ASSIGNMENT – 1

2023000813

TOPOLOGY:

Topology refers to the geometrical representation of the connection between various computers, devices, nodes etc.

It defines how different computers are connected and how data transfer happens within them.

There are many types of topologies:

1. Point to Point

2. Mesh Topology

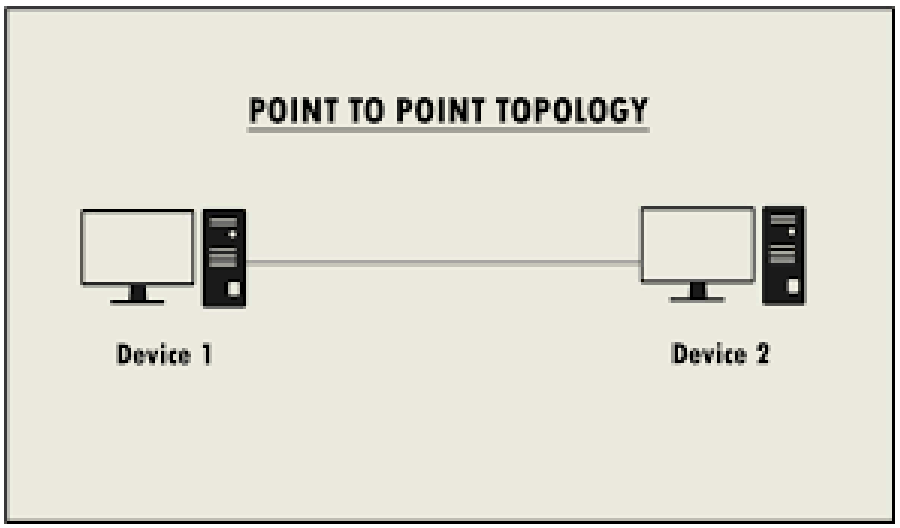
3. Star Topology 4. Bus Topology

5. Ring Topology

6. Tree Topology 7. Hybrid Topology

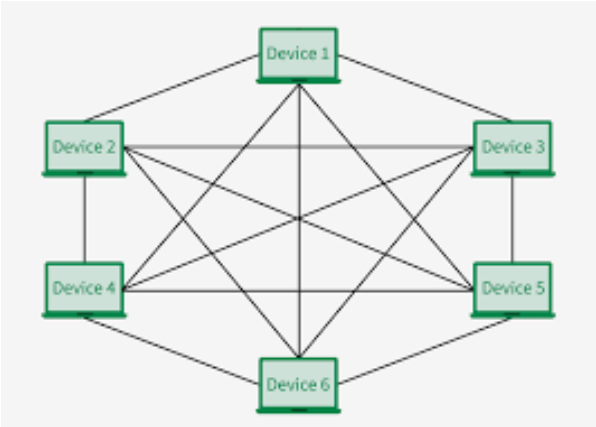
1.Point to Point:

It is known to be the simplest form of topology which is between 2 nodes that is sender and receiver. It is known to provide higher bandwidth.



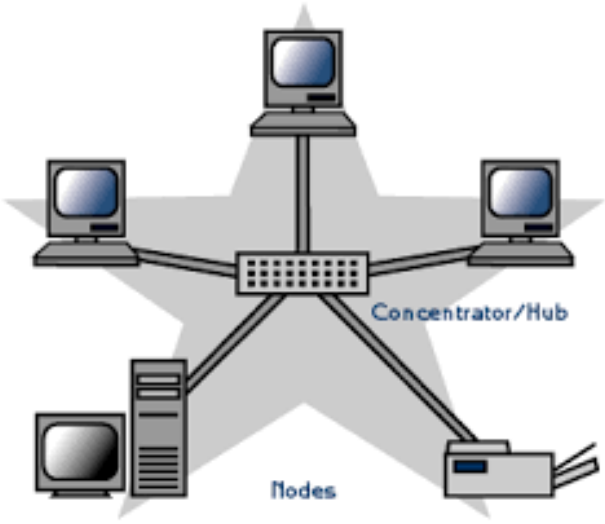
2. Mesh Topology:

When many devices are present Mesh Topology is used to interconnect every device with every other device.



