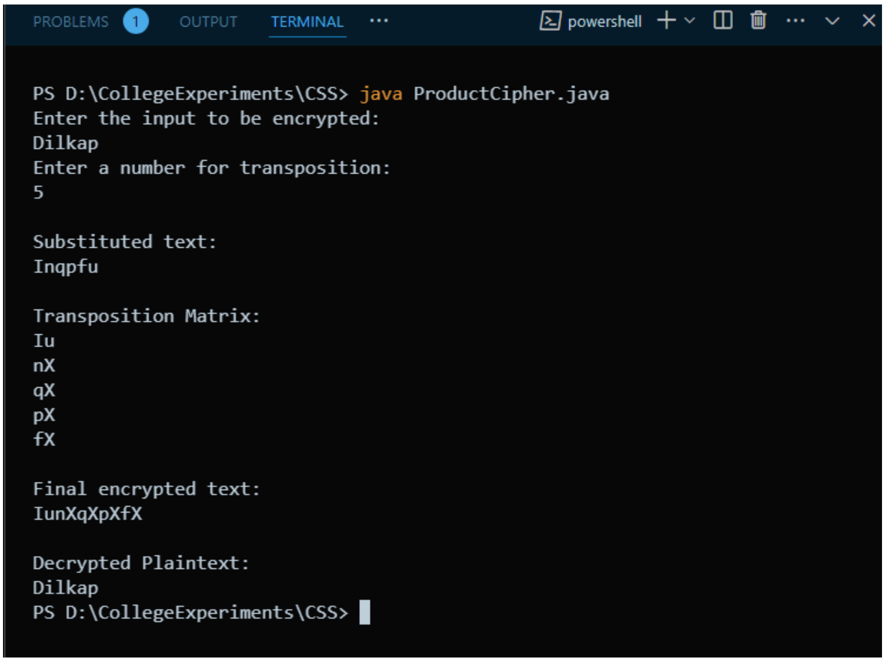
Experiment No. 1

```
import java.util.*;
class ProductCipher {
    public static void main(String args[]) {
        Scanner scanner = new Scanner(System.in);

        // Input for substitution encryption
        System.out.println("Enter the input to be encrypted:");
        String substitutionInput = scanner.nextLine();

        // Input for transposition encryption
        System.out.println("Enter a number for transposition:");
        int n = scanner.nextInt();

        // Substitution encryption
        StringBuffer substitutionOutput = new StringBuffer();
        for (int i = 0; i < substitutionInput.length(); i++) {
            char c = substitutionInput.charAt(i);
            substitutionOutput.append((char) (c + 5)); // Shift each character by 5
        }
        System.out.println("\nSubstituted text:");
        System.out.println(substitutionOutput);

        // Transposition encryption
        String transpositionInput = substitutionOutput.toString();
        int modulus = transpositionInput.length() % n;
        if (modulus != 0) {
            modulus = n - modulus; // Calculate padding needed
            for (; modulus != 0; modulus--) {
```

```
        transpositionInput += "X"; // Add padding character 'X'
    }
}
StringBuffer transpositionOutput = new StringBuffer();
System.out.println("\nTransposition Matrix:");
for (int i = 0; i < n; i++) {
    for (int j = 0; j < transpositionInput.length() / n; j++) {
        char c = transpositionInput.charAt(i + (j * n));
        System.out.print(c); // Print matrix row-wise
        transpositionOutput.append(c);
    }
    System.out.println();
}
System.out.println("\nFinal encrypted text:");
System.out.println(transpositionOutput);

// Transposition decryption
String transpositionEncrypted = transpositionOutput.toString();
int rows = transpositionEncrypted.length() / n;
StringBuffer transpositionPlaintext = new StringBuffer();
for (int i = 0; i < rows; i++) {
    for (int j = 0; j < n; j++) {
        char c = transpositionEncrypted.charAt(i + (j * rows));
        transpositionPlaintext.append(c);
    }
}

// Remove padding
while (transpositionPlaintext.charAt(transpositionPlaintext.length() - 1) == 'X') {
```

```
            transpositionPlaintext.deleteCharAt(transpositionPlaintext.length() - 1);
        }

        // Substitution decryption
        StringBuffer plaintext = new StringBuffer();
        for (int i = 0; i < transpositionPlaintext.length(); i++) {
            char c = transpositionPlaintext.charAt(i);
            plaintext.append((char) (c - 5)); // Reverse shift by 5
        }

        System.out.println("\nDecrypted Plaintext:");
        System.out.println(plaintext);

        scanner.close();
    }
}
```

Output:



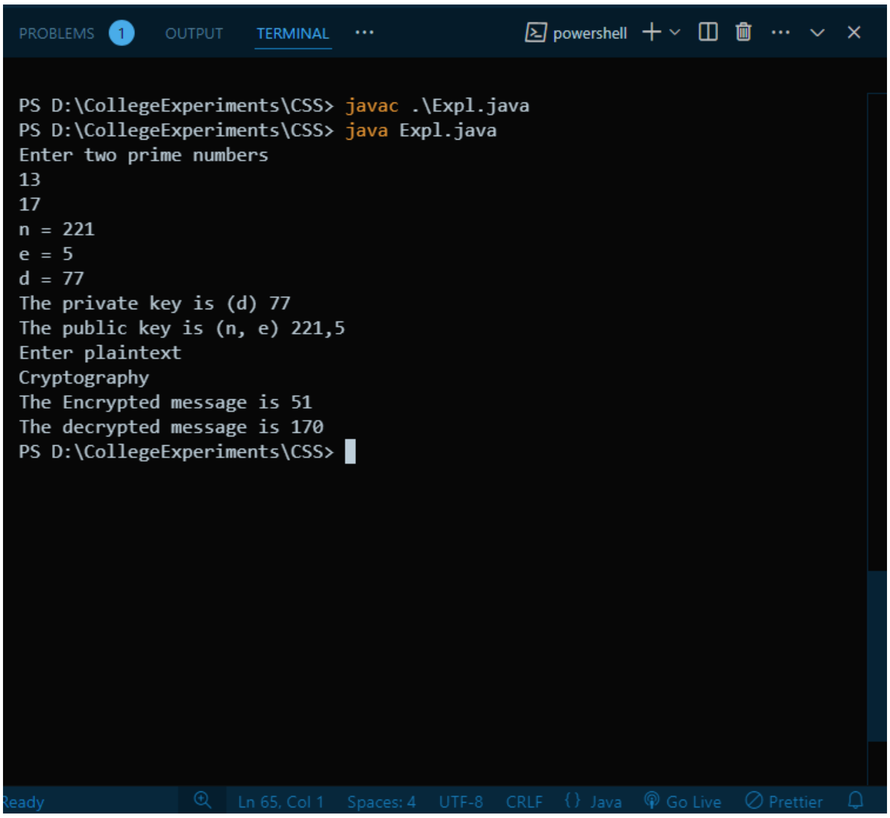
```
PS D:\CollegeExperiments\CSS> java ProductCipher.java
Enter the input to be encrypted:
Dilkap
Enter a number for transposition:
5

Substituted text:
Inqpfu

Transposition Matrix:
Iu
nX
qX
pX
fX

Final encrypted text:
IunXqXpXfX

Decrypted Plaintext:
Dilkap
PS D:\CollegeExperiments\CSS>
```

Experiment No. 2

```
import java.util.*;
class Expl {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        int d = 0;

        System.out.println("Enter two prime numbers");
        int p = sc.nextInt();
        int q = sc.nextInt();

        int n = p * q;
        System.out.println("n = " + n);

        int pn = (p - 1) * (q - 1);
        int e = 0;

        search:
        for (int i = 2; i <= pn; i++) {
            int j = i;
            int k = pn;

            while (k != j) {
                if (k > j)
                    k = k - j;
                else
                    j = j - k;
            }
    if (k == 1) {
        e = i;
        break search;
    }
}
System.out.println("e = " + e);

go:
for (int i = 1; i < pn; i++) {
    int x = (e * i) % pn;
    if (x == 1) {
        System.out.println("d = " + i);
        System.out.println("The private key is (d) " + i);
        d = i;
        break go;
    }
}

System.out.println("The public key is (n, e) " + n + "," + e);

System.out.println("Enter plaintext");
String t = sc.next();
int c, m = 0;

for (int i = 0; i < t.length(); i++) {
    m += (int) t.charAt(i);
}
```

```
        c = (m * e) % n;
        System.out.println("The Encrypted message is " + c);

        m = (c * d) % n;
        System.out.println("The decrypted message is " + m);
    }
}
```

Output:



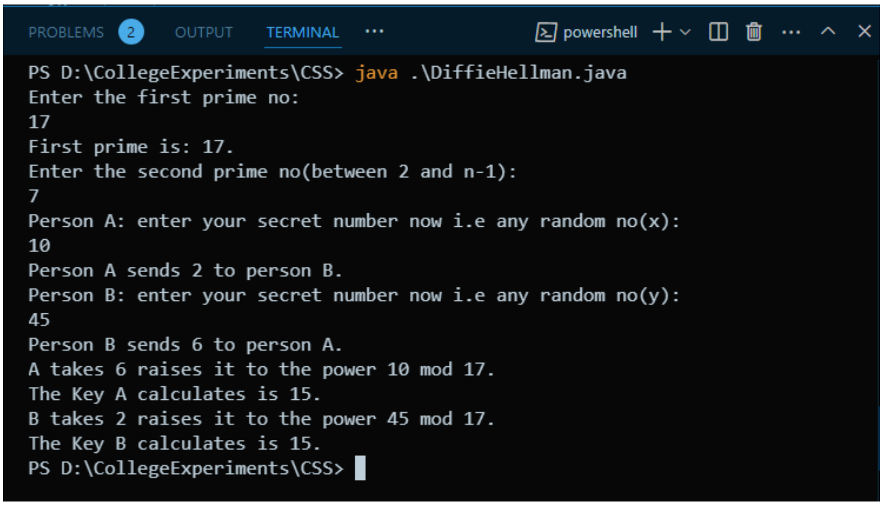
```
PS D:\CollegeExperiments\CSS> javac .\Expl.java
PS D:\CollegeExperiments\CSS> java Expl.java
Enter two prime numbers
13
17
n = 221
e = 5
d = 77
The private key is (d) 77
The public key is (n, e) 221,5
Enter plaintext
Cryptography
The Encrypted message is 51
The decrypted message is 170
PS D:\CollegeExperiments\CSS> 
```

Experiment No. 3

```
import java.util.*;
import java.math.BigInteger;

public class DiffieHellman {
  final static BigInteger one  =  new BigInteger("1");

  public static void main(String args[]) {
    Scanner stdin = new Scanner(System.in);
    BigInteger n;

    // Get a start spot to pick a prime from the user.
    System.out.println("Enter the first prime no:");
    String ans = stdin.next();
    n = getNextPrime(ans);

    System.out.println("First prime is: " + n + ".");

    // Get the base for exponentiation from the user.
    System.out.println("Enter the second prime no(between 2 and n-1):");
    BigInteger g = new BigInteger(stdin.next());

    // Get A's secret number.
    System.out.println("Person A: enter your secret number now i.e any random no(x):");
    BigInteger a = new BigInteger(stdin.next());

    // Make A's calculation.
    BigInteger resulta = g.modPow(a, n);
```

```
        // This is the value that will get sent from A to B.
        // This value does NOT compromise the value of a easily.
        System.out.println("Person A sends " + resulta + " to person B.");

        // Get B's secret number.
        System.out.println("Person B: enter your secret number now i.e any random no(y):");
        BigInteger b = new BigInteger(stdin.next());

        // Make B's calculation.
        BigInteger resultb = g.modPow(b, n);
        System.out.println("Person B sends " + resultb + " to person A.");

        // Key A calculates
        BigInteger KeyACalculates = resultb.modPow(a, n);
        // Key B calculates
        BigInteger KeyBCalculates = resulta.modPow(b, n);

        // Print out the Key A calculates.
        System.out.println("A takes " + resultb + " raises it to the power " + a + " mod " + n + ".");
        System.out.println("The Key A calculates is " + KeyACalculates + ".");

        // Print out the Key B calculates.
        System.out.println("B takes " + resulta + " raises it to the power " + b + " mod " + n + ".");
        System.out.println("The Key B calculates is " + KeyBCalculates + ".");
    }

    public static BigInteger getNextPrime(String ans) {
        BigInteger test = new BigInteger(ans);
        while (!test.isProbablePrime(99))
            test = test.add(one);
        return test;
    }
}
```

Output:



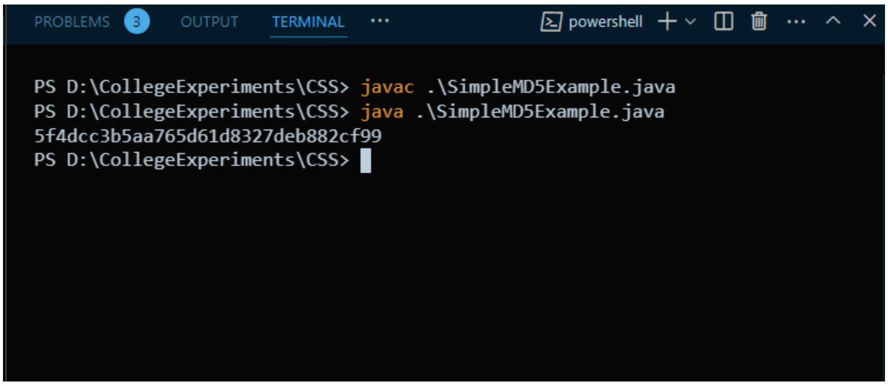
```
PS D:\CollegeExperiments\CSS> java .\DiffieHellman.java
Enter the first prime no:
17
First prime is: 17.
Enter the second prime no(between 2 and n-1):
7
Person A: enter your secret number now i.e any random no(x):
10
Person A sends 2 to person B.
Person B: enter your secret number now i.e any random no(y):
45
Person B sends 6 to person A.
A takes 6 raises it to the power 10 mod 17.
The Key A calculates is 15.
B takes 2 raises it to the power 45 mod 17.
The Key B calculates is 15.
PS D:\CollegeExperiments\CSS> 
```

