

PLAINTEXT HTTP TRAFFIC ANALYSIS REPORT

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Case ID: NET-HTTP-001

1. Case Summary

This lab exercise demonstrates how HTTP traffic is transmitted in plaintext and can be intercepted and read using packet capture tools. The objective was to illustrate the security risk of unencrypted protocols by observing client-server communication over port 80.

Traffic was generated locally and captured to analyze packet contents and visibility of transmitted data.

2. Lab Environment

Component	Description
OS	Kali Linux
Capture Tool	tcpdump
Server Tool	Netcat (nc)
Client Tool	Netcat (nc)
Network Interface	Loopback (127.0.0.1)
Protocol Observed	HTTP (Port 80)

3. Tools Used

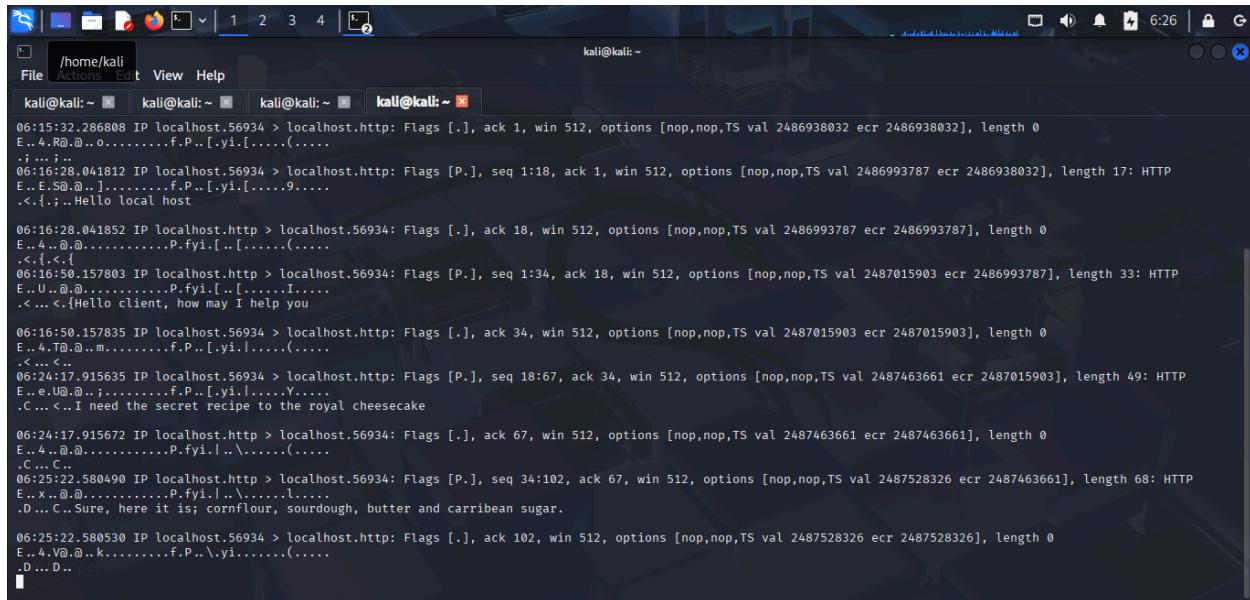
- **tcpdump** – Network packet capture
 - **Netcat (nc)** – Used to simulate client-server communication
-

4. Packet Capture Setup

Traffic capture was started on the loopback interface:

```
sudo tcpdump -i lo -A
```