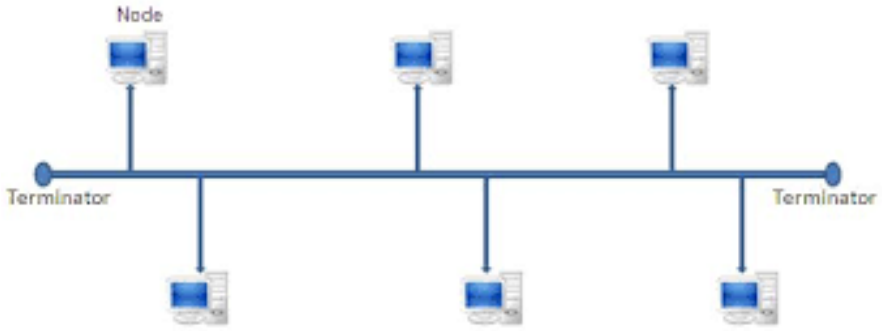
3.Star Topology:

In Star Topology all devices are connected to a single central node called HUB. It is easy to set-up.



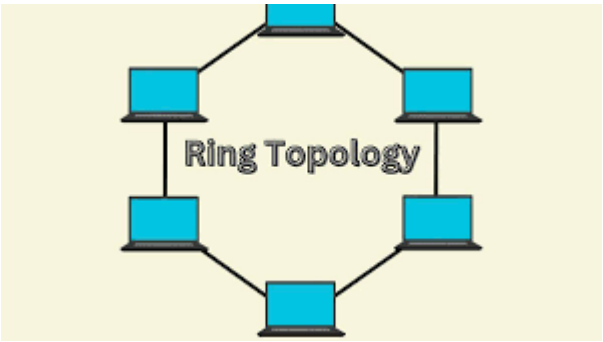
4.Bus Topology:

All devices are connected in a linear way through a bi-directional single cable called the BACKBONE.



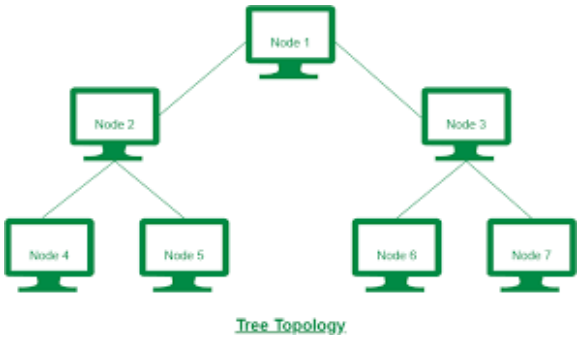
5.Ring Topology:

Every device in Ring Topology is connected only to 2 devices, this forms a ring shape hence the name Ring Topology.



6.Tree Topology:

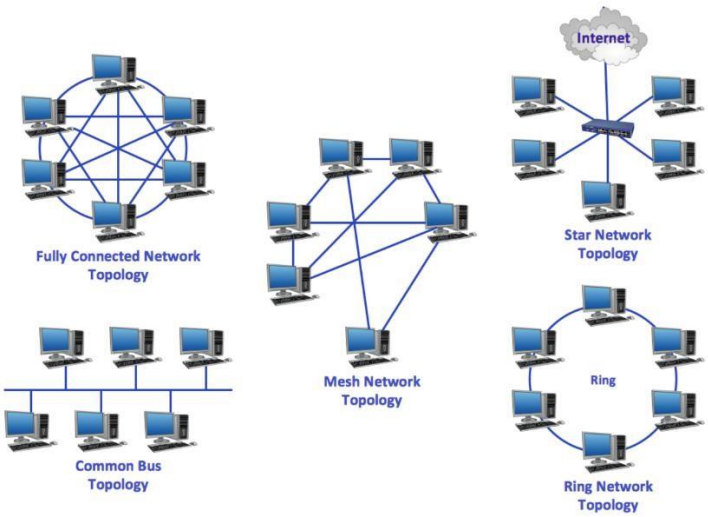
Tree topology similar to Trees in Data structure follow a hierarchical flow of data.



Tree Topology

7.Hybrid Topology:

Combination of minimum of two different types of Topologies result in a Hybrid Topology.