Experiment No. 4

```
import java.security.MessageDigest;

import java.security.NoSuchAlgorithmException;

import java.security.SecureRandom;


public class SimpleMD5Example {

   public static void main(String[] args) {

      String passwordToHash = "password";

      String generatedPassword = null;


      try {

         // Create MessageDigest instance for MD5

         // For hashing using MD5 can be replaced by SHA1 in the following line

         MessageDigest md = MessageDigest.getInstance("MD5");


         // Add password bytes to digest

         md.update(passwordToHash.getBytes());


         // Get the hash's bytes

         byte[] bytes = md.digest();


         // This bytes[] has bytes in decimal format;

         // Convert it to hexadecimal format

         StringBuilder sb = new StringBuilder();

         for (int i = 0; i < bytes.length; i++) {

            sb.append(Integer.toString((bytes[i] & 0xff) + 0x100, 16).substring(1));

         }
```

```
            // Get complete hashed password in hex format
            generatedPassword = sb.toString();
        } catch (NoSuchAlgorithmException e) {
            e.printStackTrace();
        }

        System.out.println(generatedPassword);
    }
}
```

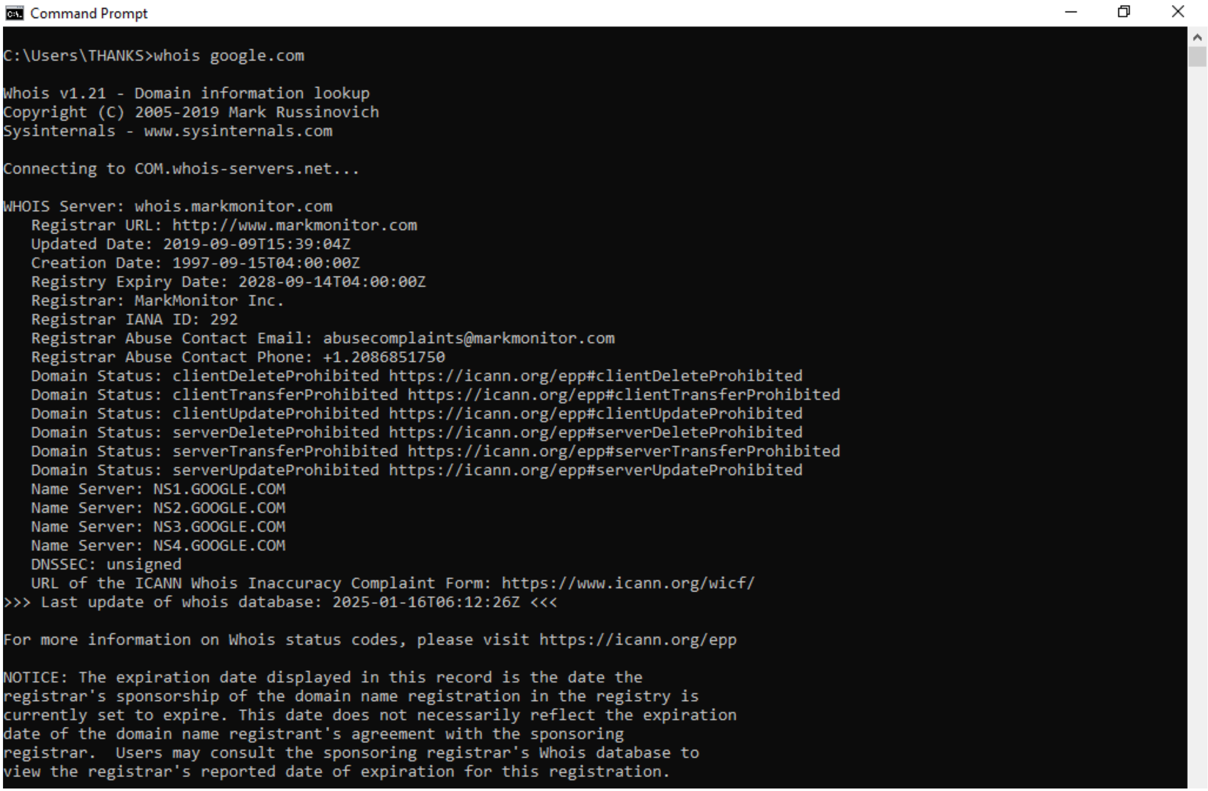
Output:



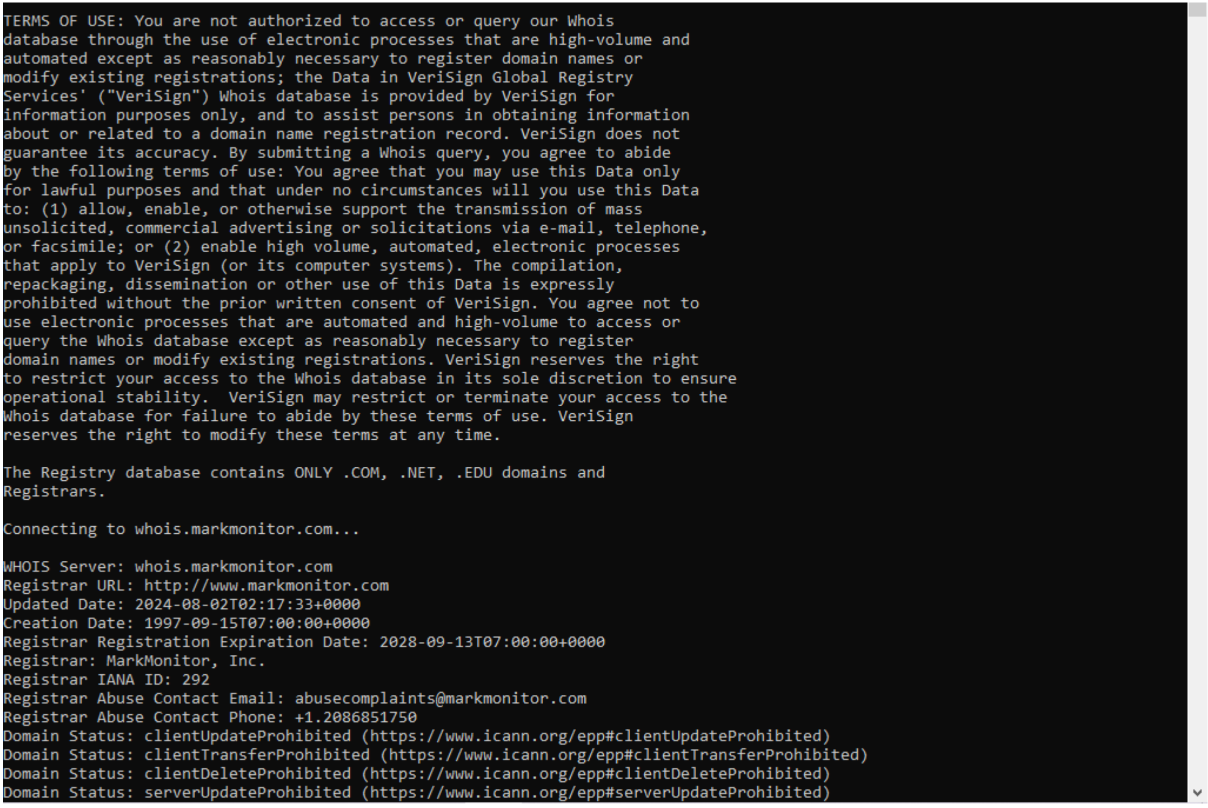
```
PS D:\CollegeExperiments\CSS> javac .\SimpleMD5Example.java
PS D:\CollegeExperiments\CSS> java .\SimpleMD5Example.java
5f4dcc3b5aa765d61d8327deb882cf99
PS D:\CollegeExperiments\CSS> 
```

Experiment No. 5

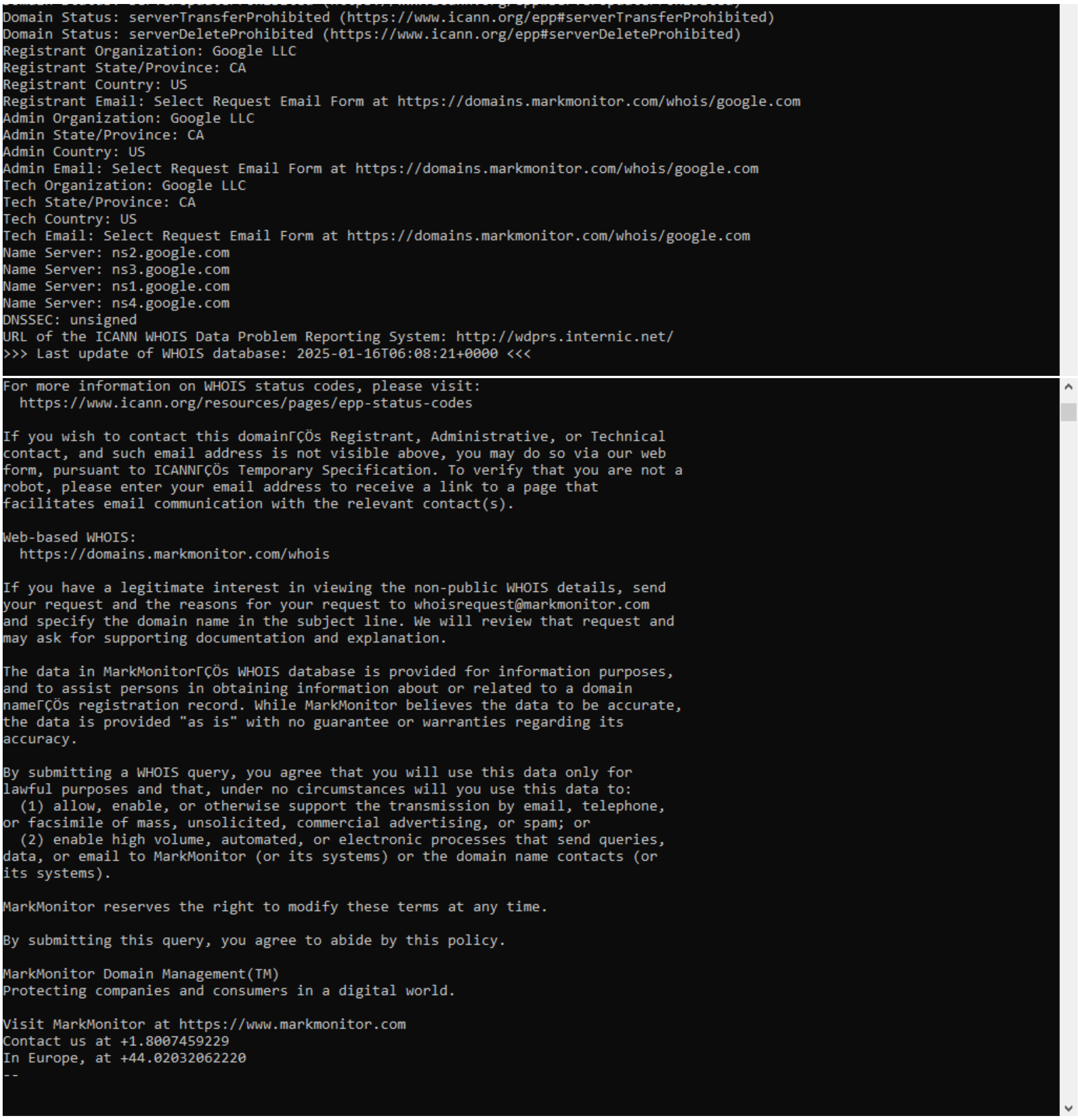
1. Whois Command



```
C:\Users\THANKS>whois google.com

Whois v1.21 - Domain information lookup
Copyright (C) 2005-2019 Mark Russinovich
Sysinternals - www.sysinternals.com

Connecting to COM.whois-servers.net...

WHOIS Server: whois.markmonitor.com
   Registrar URL: http://www.markmonitor.com
   Updated Date: 2019-09-09T15:39:04Z
   Creation Date: 1997-09-15T04:00:00Z
   Registry Expiry Date: 2028-09-14T04:00:00Z
   Registrar: MarkMonitor Inc.
   Registrar IANA ID: 292
   Registrar Abuse Contact Email: abusecomplaints@markmonitor.com
   Registrar Abuse Contact Phone: +1.2086851750
   Domain Status: clientDeleteProhibited https://icann.org/epp#clientDeleteProhibited
   Domain Status: clientTransferProhibited https://icann.org/epp#clientTransferProhibited
   Domain Status: clientUpdateProhibited https://icann.org/epp#clientUpdateProhibited
   Domain Status: serverDeleteProhibited https://icann.org/epp#serverDeleteProhibited
   Domain Status: serverTransferProhibited https://icann.org/epp#serverTransferProhibited
   Domain Status: serverUpdateProhibited https://icann.org/epp#serverUpdateProhibited
   Name Server: NS1.GOOGLE.COM
   Name Server: NS2.GOOGLE.COM
   Name Server: NS3.GOOGLE.COM
   Name Server: NS4.GOOGLE.COM
   DNSSEC: unsigned
   URL of the ICANN Whois Inaccuracy Complaint Form: https://www.icann.org/wicf/
>>> Last update of whois database: 2025-01-16T06:12:26Z <<<

For more information on Whois status codes, please visit https://icann.org/epp

NOTICE: The expiration date displayed in this record is the date the
registrar's sponsorship of the domain name registration in the registry is
currently set to expire. This date does not necessarily reflect the expiration
date of the domain name registrant's agreement with the sponsoring
registrar.  Users may consult the sponsoring registrar's Whois database to
view the registrar's reported date of expiration for this registration.
```