The **-A** option displays packet contents in readable ASCII format. This allows direct observation of transmitted data without encryption.



```
kali@kali:~ /home/kali kali@kali:~ kali@kali:~ kali@kali:~ 
File Actions Edit View Help
kali@kali:~ kali@kali:~ kali@kali:~ kali@kali:~ 
06:15:32.286808 IP localhost.56934 > localhost.http: Flags [.], ack 1, win 512, options [nop,nop,TS val 2486938032 ecr 2486938032], length 0
E..4.RQ.O..o.....f.P..[.y1.[....(.....
. .... i ...
06:16:28.041812 IP localhost.56934 > localhost.http: Flags [P.], seq 1:18, ack 1, win 512, options [nop,nop,TS val 2486993787 ecr 2486993787], length 17: HTTP
E..E.S0.O..].....f.P..[.y1.[....9.....
.<{.;..Hello local host

06:16:28.041852 IP localhost.http > localhost.56934: Flags [.], ack 18, win 512, options [nop,nop,TS val 2486993787 ecr 2486993787], length 0
E..4..@.O.....P.fyi.[...[....(.....
.<{.<{
06:16:50.157803 IP localhost.http > localhost.56934: Flags [P.], seq 1:34, ack 18, win 512, options [nop,nop,TS val 2487015903 ecr 2486993787], length 33: HTTP
E..U..@.O.....P.fyi.[...[....I.....
.<{...<{Hello client, how may I help you

06:16:50.157835 IP localhost.56934 > localhost.http: Flags [.], ack 34, win 512, options [nop,nop,TS val 2487015903 ecr 2487015903], length 0
E..4.T@.O.m.....f.P..[.y1.[....(.....
.<...<..
06:24:17.915635 IP localhost.56934 > localhost.http: Flags [P.], seq 18:67, ack 34, win 512, options [nop,nop,TS val 2487463661 ecr 2487015903], length 49: HTTP
E..e.U@.O.;.....f.P..[.y1.[....Y.....
.C...<{I need the secret recipe to the royal cheesecake

06:24:17.915672 IP localhost.http > localhost.56934: Flags [.], ack 67, win 512, options [nop,nop,TS val 2487463661 ecr 2487463661], length 0
E..4..@.O.....P.fyi.[...[....(.....
.C ... C..
06:25:22.580490 IP localhost.http > localhost.56934: Flags [P.], seq 34:102, ack 67, win 512, options [nop,nop,TS val 2487528326 ecr 2487463661], length 68: HTTP
E..x..@.O.....P.fyi.[...[....l.....
.D ... C..Sure, here it is; cornflour, sourdough, butter and carribean sugar.

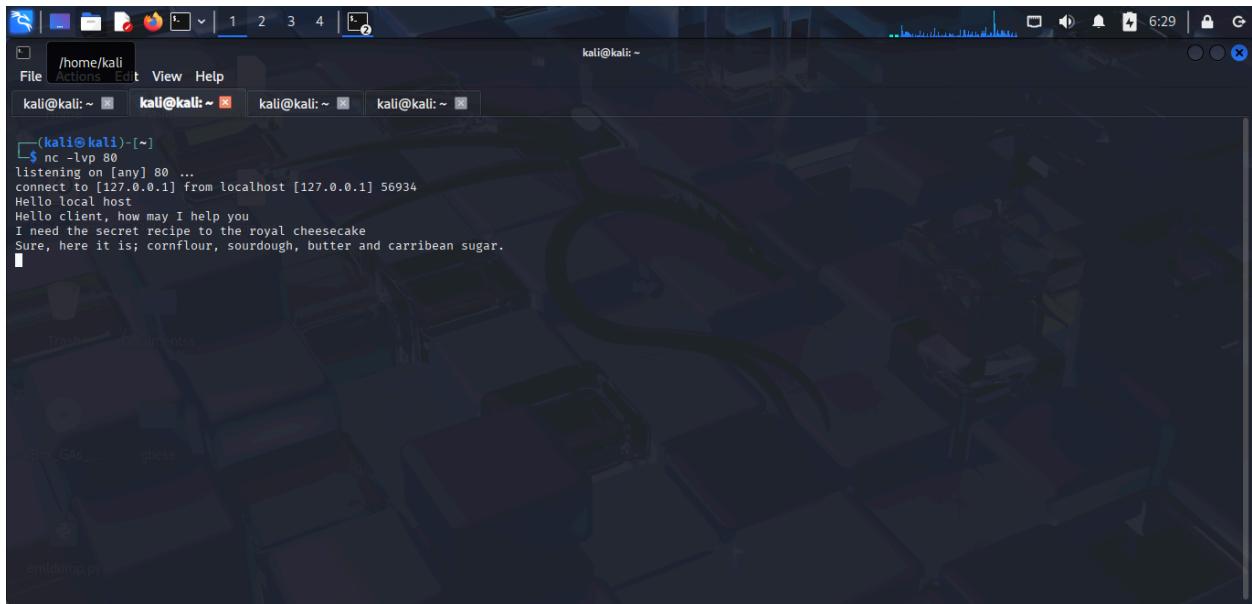
06:25:22.580530 IP localhost.56934 > localhost.http: Flags [.], ack 102, win 512, options [nop,nop,TS val 2487528326 ecr 2487528326], length 0
E..4.V@.O.k.....f.P..[.y1.[....(.....
.D ... D..
```

5. Server Configuration

A local server was created to listen for incoming traffic on port 80:

```
nc -lvp 80
```

This configured the system to act as a basic server waiting for client connections.



A screenshot of a Kali Linux terminal window titled 'kali@kali: ~'. The terminal shows a netcat listener running on port 80. A client connection has been established from localhost (127.0.0.1) on port 56934. The server responds with a friendly greeting and a secret recipe for a royal cheesecake.