CONNECTION DEVICES:

These are physical devices that allow hardware on a computer network to communicate and interact with each other by controlling connected data transfer, boosting signals, and linking different networks.

Few Examples of connection devices include:

1. Hub
2. Router
3. Gateway
4. NIC
5. Modem
6. Repeater
7. VPN

1.Hub:

It connects multiple wires from different devices, branches into one. A hub though is simple it leads to inefficiencies and loss of data.

2.Router:

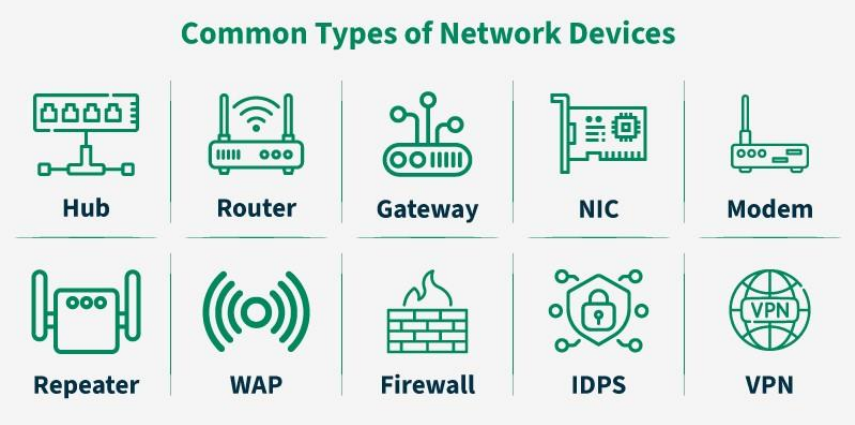
It is Network Layer device which route data packets based on their IP addresses.

3.Gateway:

They are protocol converters which connects 2 networks hence the name Gateway.

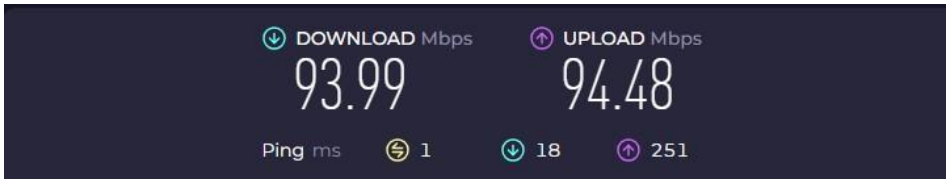
4.NIC:

It is a network adapter which connects computer to the network. It works on both physical and datalink layer.

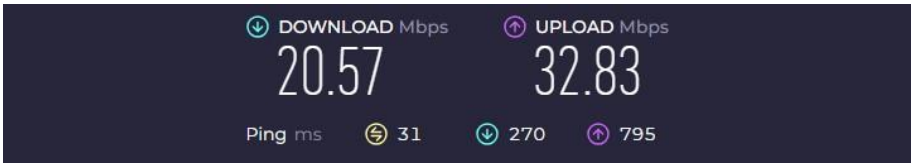


- **SPEED OF WIRED AND WIRELESS LAN:**

Speed of wired LAN connection in my organization:



Speed of wireless LAN connection in my organization:



- **IP, MAC ADRESS AND SUBNET MASK OF MY DEVICE:**

IPv6 Address: fe80::c057:9d3b:61ca:e8ec%19
IPv4 Address: 172.17.252.122
MAC/Physical address: CC-96-E5-4A-08-DD
Subnet Mask: 255.255.240.0

```
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\CSE-214-17>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet 2:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::e372:3d6e:ec7d:a264%13
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . : gitam.edu
   Link-local IPv6 Address . . . . . : fe80::c057:9d3b:61ca:e8ec%19
   IPv4 Address. . . . . . . . . . . : 172.17.252.122
   Subnet Mask . . . . . . . . . . . : 255.255.240.0
   Default Gateway . . . . . . . . . : 172.17.240.1

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : gitam.edu
   Link-local IPv6 Address . . . . . : fe80::db35:d2d9:6b26:f7c8%15
   IPv4 Address. . . . . . . . . . . : 172.18.155.39
   Subnet Mask . . . . . . . . . . . : 255.255.248.0
   Default Gateway . . . . . . . . . : 172.18.152.1

C:\Users\CSE-214-17>getmac

Physical Address    Transport Name
=================== ==========================================================
CC-96-E5-4A-08-DD   \Device\Tcpip_{F9DECE27-BF3C-4F68-9702-77AAD7B0E6F5}
A0-02-A5-CC-D0-26   \Device\Tcpip_{D04B8191-C573-469B-911F-FEA71D787BD8}
0A-00-27-00-00-0D   \Device\Tcpip_{A5C2234E-6804-4926-BB69-E96F64BF0365}

C:\Users\CSE-214-17>
```