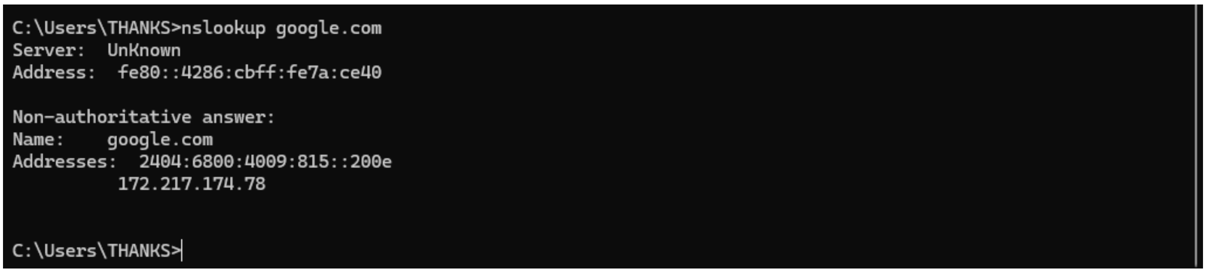


```
TERMS OF USE: You are not authorized to access or query our Whois
database through the use of electronic processes that are high-volume and
automated except as reasonably necessary to register domain names or
modify existing registrations; the Data in VeriSign Global Registry
Services' ("VeriSign") Whois database is provided by VeriSign for
information purposes only, and to assist persons in obtaining information
about or related to a domain name registration record. VeriSign does not
guarantee its accuracy. By submitting a Whois query, you agree to abide
by the following terms of use: You agree that you may use this Data only
for lawful purposes and that under no circumstances will you use this Data
to: (1) allow, enable, or otherwise support the transmission of mass
unsolicited, commercial advertising or solicitations via e-mail, telephone,
or facsimile; or (2) enable high volume, automated, electronic processes
that apply to VeriSign (or its computer systems). The compilation,
repackaging, dissemination or other use of this Data is expressly
prohibited without the prior written consent of VeriSign. You agree not to
use electronic processes that are automated and high-volume to access or
query the Whois database except as reasonably necessary to register
domain names or modify existing registrations. VeriSign reserves the right
to restrict your access to the Whois database in its sole discretion to ensure
operational stability.  VeriSign may restrict or terminate your access to the
Whois database for failure to abide by these terms of use. VeriSign
reserves the right to modify these terms at any time.

The Registry database contains ONLY .COM, .NET, .EDU domains and
Registrars.

Connecting to whois.markmonitor.com...

WHOIS Server: whois.markmonitor.com
Registrar URL: http://www.markmonitor.com
Updated Date: 2024-08-02T02:17:33+0000
Creation Date: 1997-09-15T07:00:00+0000
Registrar Registration Expiration Date: 2028-09-13T07:00:00+0000
Registrar: MarkMonitor, Inc.
Registrar IANA ID: 292
Registrar Abuse Contact Email: abusecomplaints@markmonitor.com
Registrar Abuse Contact Phone: +1.2086851750
Domain Status: clientUpdateProhibited (https://www.icann.org/epp#clientUpdateProhibited)
Domain Status: clientTransferProhibited (https://www.icann.org/epp#clientTransferProhibited)
Domain Status: clientDeleteProhibited (https://www.icann.org/epp#clientDeleteProhibited)
Domain Status: serverUpdateProhibited (https://www.icann.org/epp#serverUpdateProhibited)
```



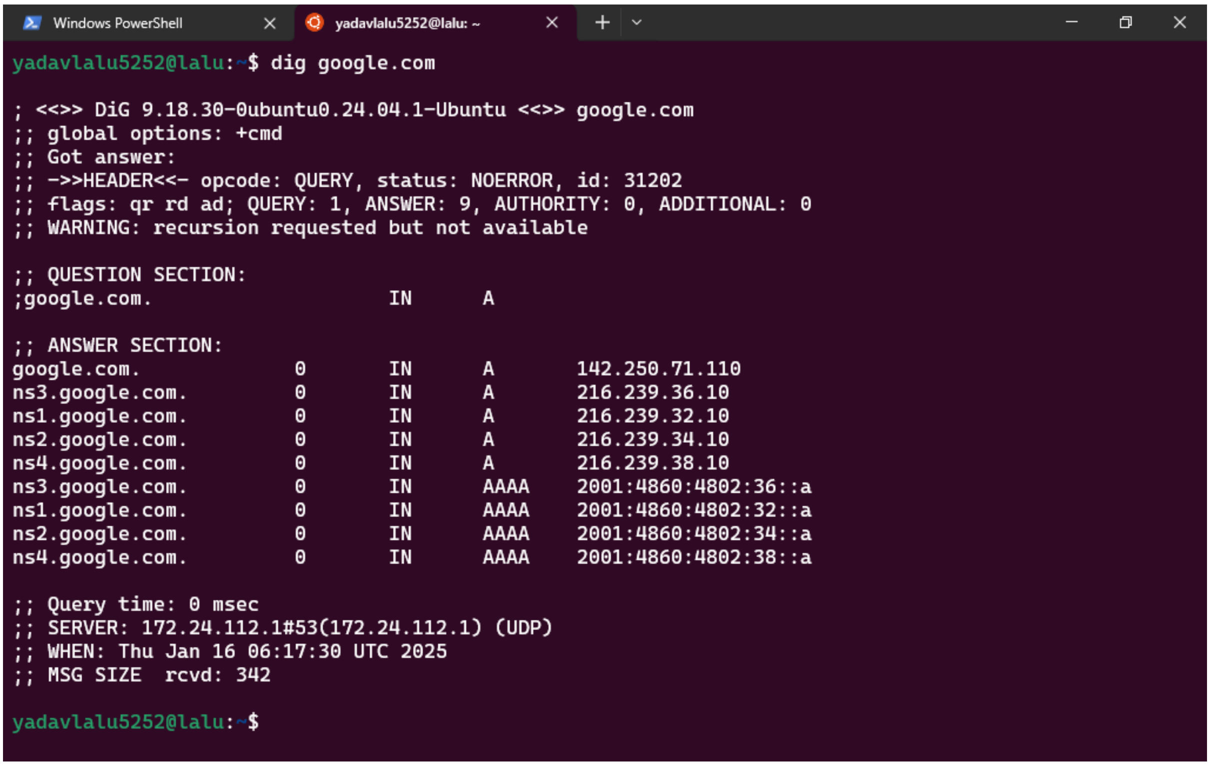
```
Domain Status: serverTransferProhibited (https://www.icann.org/epp#serverTransferProhibited)
Domain Status: serverDeleteProhibited (https://www.icann.org/epp#serverDeleteProhibited)
Registrant Organization: Google LLC
Registrant State/Province: CA
Registrant Country: US
Registrant Email: Select Request Email Form at https://domains.markmonitor.com/whois/google.com
Admin Organization: Google LLC
Admin State/Province: CA
Admin Country: US
Admin Email: Select Request Email Form at https://domains.markmonitor.com/whois/google.com
Tech Organization: Google LLC
Tech State/Province: CA
Tech Country: US
Tech Email: Select Request Email Form at https://domains.markmonitor.com/whois/google.com
Name Server: ns2.google.com
Name Server: ns3.google.com
Name Server: ns1.google.com
Name Server: ns4.google.com
DNSSEC: unsigned
URL of the ICANN WHOIS Data Problem Reporting System: http://wdprs.internic.net/
>>> Last update of WHOIS database: 2025-01-16T06:08:21+0000 <<<
For more information on WHOIS status codes, please visit:
  https://www.icann.org/resources/pages/epp-status-codes

If you wish to contact this domainΓÇÖs Registrant, Administrative, or Technical
contact, and such email address is not visible above, you may do so via our web
form, pursuant to ICANNΓÇÖs Temporary Specification. To verify that you are not a
robot, please enter your email address to receive a link to a page that
facilitates email communication with the relevant contact(s).

Web-based WHOIS:
  https://domains.markmonitor.com/whois

If you have a legitimate interest in viewing the non-public WHOIS details, send
your request and the reasons for your request to whoisrequest@markmonitor.com
and specify the domain name in the subject line. We will review that request and
may ask for supporting documentation and explanation.

The data in MarkMonitorΓÇÖs WHOIS database is provided for information purposes,
and to assist persons in obtaining information about or related to a domain
nameΓÇÖs registration record. While MarkMonitor believes the data to be accurate,
the data is provided "as is" with no guarantee or warranties regarding its
accuracy.

By submitting a WHOIS query, you agree that you will use this data only for
lawful purposes and that, under no circumstances will you use this data to:
  (1) allow, enable, or otherwise support the transmission by email, telephone,
or facsimile of mass, unsolicited, commercial advertising, or spam; or
  (2) enable high volume, automated, or electronic processes that send queries,
data, or email to MarkMonitor (or its systems) or the domain name contacts (or
its systems).

MarkMonitor reserves the right to modify these terms at any time.

By submitting this query, you agree to abide by this policy.

MarkMonitor Domain Management(TM)
Protecting companies and consumers in a digital world.

Visit MarkMonitor at https://www.markmonitor.com
Contact us at +1.8007459229
In Europe, at +44.02032062220
--
```

2. Nslookup



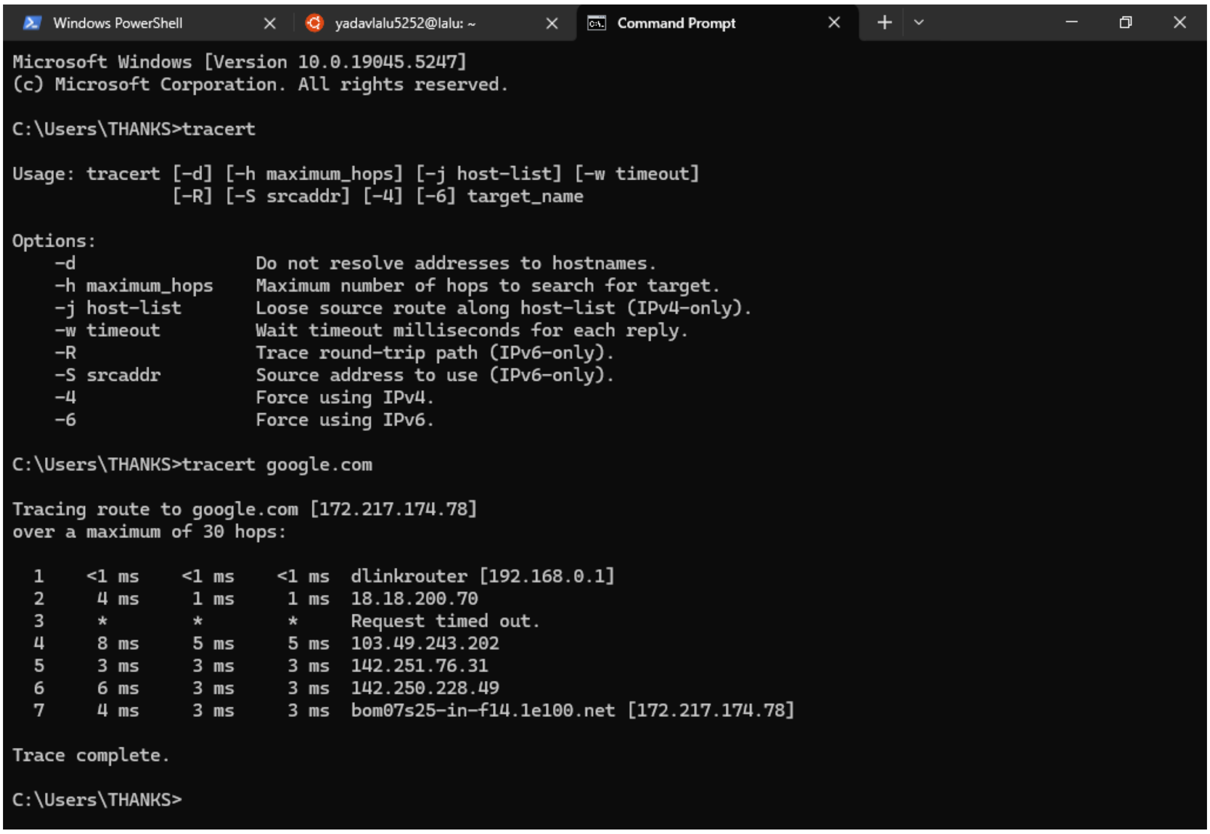
```
C:\Users\THANKS>nslookup google.com
Server:  UnKnown
Address:  fe80::4286:cbff:fe7a:ce40

Non-authoritative answer:
Name:    google.com
Addresses:  2404:6800:4009:815::200e
          172.217.174.78


C:\Users\THANKS>
```

3. Dig



```
yadavlalu5252@lalu:~$ dig google.com

; <<>> DiG 9.18.30-0ubuntu0.24.04.1-Ubuntu <<>> google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 31202
;; flags: qr rd ad; QUERY: 1, ANSWER: 9, AUTHORITY: 0, ADDITIONAL: 0
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;google.com.                    IN      A

;; ANSWER SECTION:
google.com.             0       IN      A       142.250.71.110
ns3.google.com.         0       IN      A       216.239.36.10
ns1.google.com.         0       IN      A       216.239.32.10
ns2.google.com.         0       IN      A       216.239.34.10
ns4.google.com.         0       IN      A       216.239.38.10
ns3.google.com.         0       IN      AAAA    2001:4860:4802:36::a
ns1.google.com.         0       IN      AAAA    2001:4860:4802:32::a
ns2.google.com.         0       IN      AAAA    2001:4860:4802:34::a
ns4.google.com.         0       IN      AAAA    2001:4860:4802:38::a

;; Query time: 0 msec
;; SERVER: 172.24.112.1#53(172.24.112.1) (UDP)
;; WHEN: Thu Jan 16 06:17:30 UTC 2025
;; MSG SIZE  rcvd: 342

yadavlalu5252@lalu:~$
```

