port: 57648, Dst Port: 502,
    Source Port: 57648
    Destination Port: 502
```

The source port is 57648 and Destination port is 502. Modbus uses TCP.

```
▾ Transmission Control Protocol, Src Port: 502, Dst Port: 57648
    Source Port: 502
    Destination Port: 57648
```

The source port is 502 and destination port is 57648. Modbus uses TCP.

5. Answer the following question:
   a. What ports are opened on **terminal.example.com**?

   Port 22 and Port 502

   b. What service are provided on these opened ports?

   SSH and mbap Service

Then, attach a screenshot that shows your `nmap` scan command and result. The screenshot must include:

c. The command you have typed.
d. The complete scan result, displaying all the open ports identified on **terminal.example.com**.

```
student@desktop:~$ nmap -p- 10.1.165.39
Starting Nmap 7.80 ( https://nmap.org ) at 2022-02-19 04:03 UTC
Nmap scan report for ip-10-1-165-39.ec2.internal (10.1.165.39)
Host is up (0.0083s latency).
Not shown: 65533 closed ports
PORT    STATE SERVICE
22/tcp  open  ssh
502/tcp open  mbap
```

6. Answer the following question:
    a. What is the Slave ID of the server?
       Pymodbus\xFF
    b. What is the Device Identification of the server?
       Pymodbus Inc. PM 1.0

Then, attach a screenshot of the scan result using the `--script` option, which much include the command you have typed, and the complete scan result.