COMMANDS:

1) Ipconfig :- gives the basic IP configuration of your system
2) ipconfig /all :- Displays detailed IP configuration information for all network interfaces, including the MAC address and more.
3) arp –a :- Displays the ARP (Address Resolution Protocol) table, which shows IP addresses mapped to MAC addresses
4) netstat :- Displays active network connections, routing tables, and network interface statistics.
5) ping 172.17.252.122:- Sends ICMP echo requests to the specified IP address
6) ping google.com :- Sends ICMP echo requests to a remote website
7) tracert google.com :- Traces the route that packets take from your machine to a remote destination
8) getmac /v /fo list :- Displays the MAC (Media Access Control) address and detailed information about the network interfaces on your computer

```
C:\Users\CSE-214-17>ipconfig/all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : ICTCSE-L214-17
   Primary Dns Suffix  . . . . . . . : gitam.edu
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No
   DNS Suffix Search List. . . . . . : gitam.edu

Ethernet adapter Ethernet 2:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : VirtualBox Host-Only Ethernet Adapter
   Physical Address. . . . . . . . . : 0A-00-27-00-00-0D
   DHCP Enabled. . . . . . . . . . . : No
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::e372:3d6e:ec7d:a264%13(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.56.1(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :
   DHCPv6 IAID . . . . . . . . . . . : 688521255
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2D-3D-C3-CE-CC-96-E5-4A-08-DD
   NetBIOS over Tcpip. . . . . . . . : Enabled

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
   Physical Address. . . . . . . . . : A0-02-A5-CC-D0-27
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
   Physical Address. . . . . . . . . : A2-02-A5-CC-D0-26
   DHCP Enabled. . . . . . . . . . . : No
   Autoconfiguration Enabled . . . . : Yes

Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . : gitam.edu
   Description . . . . . . . . . . . : Intel(R) Ethernet Connection (17) I219-LM
   Physical Address. . . . . . . . . : CC-96-E5-4A-08-DD
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
```

```
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\CSE-214-17>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet 2:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::e372:3d6e:ec7d:a264%13
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . : gitam.edu
   Link-local IPv6 Address . . . . . : fe80::c057:9d3b:61ca:e8ec%19
   IPv4 Address. . . . . . . . . . . : 172.17.252.122
   Subnet Mask . . . . . . . . . . . : 255.255.240.0
   Default Gateway . . . . . . . . . : 172.17.240.1

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : gitam.edu
   Link-local IPv6 Address . . . . . : fe80::db35:d2d9:6b26:f7c8%15
   IPv4 Address. . . . . . . . . . . : 172.18.155.39
   Subnet Mask . . . . . . . . . . . : 255.255.248.0
   Default Gateway . . . . . . . . . : 172.18.152.1
```

```
C:\Users\CSE-214-17>arp -a

Interface: 192.168.56.1 --- 0xd
  Internet Address      Physical Address      Type
  192.168.56.255        ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  230.0.0.1             01-00-5e-00-00-01     static
  239.255.255.250       01-00-5e-7f-ff-fa     static

Interface: 172.18.155.39 --- 0xf
  Internet Address      Physical Address      Type
  172.18.152.1          6c-03-b5-61-79-c2     dynamic
  172.18.159.255        ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  230.0.0.1             01-00-5e-00-00-01     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 172.17.252.122 --- 0x13
  Internet Address      Physical Address      Type
  172.17.240.1          6c-03-b5-61-79-d0     dynamic
  172.17.248.13         4c-d7-17-8f-26-d0     dynamic
  172.17.248.38         4c-d7-17-8f-23-dd     dynamic
  172.17.248.86         4c-d7-17-8e-d4-77     dynamic
  172.17.248.125        4c-d7-17-8f-22-f0     dynamic
  172.17.249.143        00-be-43-8f-b6-84     dynamic
  172.17.250.90         4c-d7-17-8e-d4-5f     dynamic
  172.17.250.93         4c-d7-17-8e-d2-6f     dynamic
  172.17.250.134        4c-d7-17-8f-24-09     dynamic
  172.17.250.203        cc-96-e5-4a-11-9d     dynamic
  172.17.251.104        f4-8e-38-8c-8a-dc     dynamic
  172.17.251.182        00-be-43-bb-a3-51     dynamic
  172.17.253.58         e4-54-e8-bd-04-25     dynamic
  172.17.255.255        ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  230.0.0.1             01-00-5e-00-00-01     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