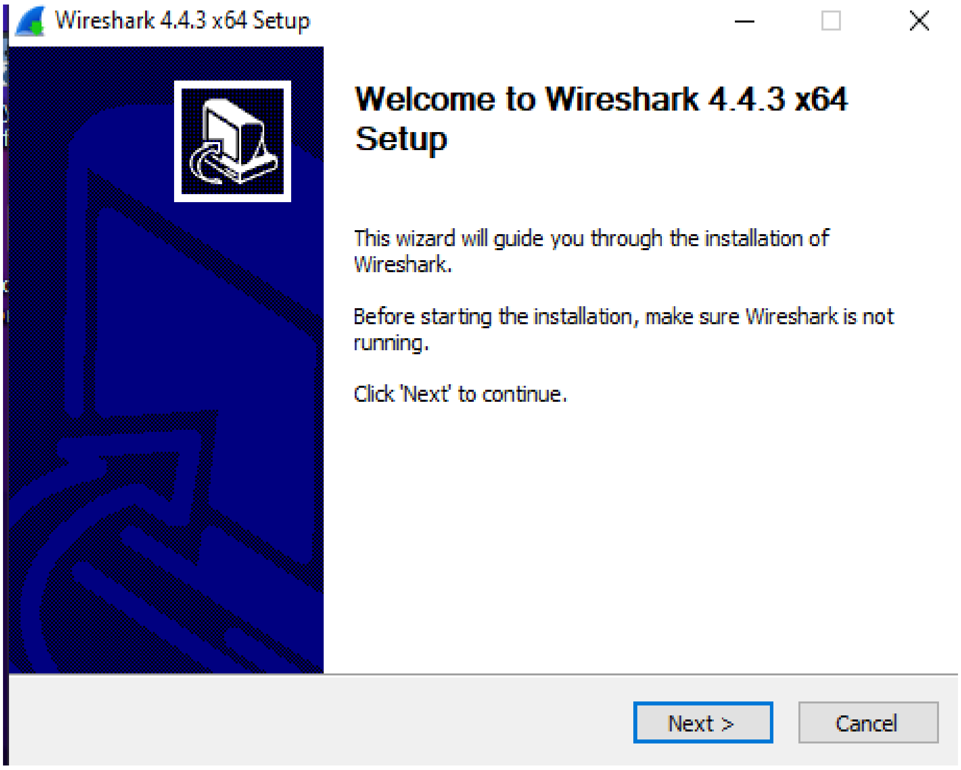
4. Traceroute



```
Microsoft Windows [Version 10.0.19045.5247]
(c) Microsoft Corporation. All rights reserved.

C:\Users\THANKS>tracert

Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout]
               [-R] [-S srcaddr] [-4] [-6] target_name

Options:
    -d                 Do not resolve addresses to hostnames.
    -h maximum_hops    Maximum number of hops to search for target.
    -j host-list       Loose source route along host-list (IPv4-only).
    -w timeout         Wait timeout milliseconds for each reply.
    -R                 Trace round-trip path (IPv6-only).
    -S srcaddr         Source address to use (IPv6-only).
    -4                 Force using IPv4.
    -6                 Force using IPv6.

C:\Users\THANKS>tracert google.com

Tracing route to google.com [172.217.174.78]
over a maximum of 30 hops:

  1    <1 ms    <1 ms    <1 ms  dlinkrouter [192.168.0.1]
  2     4 ms     1 ms     1 ms  18.18.200.70
  3     *        *        *     Request timed out.
  4     8 ms     5 ms     5 ms  103.49.243.202
  5     3 ms     3 ms     3 ms  142.251.76.31
  6     6 ms     3 ms     3 ms  142.250.228.49
  7     4 ms     3 ms     3 ms  bom07s25-in-f14.1e100.net [172.217.174.78]

Trace complete.

C:\Users\THANKS>
```

Experiment No. 6

Output:



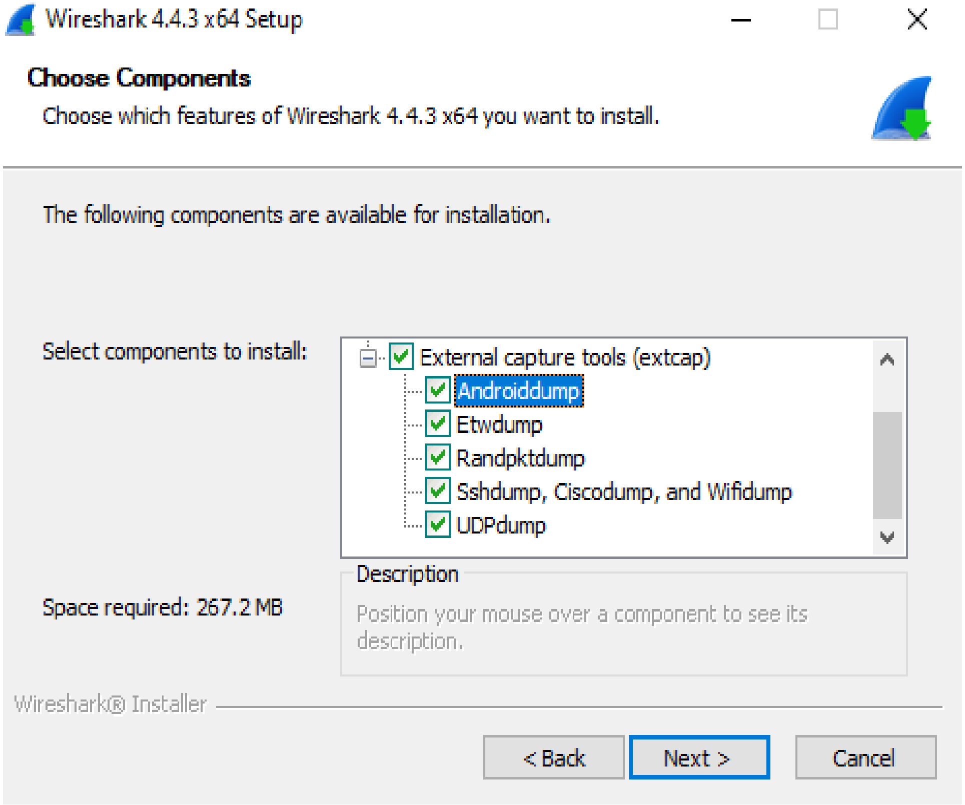
Wireshark 4.4.3 x64 Setup

Welcome to Wireshark 4.4.3 x64 Setup

This wizard will guide you through the installation of Wireshark.

Before starting the installation, make sure Wireshark is not running.

Click 'Next' to continue.



Wireshark 4.4.3 x64 Setup

Choose Components

Choose which features of Wireshark 4.4.3 x64 you want to install.

The following components are available for installation.

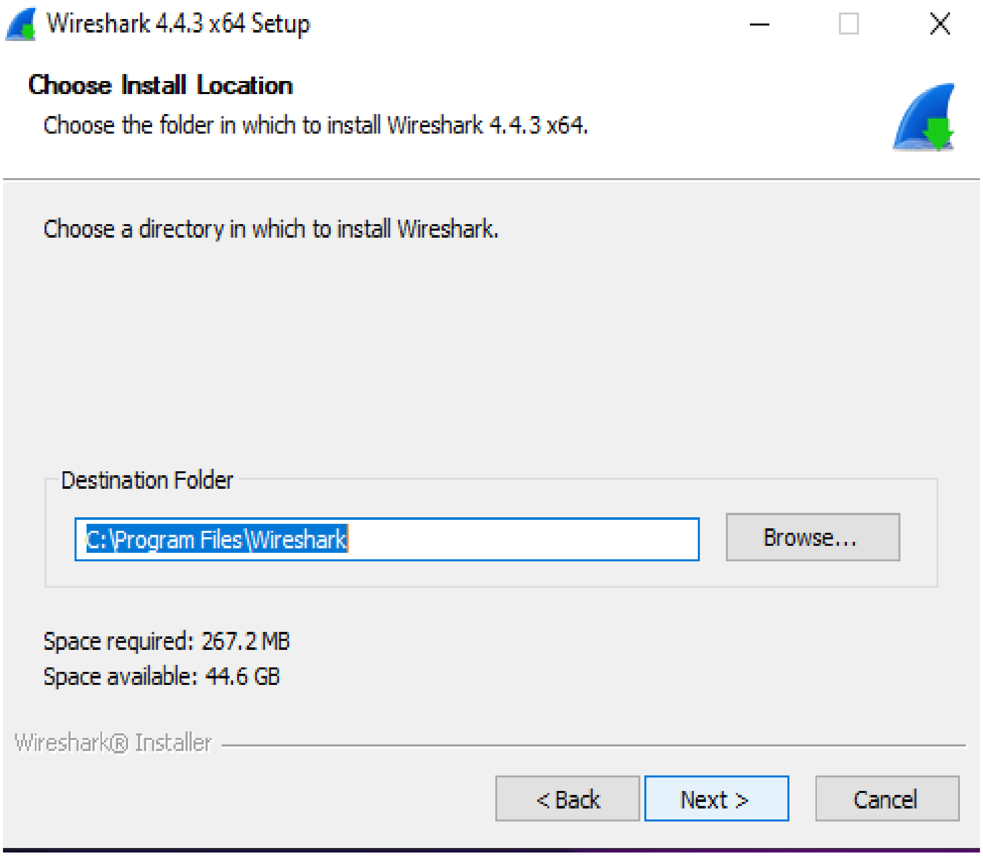
Select components to install:

- ☑ External capture tools (extcap)
  - ☑ Androiddump
  - ☑ Etwdump
  - ☑ Randpktdump
  - ☑ Sshdump, Ciscodump, and Wifidump
  - ☑ UDPdump

Space required: 267.2 MB

Description

Position your mouse over a component to see its description.



Wireshark 4.4.3 x64 Setup

Choose Install Location

Choose the folder in which to install Wireshark 4.4.3 x64.

Choose a directory in which to install Wireshark.

