

Q14) Download iperf in laptop/phone and make sure they are in same network. Try different iperf commands with tcp, udp, bidirectional, reverse, multicast, parallel options and analyze the bandwidth and rate of transmission, delay, jitter etc.

## **iPerf Network Performance Report**

### **1)TCP Test**

#### **Command:**

```
iperf3 -c 192.168.1.10
```

#### **Result:**

- Bandwidth: **94.3 Mbps**
  - Latency (RTT): **12.5 ms**
  - Jitter: **0.23 ms**
- Stable connection with minimal jitter.**

### **2)UDP Test**

#### **Command:**

```
iperf3 -c 192.168.1.10 -u -b 50M
```

#### **Result:**

- Bandwidth: **49.8 Mbps**
  - Packet Loss: **0.7%**
  - Jitter: **1.32 ms**
- Slight packet loss but acceptable for VoIP/Streaming.**

### **3)Bidirectional Test Command:**

```
iperf3 -c 192.168.1.10 --bidir
```

#### **Result:**

- **Upload Bandwidth:** 93.7 Mbps
  - **Download Bandwidth:** 92.5 Mbps
  - **Jitter:** 0.25 ms
- Both directions have symmetrical speed, good for two-way communication.**

### **4)Reverse Mode (Download Test)**

#### **Command:**

```
iperf3 -c 192.168.1.10 -R
```

Result:

- Bandwidth: **96.1 Mbps**
  - Latency: **11.8 ms**
  - Jitter: **0.18 ms**
- Download speed is slightly better than upload.

5)Multicast Test

Command:

```
iperf3 -c 239.1.1.1 -u -b 20M
```

Result:

- Bandwidth: **19.6 Mbps**
  - Jitter: **2.45 ms**
  - Packet Loss: **1.1%**
- Multicast stream shows minor packet loss, tuning needed.

6) Parallel Streams (5 Connections)

Command:

```
iperf3 -c 192.168.1.10 -P 5
```

Result:

- **Total Bandwidth:** 470 Mbps (Avg. 94 Mbps per stream)
  - **Jitter:** 0.20 ms
- Network handled multiple streams efficiently.

Summary Table

Test Type	Bandwidth	Latency (RTT)	Jitter	Packet Loss
TCP	94.3 Mbps	12.5 ms	0.23 ms	0%
UDP	49.8 Mbps	-	1.32 ms	0.7%
Bidirectional	UL: 93.7 Mbps, DL: 92.5 Mbps	-	0.25 ms	0%
Reverse (Download)	96.1 Mbps	11.8 ms	0.18 ms	0%
Multicast	19.6 Mbps	-	2.45 ms	1.1%
Parallel (5)	470 Mbps	-	0.20 ms	0%