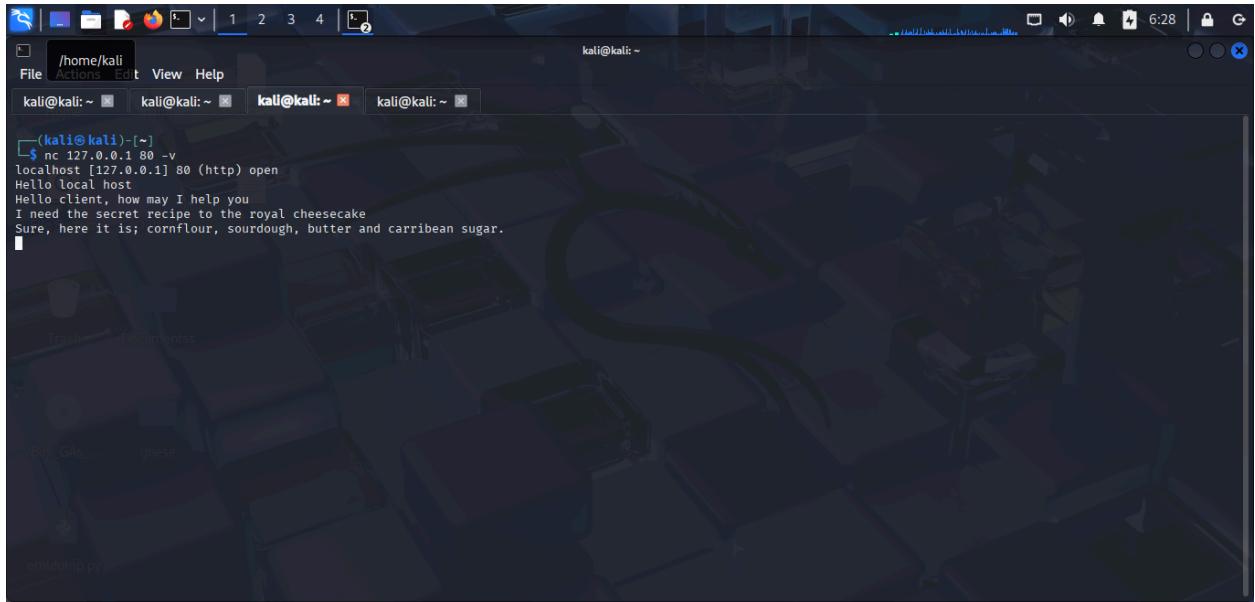
```
(kali㉿kali)-[~]
$ nc -lvp 80
listening on [any] 80 ...
connect to [127.0.0.1] from localhost [127.0.0.1] 56934
Hello local host
Hello client, how may I help you
I need the secret recipe to the royal cheesecake
Sure, here it is; cornflour, sourdough, butter and carribean sugar.
```

6. Client Connection

A client connection was initiated to communicate with the server:

```
nc 127.0.0.1 80 -v
```

This established communication between the client and server, generating observable network traffic.



A screenshot of a Kali Linux desktop environment. In the foreground, a terminal window titled '(kali㉿kali)-[~]' shows the command 'nc 127.0.0.1 80 -v' being run. The output reveals a local web server listening on port 80, responding with a friendly message about a secret cheesecake recipe. The terminal window has tabs for 'File', 'Actions', 'Edit', 'View', and 'Help'. The background shows a dark, abstract wallpaper.

```
[~] $ nc 127.0.0.1 80 -v
localhost [127.0.0.1] 80 (http) open
Hello local host
Hello client, how may I help you
I need the secret recipe to the royal cheesecake
Sure, here it is; cornflour, sourdough, butter and carribean sugar.
```

7. Key Observation — Plaintext Transmission

The captured packets revealed that:

- Data transmitted over HTTP appeared in readable text
- Packet contents were visible in ASCII format
- No encryption or obfuscation was applied

This confirms that HTTP transmits data in plaintext.

8. Security Implications

Because HTTP traffic is unencrypted:

- Sensitive data can be intercepted
- Credentials and session data may be exposed
- Attackers on the same network can monitor communication

This demonstrates why HTTPS (HTTP over TLS) is required to secure data in transit.

9. Conclusion

This lab provided practical evidence that HTTP traffic is not secure due to lack of encryption. Observing plaintext packets reinforces the importance of using secure protocols in modern network environments.

Understanding protocol security weaknesses is essential for SOC analysts and network security professionals responsible for monitoring and protecting organizational traffic.