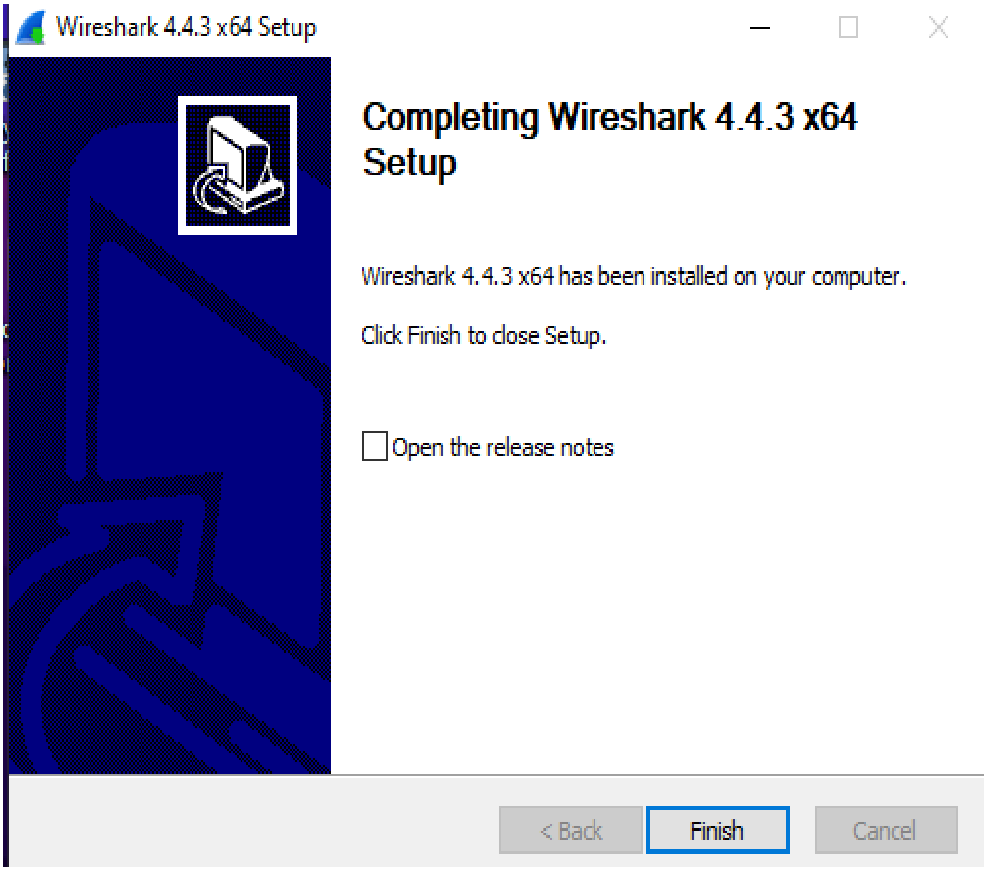
Destination Folder

C:\Program Files\Wireshark

Space required: 267.2 MB

Space available: 44.6 GB

Wireshark® Installer



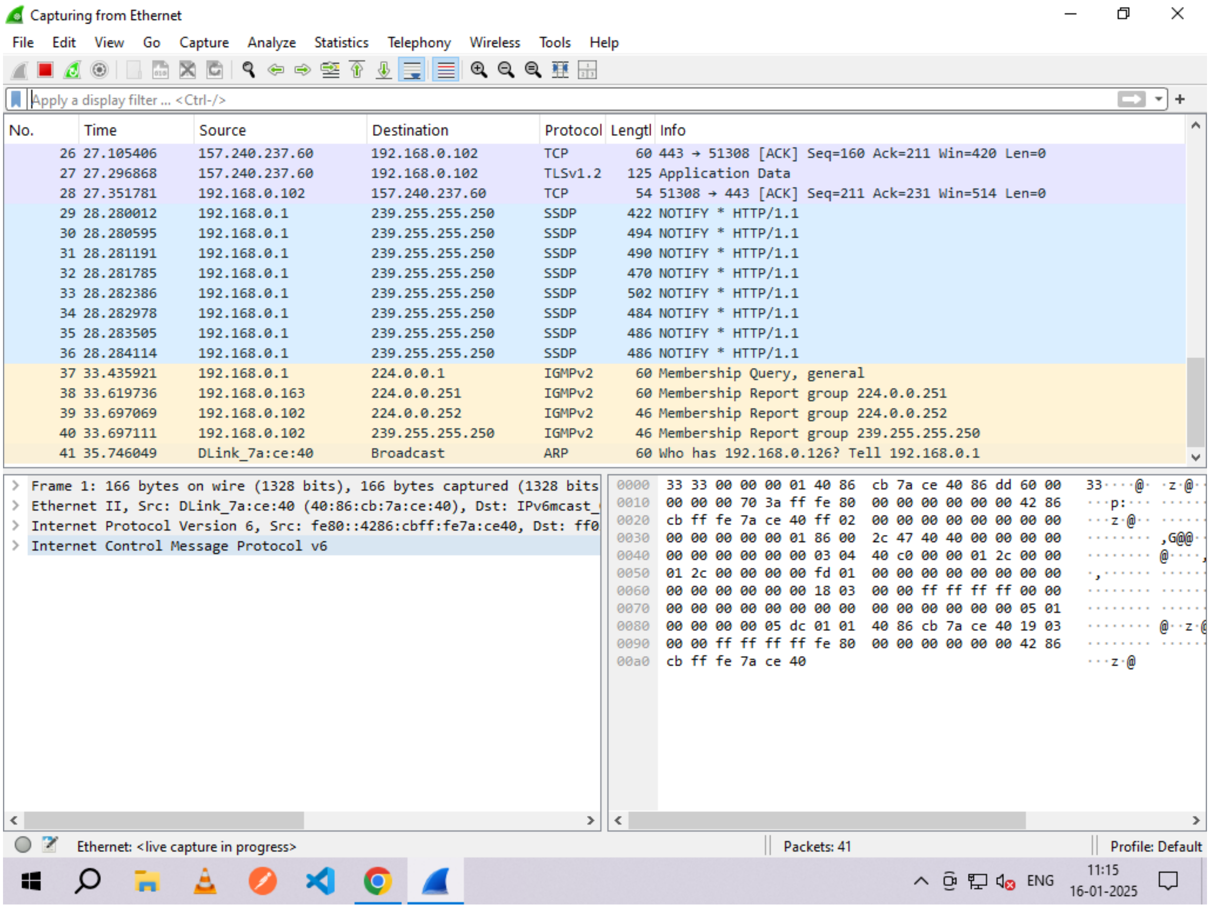
Wireshark 4.4.3 x64 Setup

Completing Wireshark 4.4.3 x64 Setup

Wireshark 4.4.3 x64 has been installed on your computer.

Click Finish to close Setup.

□ Open the release notes

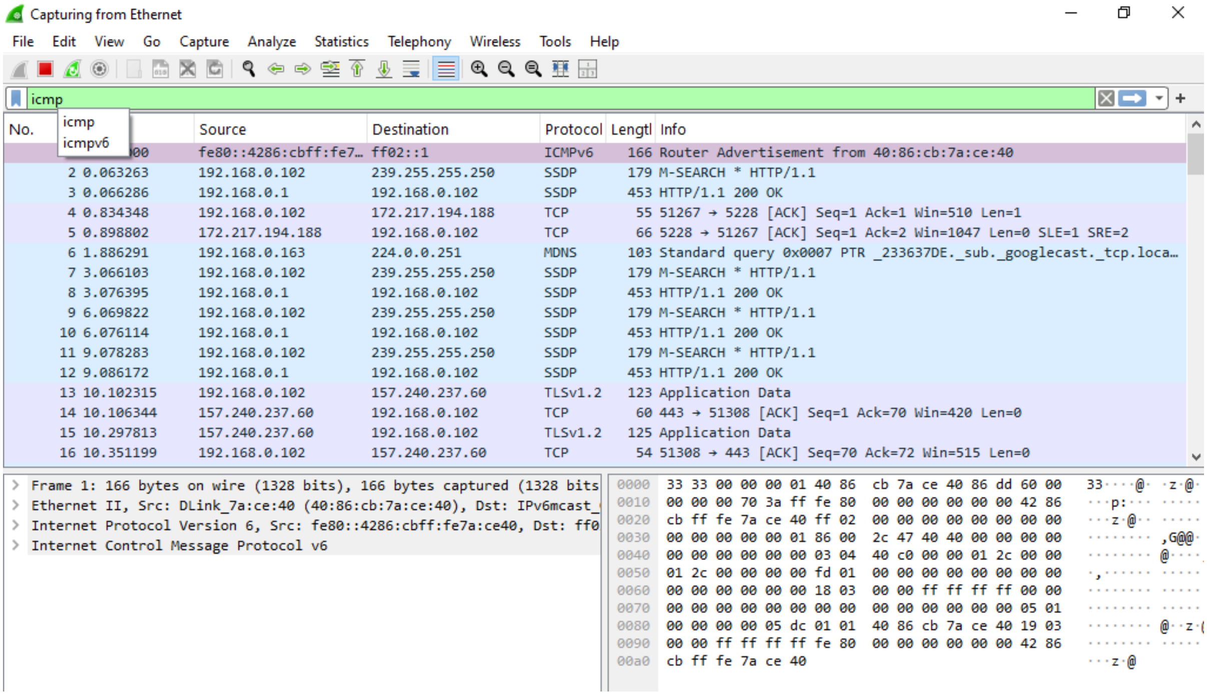

Capturing from Ethernet
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>
Ethernet: <live capture in progress>
Packets: 41
Profile: Default
ENG
11:15
16-01-2025

```
No.   Time          Source            Destination       Protocol Lengtl Info
   26 27.105406     157.240.237.60    192.168.0.102     TCP         60 443 → 51308 [ACK] Seq=160 Ack=211 Win=420 Len=0
   27 27.296868     157.240.237.60    192.168.0.102     TLSv1.2    125 Application Data
   28 27.351781     192.168.0.102     157.240.237.60    TCP         54 51308 → 443 [ACK] Seq=211 Ack=231 Win=514 Len=0
   29 28.280012     192.168.0.1       239.255.255.250   SSDP       422 NOTIFY * HTTP/1.1
   30 28.280595     192.168.0.1       239.255.255.250   SSDP       494 NOTIFY * HTTP/1.1
   31 28.281191     192.168.0.1       239.255.255.250   SSDP       490 NOTIFY * HTTP/1.1
   32 28.281785     192.168.0.1       239.255.255.250   SSDP       470 NOTIFY * HTTP/1.1
   33 28.282386     192.168.0.1       239.255.255.250   SSDP       502 NOTIFY * HTTP/1.1
   34 28.282978     192.168.0.1       239.255.255.250   SSDP       484 NOTIFY * HTTP/1.1
   35 28.283505     192.168.0.1       239.255.255.250   SSDP       486 NOTIFY * HTTP/1.1
   36 28.284114     192.168.0.1       239.255.255.250   SSDP       486 NOTIFY * HTTP/1.1
   37 33.435921     192.168.0.1       224.0.0.1         IGMPv2      60 Membership Query, general
   38 33.619736     192.168.0.163     224.0.0.251       IGMPv2      60 Membership Report group 224.0.0.251
   39 33.697069     192.168.0.102     224.0.0.252       IGMPv2      46 Membership Report group 224.0.0.252
   40 33.697111     192.168.0.102     239.255.255.250   IGMPv2      46 Membership Report group 239.255.255.250
   41 35.746049     DLink_7a:ce:40    Broadcast         ARP         60 Who has 192.168.0.126? Tell 192.168.0.1
```

```
> Frame 1: 166 bytes on wire (1328 bits), 166 bytes captured (1328 bits
> Ethernet II, Src: DLink_7a:ce:40 (40:86:cb:7a:ce:40), Dst: IPv6mcast_
> Internet Protocol Version 6, Src: fe80::4286:cbff:fe7a:ce40, Dst: ff0
> Internet Control Message Protocol v6
```

```
0000  33 33 00 00 00 01 40 86  cb 7a ce 40 86 dd 60 00   33····@· ·z·@··
0010  00 00 00 70 3a ff fe 80  00 00 00 00 00 00 42 86   ···p:··· ······
0020  cb ff fe 7a ce 40 ff 02  00 00 00 00 00 00 00 00   ···z·@·· ······
0030  00 00 00 00 00 01 86 00  2c 47 40 40 00 00 00 00   ········ ,G@@·
0040  00 00 00 00 00 00 03 04  40 c0 00 00 01 2c 00 00   ········ @····,
0050  01 2c 00 00 00 00 fd 01  00 00 00 00 00 00 00 00   ·,······ ······
0060  00 00 00 00 00 00 18 03  00 00 ff ff ff ff 00 00   ········ ······
0070  00 00 00 00 00 00 00 00  00 00 00 00 00 00 05 01   ········ ······
0080  00 00 00 00 05 dc 01 01  40 86 cb 7a ce 40 19 03   ········ @··z·@
0090  00 00 ff ff ff ff fe 80  00 00 00 00 00 00 42 86   ········ ······
00a0  cb ff fe 7a ce 40                                  ···z·@
```