```
C:\Users\CSE-214-17>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:53477        ICTCSE-L214-17:53478   ESTABLISHED
  TCP    127.0.0.1:53478        ICTCSE-L214-17:53477   ESTABLISHED
  TCP    172.17.252.122:49408   20.198.119.143:https   ESTABLISHED
  TCP    172.17.252.122:50630   172.64.155.209:https   ESTABLISHED
  TCP    172.17.252.122:50673   lb-140-82-113-25-iad:https  ESTABLISHED
  TCP    172.17.252.122:50746   158:https              TIME_WAIT
  TCP    172.17.252.122:50778   192.168.63.82:8027     ESTABLISHED
```

```
C:\Users\CSE-214-17>ping 172.17.252.122

Pinging 172.17.252.122 with 32 bytes of data:
Reply from 172.17.252.122: bytes=32 time<1ms TTL=128
Reply from 172.17.252.122: bytes=32 time<1ms TTL=128
Reply from 172.17.252.122: bytes=32 time<1ms TTL=128
Reply from 172.17.252.122: bytes=32 time<1ms TTL=128

Ping statistics for 172.17.252.122:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
C:\Users\CSE-214-17>ping google.com

Pinging google.com [142.250.71.46] with 32 bytes of data:
Reply from 142.250.71.46: bytes=32 time=14ms TTL=116
Reply from 142.250.71.46: bytes=32 time=14ms TTL=116
Reply from 142.250.71.46: bytes=32 time=14ms TTL=116
Reply from 142.250.71.46: bytes=32 time=14ms TTL=116

Ping statistics for 142.250.71.46:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 14ms, Maximum = 14ms, Average = 14ms
```

```
C:\Users\CSE-214-17>tracert google.com

Tracing route to google.com [142.250.71.46]
over a maximum of 30 hops:

  1    <1 ms     1 ms     1 ms  172.17.240.1
  2     1 ms     1 ms    <1 ms  192.168.158.21
  3     1 ms     1 ms     1 ms  192.168.158.22
  4    <1 ms     1 ms    <1 ms  103.23.29.65
  5     *        *        *     Request timed out.
  6    20 ms    16 ms    16 ms  103.40.48.10
  7    16 ms    17 ms    15 ms  103.40.48.161
  8    14 ms    15 ms    16 ms  216.239.43.131
  9    15 ms    17 ms    14 ms  142.250.233.143
 10    14 ms    14 ms    14 ms  maa03s35-in-f14.1e100.net [142.250.71.46]

Trace complete.
```

```
C:\Users\CSE-214-17>getmac /v /fo list

Connection Name:  Ethernet
Network Adapter:  Intel(R) Ethernet Connection (17) I219-LM
Physical Address: CC-96-E5-4A-08-DD
Transport Name:   \Device\Tcpip_{F9DECE27-BF3C-4F68-9702-77AAD7B0E6F5}

Connection Name:  Wi-Fi
Network Adapter:  Intel(R) Wi-Fi 6E AX210 160MHz
Physical Address: A0-02-A5-CC-D0-26
Transport Name:   \Device\Tcpip_{D04B8191-C573-469B-911F-FEA71D787BD8}

Connection Name:  Ethernet 2
Network Adapter:  VirtualBox Host-Only Ethernet Adapter
Physical Address: 0A-00-27-00-00-0D
Transport Name:   \Device\Tcpip_{A5C2234E-6804-4926-BB69-E96F64BF0365}
```