Icmp:-

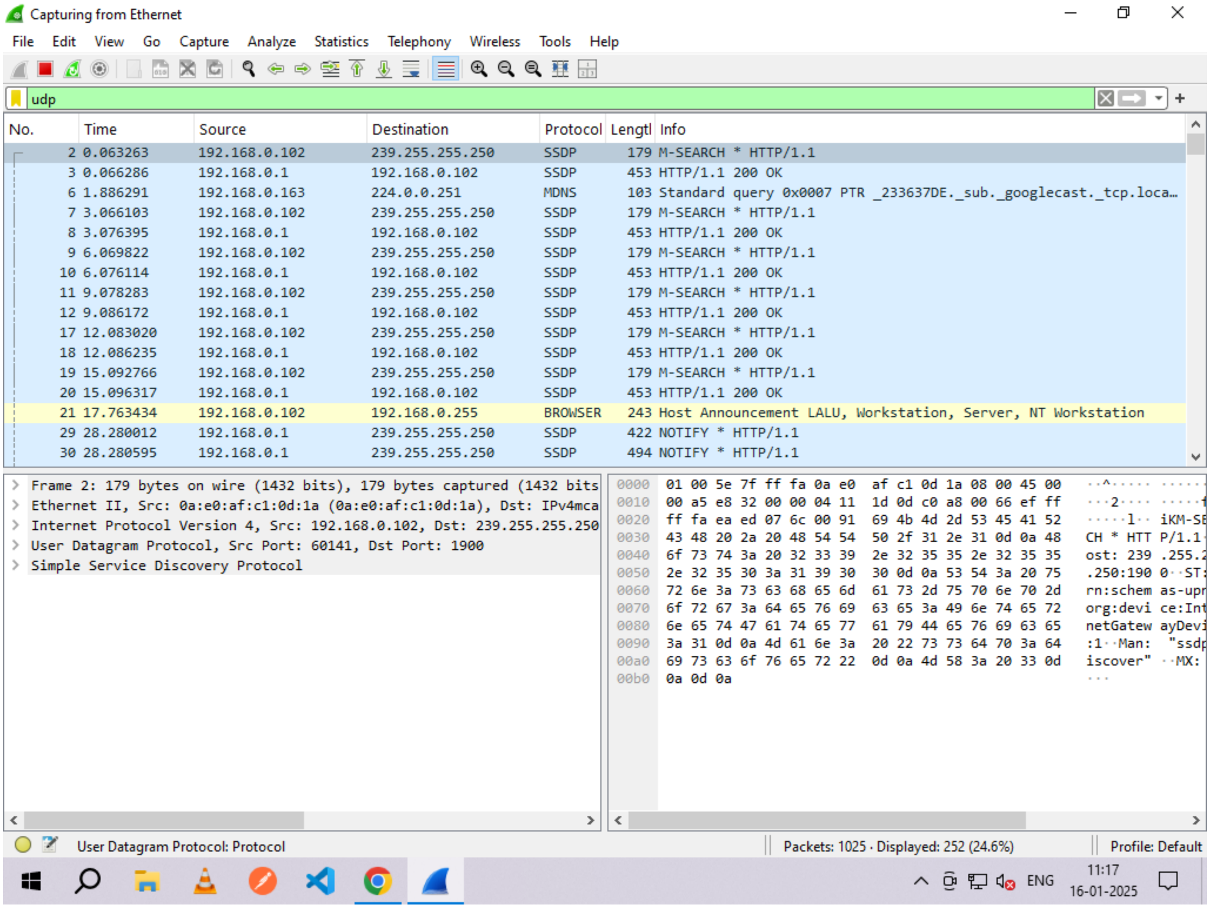

Capturing from Ethernet
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
icmp
icmp
icmpv6

```
No.   Time          Source            Destination       Protocol Lengtl Info
    1 ...00         fe80::4286:cbff:fe7… ff02::1        ICMPv6     166 Router Advertisement from 40:86:cb:7a:ce:40
    2 0.063263      192.168.0.102     239.255.255.250   SSDP       179 M-SEARCH * HTTP/1.1
    3 0.066286      192.168.0.1       192.168.0.102     SSDP       453 HTTP/1.1 200 OK
    4 0.834348      192.168.0.102     172.217.194.188   TCP         55 51267 → 5228 [ACK] Seq=1 Ack=1 Win=510 Len=1
    5 0.898802      172.217.194.188   192.168.0.102     TCP         66 5228 → 51267 [ACK] Seq=1 Ack=2 Win=1047 Len=0 SLE=1 SRE=2
    6 1.886291      192.168.0.163     224.0.0.251       MDNS       103 Standard query 0x0007 PTR _233637DE._sub._googlecast._tcp.loca…
    7 3.066103      192.168.0.102     239.255.255.250   SSDP       179 M-SEARCH * HTTP/1.1
    8 3.076395      192.168.0.1       192.168.0.102     SSDP       453 HTTP/1.1 200 OK
    9 6.069822      192.168.0.102     239.255.255.250   SSDP       179 M-SEARCH * HTTP/1.1
   10 6.076114      192.168.0.1       192.168.0.102     SSDP       453 HTTP/1.1 200 OK
   11 9.078283      192.168.0.102     239.255.255.250   SSDP       179 M-SEARCH * HTTP/1.1
   12 9.086172      192.168.0.1       192.168.0.102     SSDP       453 HTTP/1.1 200 OK
   13 10.102315     192.168.0.102     157.240.237.60    TLSv1.2    123 Application Data
   14 10.106344     157.240.237.60    192.168.0.102     TCP         60 443 → 51308 [ACK] Seq=1 Ack=70 Win=420 Len=0
   15 10.297813     157.240.237.60    192.168.0.102     TLSv1.2    125 Application Data
   16 10.351199     192.168.0.102     157.240.237.60    TCP         54 51308 → 443 [ACK] Seq=70 Ack=72 Win=515 Len=0
```

```
> Frame 1: 166 bytes on wire (1328 bits), 166 bytes captured (1328 bits
> Ethernet II, Src: DLink_7a:ce:40 (40:86:cb:7a:ce:40), Dst: IPv6mcast_
> Internet Protocol Version 6, Src: fe80::4286:cbff:fe7a:ce40, Dst: ff0
> Internet Control Message Protocol v6
```

```
0000  33 33 00 00 00 01 40 86  cb 7a ce 40 86 dd 60 00   33····@· ·z·@··
0010  00 00 00 70 3a ff fe 80  00 00 00 00 00 00 42 86   ···p:··· ······
0020  cb ff fe 7a ce 40 ff 02  00 00 00 00 00 00 00 00   ···z·@·· ······
0030  00 00 00 00 00 01 86 00  2c 47 40 40 00 00 00 00   ········ ,G@@·
0040  00 00 00 00 00 00 03 04  40 c0 00 00 01 2c 00 00   ········ @····
0050  01 2c 00 00 00 00 fd 01  00 00 00 00 00 00 00 00   ·,······ ······
0060  00 00 00 00 00 00 18 03  00 00 ff ff ff ff 00 00   ········ ······
0070  00 00 00 00 00 00 00 00  00 00 00 00 00 00 05 01   ········ ······
0080  00 00 00 00 05 dc 01 01  40 86 cb 7a ce 40 19 03   ········ @··z·(
0090  00 00 ff ff ff ff fe 80  00 00 00 00 00 00 42 86   ········ ······
00a0  cb ff fe 7a ce 40                                  ···z·@
```

Udp:-


Capturing from Ethernet
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

udp

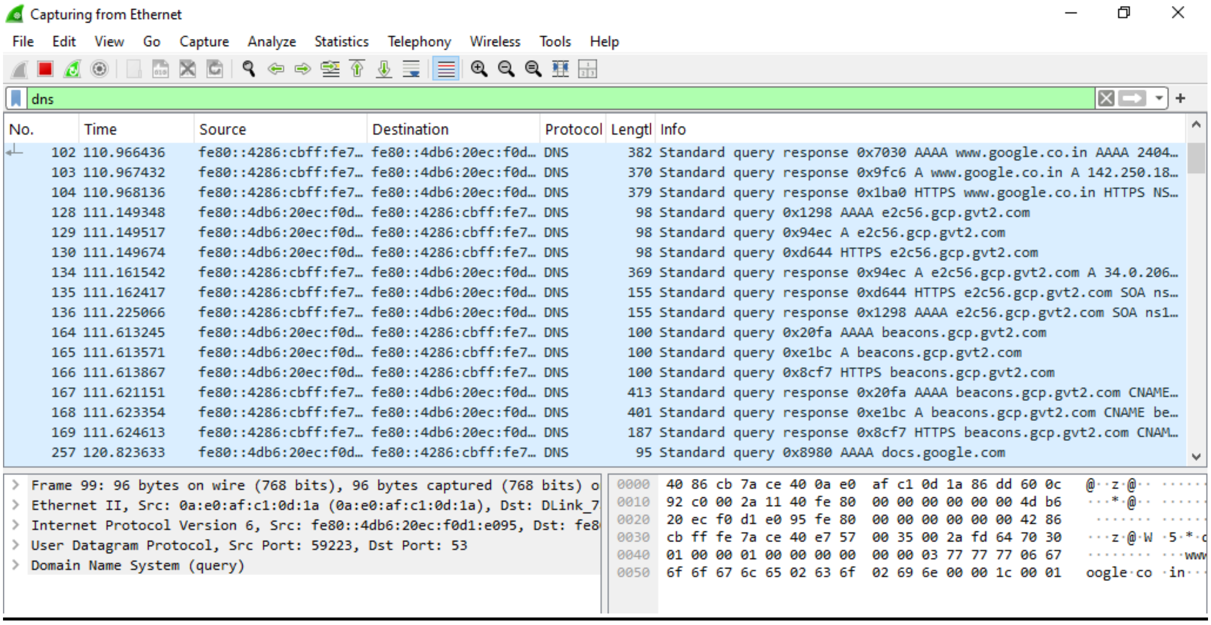
```
No.   Time        Source          Destination       Protocol Lengtl Info
    2 0.063263    192.168.0.102   239.255.255.250   SSDP     179 M-SEARCH * HTTP/1.1
    3 0.066286    192.168.0.1     192.168.0.102     SSDP     453 HTTP/1.1 200 OK
    6 1.886291    192.168.0.163   224.0.0.251       MDNS     103 Standard query 0x0007 PTR _233637DE._sub._googlecast._tcp.loca…
    7 3.066103    192.168.0.102   239.255.255.250   SSDP     179 M-SEARCH * HTTP/1.1
    8 3.076395    192.168.0.1     192.168.0.102     SSDP     453 HTTP/1.1 200 OK
    9 6.069822    192.168.0.102   239.255.255.250   SSDP     179 M-SEARCH * HTTP/1.1
   10 6.076114    192.168.0.1     192.168.0.102     SSDP     453 HTTP/1.1 200 OK
   11 9.078283    192.168.0.102   239.255.255.250   SSDP     179 M-SEARCH * HTTP/1.1
   12 9.086172    192.168.0.1     192.168.0.102     SSDP     453 HTTP/1.1 200 OK
   17 12.083020   192.168.0.102   239.255.255.250   SSDP     179 M-SEARCH * HTTP/1.1
   18 12.086235   192.168.0.1     192.168.0.102     SSDP     453 HTTP/1.1 200 OK
   19 15.092766   192.168.0.102   239.255.255.250   SSDP     179 M-SEARCH * HTTP/1.1
   20 15.096317   192.168.0.1     192.168.0.102     SSDP     453 HTTP/1.1 200 OK
   21 17.763434   192.168.0.102   192.168.0.255     BROWSER  243 Host Announcement LALU, Workstation, Server, NT Workstation
   29 28.280012   192.168.0.1     239.255.255.250   SSDP     422 NOTIFY * HTTP/1.1
   30 28.280595   192.168.0.1     239.255.255.250   SSDP     494 NOTIFY * HTTP/1.1
```

```
> Frame 2: 179 bytes on wire (1432 bits), 179 bytes captured (1432 bits
> Ethernet II, Src: 0a:e0:af:c1:0d:1a (0a:e0:af:c1:0d:1a), Dst: IPv4mca
> Internet Protocol Version 4, Src: 192.168.0.102, Dst: 239.255.255.250
> User Datagram Protocol, Src Port: 60141, Dst Port: 1900
> Simple Service Discovery Protocol
```

```
0000  01 00 5e 7f ff fa 0a e0  af c1 0d 1a 08 00 45 00   ··^·····  ······
0010  00 a5 e8 32 00 00 04 11  1d 0d c0 a8 00 66 ef ff   ···2····  ·····f
0020  ff fa ea ed 07 6c 00 91  69 4b 4d 2d 53 45 41 52   ·····l··  iKM-SE
0030  43 48 20 2a 20 48 54 54  50 2f 31 2e 31 0d 0a 48   CH * HTT  P/1.1·
0040  6f 73 74 3a 20 32 33 39  2e 32 35 35 2e 32 35 35   ost: 239  .255.2
0050  2e 32 35 30 3a 31 39 30  30 0d 0a 53 54 3a 20 75   .250:190  0··ST:
0060  72 6e 3a 73 63 68 65 6d  61 73 2d 75 70 6e 70 2d   rn:schem  as-upr
0070  6f 72 67 3a 64 65 76 69  63 65 3a 49 6e 74 65 72   org:devi  ce:Int
0080  6e 65 74 47 61 74 65 77  61 79 44 65 76 69 63 65   netGatew  ayDevi
0090  3a 31 0d 0a 4d 61 6e 3a  20 22 73 73 64 70 3a 64   :1··Man:   "ssdp
00a0  69 73 63 6f 76 65 72 22  0d 0a 4d 58 3a 20 33 0d   iscover"  ··MX:
00b0  0a 0d 0a                                           ···
```

User Datagram Protocol: Protocol | Packets: 1025 · Displayed: 252 (24.6%) | Profile: Default

Dns:-


Capturing from Ethernet
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

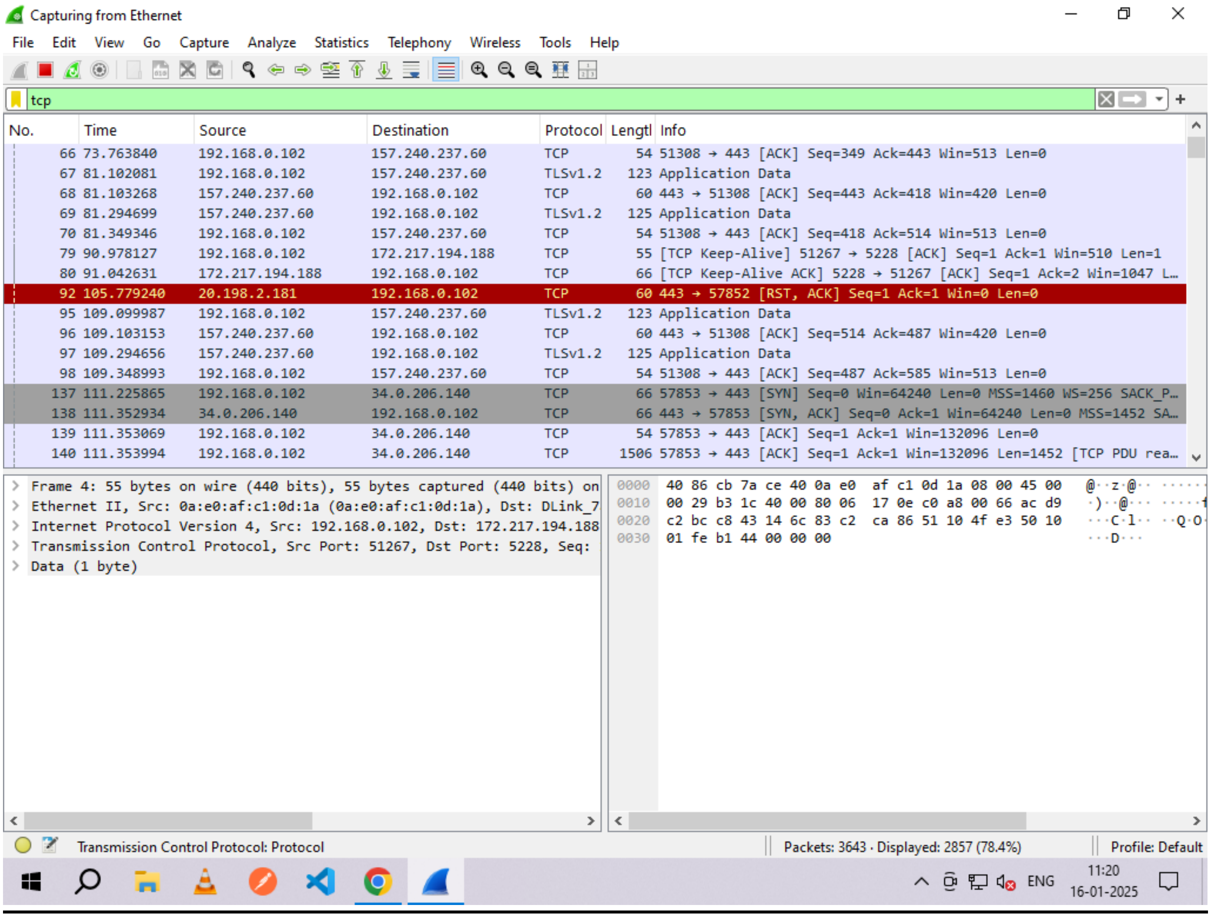
dns

```
No.   Time         Source                Destination           Protocol Lengtl Info
  102 110.966436   fe80::4286:cbff:fe7…  fe80::4db6:20ec:f0d…  DNS      382 Standard query response 0x7030 AAAA www.google.co.in AAAA 2404…
  103 110.967432   fe80::4286:cbff:fe7…  fe80::4db6:20ec:f0d…  DNS      370 Standard query response 0x9fc6 A www.google.co.in A 142.250.18…
  104 110.968136   fe80::4286:cbff:fe7…  fe80::4db6:20ec:f0d…  DNS      379 Standard query response 0x1ba0 HTTPS www.google.co.in HTTPS NS…
  128 111.149348   fe80::4db6:20ec:f0d…  fe80::4286:cbff:fe7…  DNS       98 Standard query 0x1298 AAAA e2c56.gcp.gvt2.com
  129 111.149517   fe80::4db6:20ec:f0d…  fe80::4286:cbff:fe7…  DNS       98 Standard query 0x94ec A e2c56.gcp.gvt2.com
  130 111.149674   fe80::4db6:20ec:f0d…  fe80::4286:cbff:fe7…  DNS       98 Standard query 0xd644 HTTPS e2c56.gcp.gvt2.com
  134 111.161542   fe80::4286:cbff:fe7…  fe80::4db6:20ec:f0d…  DNS      369 Standard query response 0x94ec A e2c56.gcp.gvt2.com A 34.0.206…
  135 111.162417   fe80::4286:cbff:fe7…  fe80::4db6:20ec:f0d…  DNS      155 Standard query response 0xd644 HTTPS e2c56.gcp.gvt2.com SOA ns…
  136 111.225066   fe80::4286:cbff:fe7…  fe80::4db6:20ec:f0d…  DNS      155 Standard query response 0x1298 AAAA e2c56.gcp.gvt2.com SOA ns1…
  164 111.613245   fe80::4db6:20ec:f0d…  fe80::4286:cbff:fe7…  DNS      100 Standard query 0x20fa AAAA beacons.gcp.gvt2.com
  165 111.613571   fe80::4db6:20ec:f0d…  fe80::4286:cbff:fe7…  DNS      100 Standard query 0xe1bc A beacons.gcp.gvt2.com
  166 111.613867   fe80::4db6:20ec:f0d…  fe80::4286:cbff:fe7…  DNS      100 Standard query 0x8cf7 HTTPS beacons.gcp.gvt2.com
  167 111.621151   fe80::4286:cbff:fe7…  fe80::4db6:20ec:f0d…  DNS      413 Standard query response 0x20fa AAAA beacons.gcp.gvt2.com CNAME…
  168 111.623354   fe80::4286:cbff:fe7…  fe80::4db6:20ec:f0d…  DNS      401 Standard query response 0xe1bc A beacons.gcp.gvt2.com CNAME be…
  169 111.624613   fe80::4286:cbff:fe7…  fe80::4db6:20ec:f0d…  DNS      187 Standard query response 0x8cf7 HTTPS beacons.gcp.gvt2.com CNAM…
  257 120.823633   fe80::4db6:20ec:f0d…  fe80::4286:cbff:fe7…  DNS       95 Standard query 0x8980 AAAA docs.google.com
```

```
> Frame 99: 96 bytes on wire (768 bits), 96 bytes captured (768 bits) o
> Ethernet II, Src: 0a:e0:af:c1:0d:1a (0a:e0:af:c1:0d:1a), Dst: DLink_7
> Internet Protocol Version 6, Src: fe80::4db6:20ec:f0d1:e095, Dst: fe8
> User Datagram Protocol, Src Port: 59223, Dst Port: 53
> Domain Name System (query)
```

```
0000  40 86 cb 7a ce 40 0a e0  af c1 0d 1a 86 dd 60 0c   @··z·@··  ······
0010  92 c0 00 2a 11 40 fe 80  00 00 00 00 00 00 4d b6   ···*·@··  ······
0020  20 ec f0 d1 e0 95 fe 80  00 00 00 00 00 00 42 86    ·······  ······
0030  cb ff fe 7a ce 40 e7 57  00 35 00 2a fd 64 70 30   ···z·@·W  ·5·*·d
0040  01 00 00 01 00 00 00 00  00 00 03 77 77 77 06 67   ········  ···www
0050  6f 6f 67 6c 65 02 63 6f  02 69 6e 00 00 1c 00 01   oogle·co  ·in···
```

Tcp:-



tcp

```
No.     Time         Source           Destination      Protocol  Lengtl Info
    66 73.763840     192.168.0.102    157.240.237.60   TCP         54 51308 → 443 [ACK] Seq=349 Ack=443 Win=513 Len=0
    67 81.102081     192.168.0.102    157.240.237.60   TLSv1.2    123 Application Data
    68 81.103268     157.240.237.60   192.168.0.102    TCP         60 443 → 51308 [ACK] Seq=443 Ack=418 Win=420 Len=0
    69 81.294699     157.240.237.60   192.168.0.102    TLSv1.2    125 Application Data
    70 81.349346     192.168.0.102    157.240.237.60   TCP         54 51308 → 443 [ACK] Seq=418 Ack=514 Win=513 Len=0
    79 90.978127     192.168.0.102    172.217.194.188  TCP         55 [TCP Keep-Alive] 51267 → 5228 [ACK] Seq=1 Ack=1 Win=510 Len=1
    80 91.042631     172.217.194.188  192.168.0.102    TCP         66 [TCP Keep-Alive ACK] 5228 → 51267 [ACK] Seq=1 Ack=2 Win=1047 L…
    92 105.779240    20.198.2.181     192.168.0.102    TCP         60 443 → 57852 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
    95 109.099987    192.168.0.102    157.240.237.60   TLSv1.2    123 Application Data
    96 109.103153    157.240.237.60   192.168.0.102    TCP         60 443 → 51308 [ACK] Seq=514 Ack=487 Win=420 Len=0
    97 109.294656    157.240.237.60   192.168.0.102    TLSv1.2    125 Application Data
    98 109.348993    192.168.0.102    157.240.237.60   TCP         54 51308 → 443 [ACK] Seq=487 Ack=585 Win=513 Len=0
   137 111.225865    192.168.0.102    34.0.206.140     TCP         66 57853 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_P…
   138 111.352934    34.0.206.140     192.168.0.102    TCP         66 443 → 57853 [SYN, ACK] Seq=0 Ack=1 Win=64240 Len=0 MSS=1452 SA…
   139 111.353069    192.168.0.102    34.0.206.140     TCP         54 57853 → 443 [ACK] Seq=1 Ack=1 Win=132096 Len=0
   140 111.353994    192.168.0.102    34.0.206.140     TCP       1506 57853 → 443 [ACK] Seq=1 Ack=1 Win=132096 Len=1452 [TCP PDU rea…
```

```
> Frame 4: 55 bytes on wire (440 bits), 55 bytes captured (440 bits) on
> Ethernet II, Src: 0a:e0:af:c1:0d:1a (0a:e0:af:c1:0d:1a), Dst: DLink_7
> Internet Protocol Version 4, Src: 192.168.0.102, Dst: 172.217.194.188
> Transmission Control Protocol, Src Port: 51267, Dst Port: 5228, Seq:
> Data (1 byte)
```

```
0000  40 86 cb 7a ce 40 0a e0  af c1 0d 1a 08 00 45 00   @··z·@·· ······
0010  00 29 b3 1c 40 00 80 06  17 0e c0 a8 00 66 ac d9   ·)··@··· ·····f
0020  c2 bc c8 43 14 6c 83 c2  ca 86 51 10 4f e3 50 10   ···C·l·· ··Q·O
0030  01 fe b1 44 00 00 00                               ···D···
```

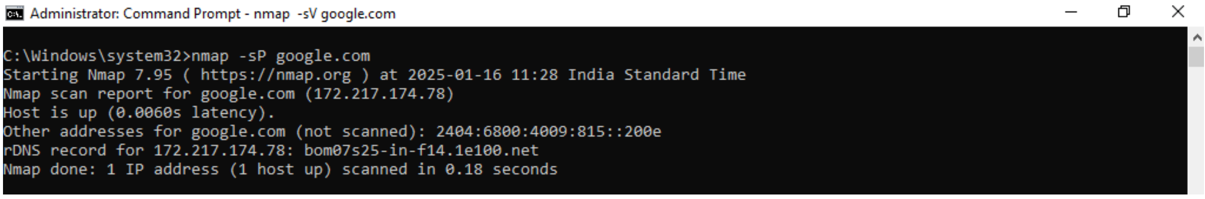
Transmission Control Protocol: Protocol

Packets: 3643 · Displayed: 2857 (78.4%)

Profile: Default

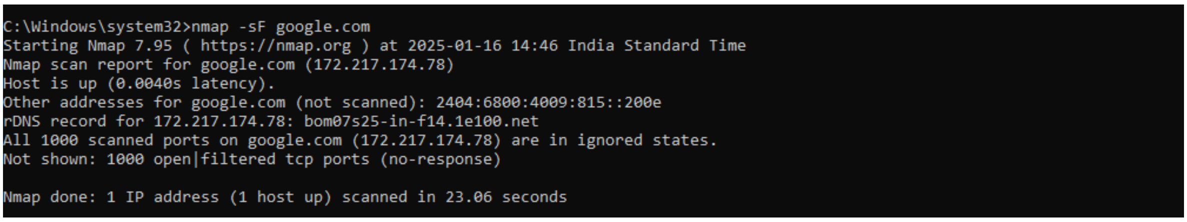
Experiment No. 7

1. Nmap -Sp



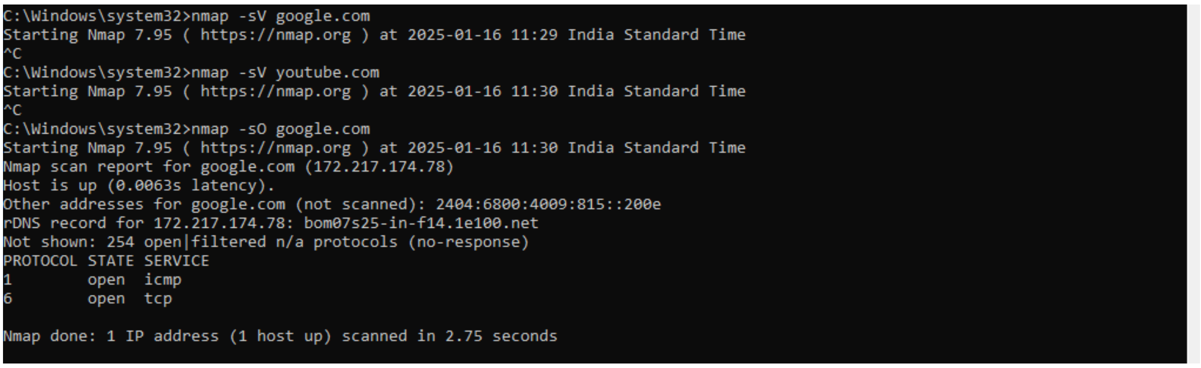
```
C:\Windows\system32>nmap -sP google.com
Starting Nmap 7.95 ( https://nmap.org ) at 2025-01-16 11:28 India Standard Time
Nmap scan report for google.com (172.217.174.78)
Host is up (0.0060s latency).
Other addresses for google.com (not scanned): 2404:6800:4009:815::200e
rDNS record for 172.217.174.78: bom07s25-in-f14.1e100.net
Nmap done: 1 IP address (1 host up) scanned in 0.18 seconds
```

2. FIN scan (-sF)



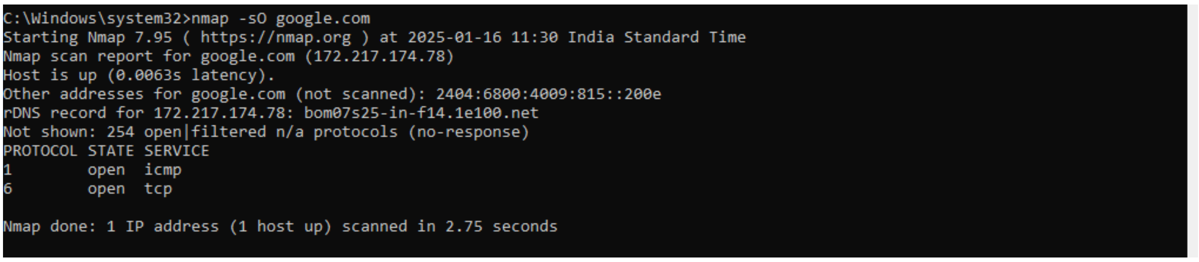
```
C:\Windows\system32>nmap -sF google.com
Starting Nmap 7.95 ( https://nmap.org ) at 2025-01-16 14:46 India Standard Time
Nmap scan report for google.com (172.217.174.78)
Host is up (0.0040s latency).
Other addresses for google.com (not scanned): 2404:6800:4009:815::200e
rDNS record for 172.217.174.78: bom07s25-in-f14.1e100.net
All 1000 scanned ports on google.com (172.217.174.78) are in ignored states.
Not shown: 1000 open|filtered tcp ports (no-response)

Nmap done: 1 IP address (1 host up) scanned in 23.06 seconds
```

3. -sV



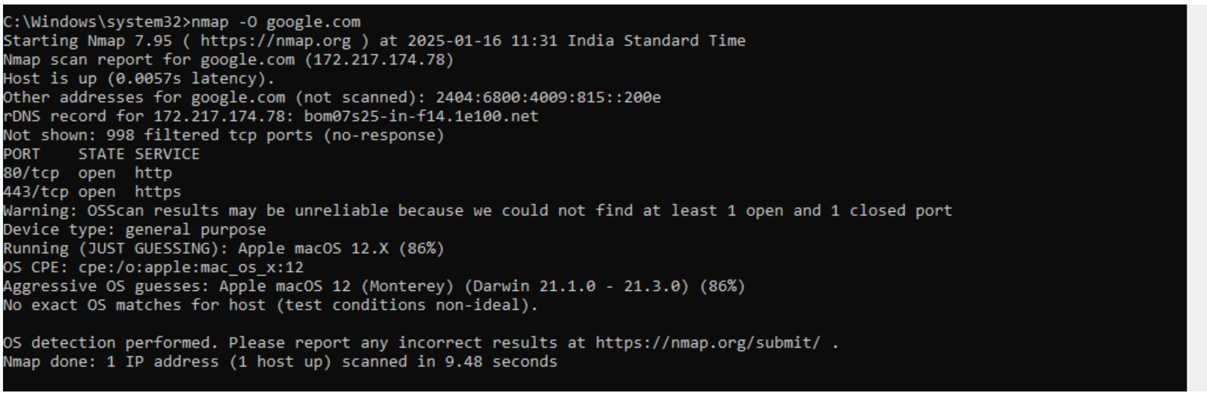
```
C:\Windows\system32>nmap -sV google.com
Starting Nmap 7.95 ( https://nmap.org ) at 2025-01-16 11:29 India Standard Time
^C
C:\Windows\system32>nmap -sV youtube.com
Starting Nmap 7.95 ( https://nmap.org ) at 2025-01-16 11:30 India Standard Time
^C
C:\Windows\system32>nmap -sO google.com
Starting Nmap 7.95 ( https://nmap.org ) at 2025-01-16 11:30 India Standard Time
Nmap scan report for google.com (172.217.174.78)
Host is up (0.0063s latency).
Other addresses for google.com (not scanned): 2404:6800:4009:815::200e
rDNS record for 172.217.174.78: bom07s25-in-f14.1e100.net
Not shown: 254 open|filtered n/a protocols (no-response)
PROTOCOL STATE SERVICE
1        open  icmp
6        open  tcp

Nmap done: 1 IP address (1 host up) scanned in 2.75 seconds
```

4. -sO



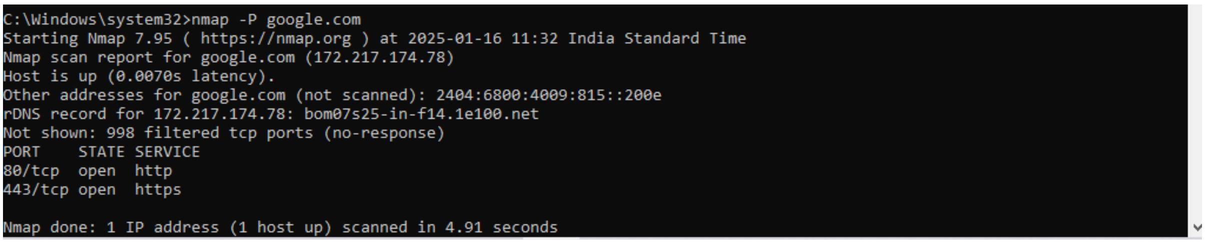
```
C:\Windows\system32>nmap -sO google.com
Starting Nmap 7.95 ( https://nmap.org ) at 2025-01-16 11:30 India Standard Time
Nmap scan report for google.com (172.217.174.78)
Host is up (0.0063s latency).
Other addresses for google.com (not scanned): 2404:6800:4009:815::200e
rDNS record for 172.217.174.78: bom07s25-in-f14.1e100.net
Not shown: 254 open|filtered n/a protocols (no-response)
PROTOCOL STATE SERVICE
1        open  icmp
6        open  tcp

Nmap done: 1 IP address (1 host up) scanned in 2.75 seconds
```

5. -O



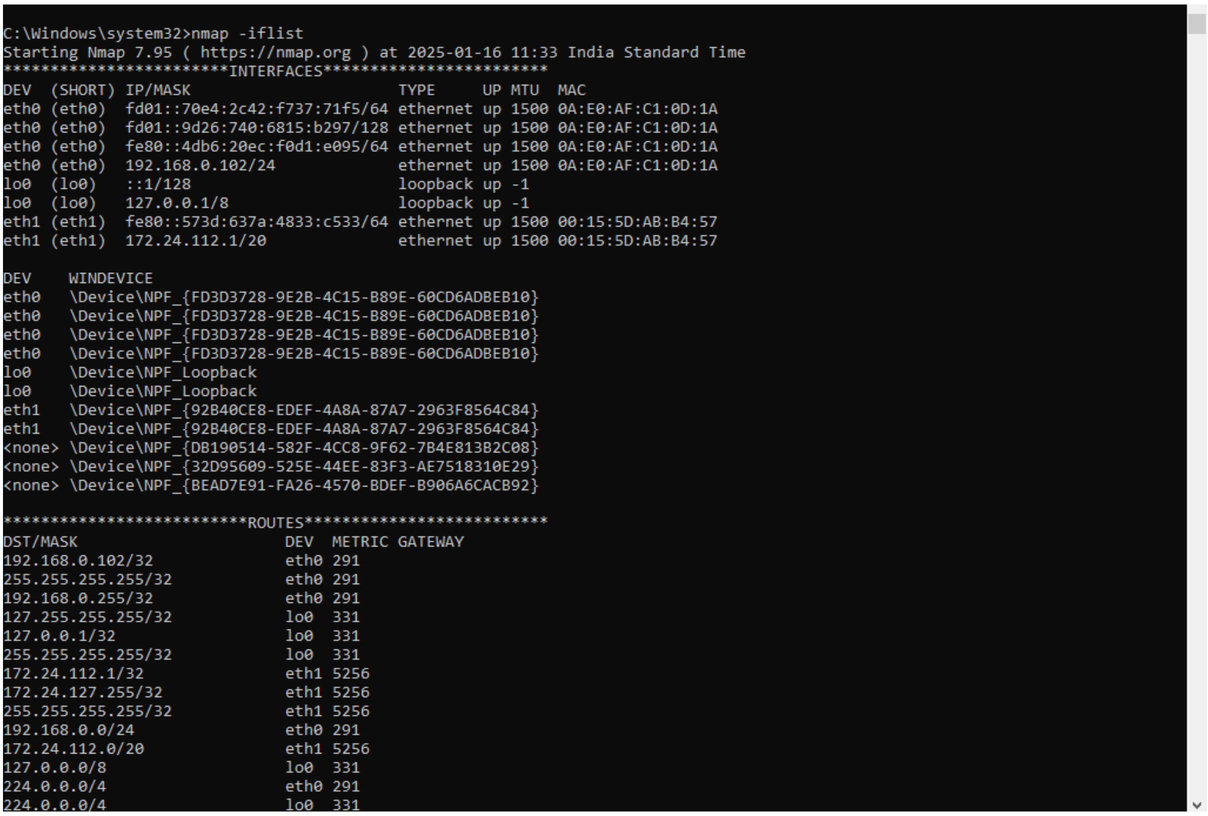
```
C:\Windows\system32>nmap -O google.com
Starting Nmap 7.95 ( https://nmap.org ) at 2025-01-16 11:31 India Standard Time
Nmap scan report for google.com (172.217.174.78)
Host is up (0.0057s latency).
Other addresses for google.com (not scanned): 2404:6800:4009:815::200e
rDNS record for 172.217.174.78: bom07s25-in-f14.1e100.net
Not shown: 998 filtered tcp ports (no-response)
PORT    STATE SERVICE
80/tcp  open  http
443/tcp open  https
Warning: OSScan results may be unreliable because we could not find at least 1 open and 1 closed port
Device type: general purpose
Running (JUST GUESSING): Apple macOS 12.X (86%)
OS CPE: cpe:/o:apple:mac_os_x:12
Aggressive OS guesses: Apple macOS 12 (Monterey) (Darwin 21.1.0 - 21.3.0) (86%)
No exact OS matches for host (test conditions non-ideal).

OS detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 9.48 seconds
```

6. -P port ranges

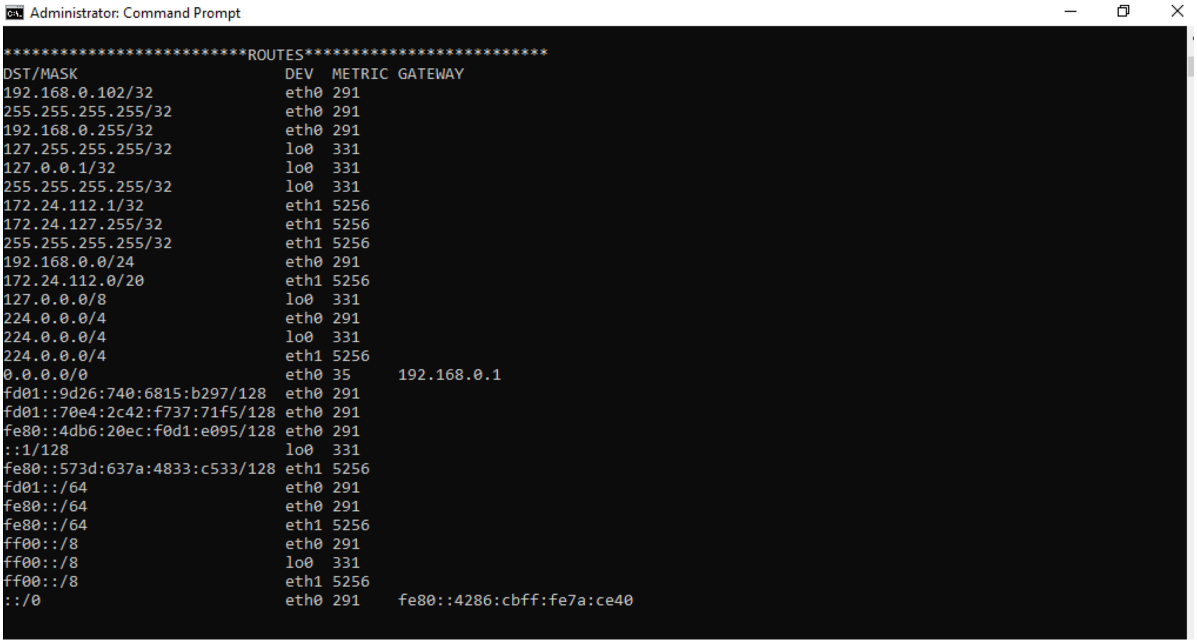


```
C:\Windows\system32>nmap -P google.com
Starting Nmap 7.95 ( https://nmap.org ) at 2025-01-16 11:32 India Standard Time
Nmap scan report for google.com (172.217.174.78)
Host is up (0.0070s latency).
Other addresses for google.com (not scanned): 2404:6800:4009:815::200e
rDNS record for 172.217.174.78: bom07s25-in-f14.1e100.net
Not shown: 998 filtered tcp ports (no-response)
PORT    STATE SERVICE
80/tcp  open  http
443/tcp open  https

Nmap done: 1 IP address (1 host up) scanned in 4.91 seconds
```

7. Nmap -iflist



```
C:\Windows\system32>nmap -iflist
Starting Nmap 7.95 ( https://nmap.org ) at 2025-01-16 11:33 India Standard Time
************************INTERFACES************************
DEV  (SHORT) IP/MASK                      TYPE     UP MTU  MAC
eth0 (eth0)  fd01::70e4:2c42:f737:71f5/64 ethernet up 1500 0A:E0:AF:C1:0D:1A
eth0 (eth0)  fd01::9d26:740:6815:b297/128 ethernet up 1500 0A:E0:AF:C1:0D:1A
eth0 (eth0)  fe80::4db6:20ec:f0d1:e095/64 ethernet up 1500 0A:E0:AF:C1:0D:1A
eth0 (eth0)  192.168.0.102/24             ethernet up 1500 0A:E0:AF:C1:0D:1A
lo0  (lo0)   ::1/128                      loopback up -1
lo0  (lo0)   127.0.0.1/8                  loopback up -1
eth1 (eth1)  fe80::573d:637a:4833:c533/64 ethernet up 1500 00:15:5D:AB:B4:57
eth1 (eth1)  172.24.112.1/20              ethernet up 1500 00:15:5D:AB:B4:57

DEV    WINDEVICE
eth0   \Device\NPF_{FD3D3728-9E2B-4C15-B89E-60CD6ADBEB10}
eth0   \Device\NPF_{FD3D3728-9E2B-4C15-B89E-60CD6ADBEB10}
eth0   \Device\NPF_{FD3D3728-9E2B-4C15-B89E-60CD6ADBEB10}
eth0   \Device\NPF_{FD3D3728-9E2B-4C15-B89E-60CD6ADBEB10}
lo0    \Device\NPF_Loopback
lo0    \Device\NPF_Loopback
eth1   \Device\NPF_{92B40CE8-EDEF-4A8A-87A7-2963F8564C84}
eth1   \Device\NPF_{92B40CE8-EDEF-4A8A-87A7-2963F8564C84}
<none> \Device\NPF_{DB190514-582F-4CC8-9F62-7B4E813B2C08}
<none> \Device\NPF_{32D95609-525E-44EE-83F3-AE7518310E29}
<none> \Device\NPF_{BEAD7E91-FA26-4570-BDEF-B906A6CACB92}

**************************ROUTES**************************
DST/MASK                      DEV  METRIC GATEWAY
192.168.0.102/32              eth0 291
255.255.255.255/32            eth0 291
192.168.0.255/32              eth0 291
127.255.255.255/32            lo0  331
127.0.0.1/32                  lo0  331
255.255.255.255/32            lo0  331
172.24.112.1/32               eth1 5256
172.24.127.255/32             eth1 5256
255.255.255.255/32            eth1 5256
192.168.0.0/24                eth0 291
172.24.112.0/20               eth1 5256
127.0.0.0/8                   lo0  331
224.0.0.0/4                   eth0 291
224.0.0.0/4                   lo0  331
```



```
**************************ROUTES**************************
DST/MASK                      DEV  METRIC GATEWAY
192.168.0.102/32              eth0 291
255.255.255.255/32            eth0 291
192.168.0.255/32              eth0 291
127.255.255.255/32            lo0  331
127.0.0.1/32                  lo0  331
255.255.255.255/32            lo0  331
172.24.112.1/32               eth1 5256
172.24.127.255/32             eth1 5256
255.255.255.255/32            eth1 5256
192.168.0.0/24                eth0 291
172.24.112.0/20               eth1 5256
127.0.0.0/8                   lo0  331
224.0.0.0/4                   eth0 291
224.0.0.0/4                   lo0  331
224.0.0.0/4                   eth1 5256
0.0.0.0/0                     eth0 35     192.168.0.1
fd01::9d26:740:6815:b297/128  eth0 291
fd01::70e4:2c42:f737:71f5/128 eth0 291
fe80::4db6:20ec:f0d1:e095/128 eth0 291
::1/128                       lo0  331
fe80::573d:637a:4833:c533/128 eth1 5256
fd01::/64                     eth0 291
fe80::/64                     eth0 291
fe80::/64                     eth1 5256
ff00::/8                      eth0 291
ff00::/8                      lo0  331
ff00::/8                      eth1 5256
::/0                          eth0 291    fe80::4286:cbff:fe7a:ce40
```