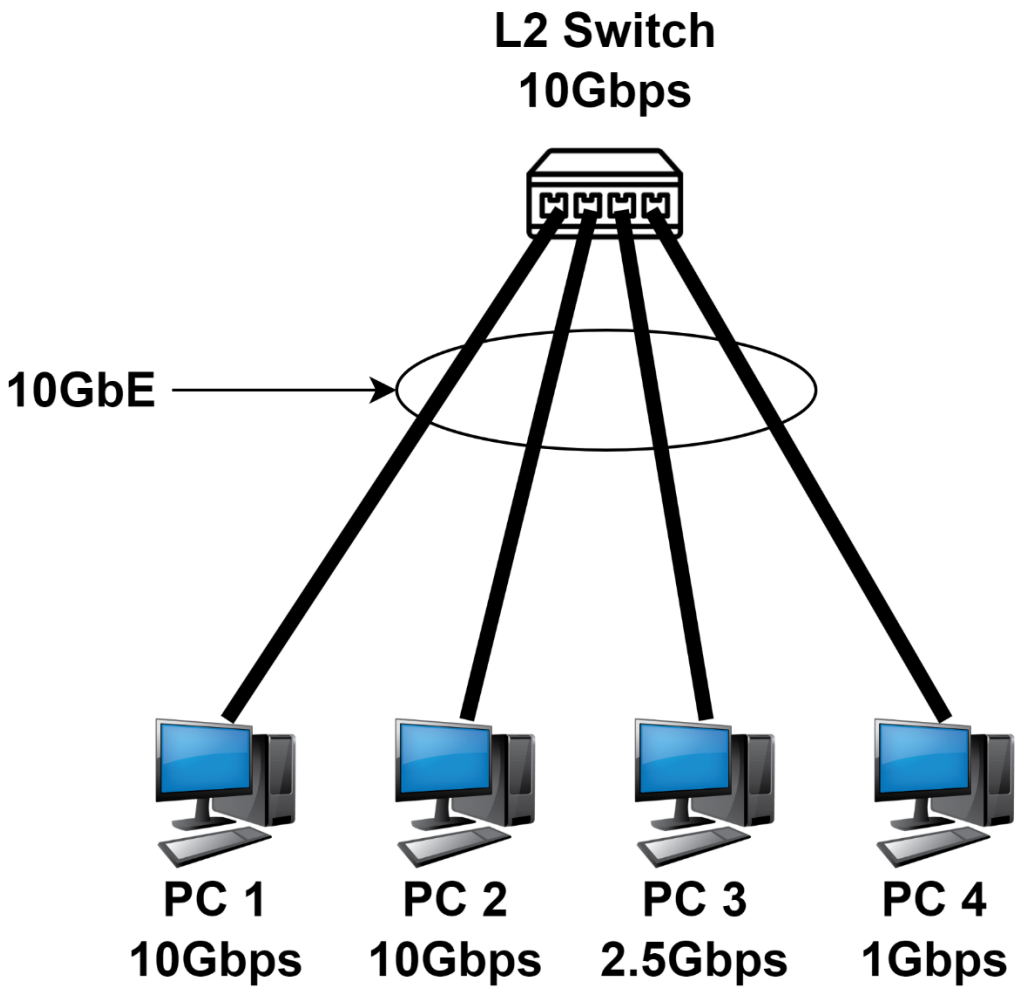

Figure 1

You have been given the network of Figure 1. The description of the network is the following:

- PC 1 and PC 2 are equipped with a 10Gbps network adapter (NIC). PC 3 is equipped with a 2.5Gbps NIC, and PC 4 is equipped with a 1Gbps NIC.
- The 4 PCs are connected via CAT6 ethernet to an L2 switch, which supports 10Gbps per port.

Answer the following questions:

1) What is the bandwidth between PC 1 and PC 2? Why?
2) What is the bandwidth between PC 1 and PC 3? Why?
3) What is the bandwidth between PC 1 and PC 4? Why?
4) What is the bandwidth between PC 3 and PC 4? Why?
5) How could you improve the bandwidth between PC 1 and PC 4?

Answers

1) The bandwidth between PC 1 and PC 2 is 10Gbps. These two computers are connected to the same LAN via the L2 switch, which can support the 10Gbps bandwidth. Both computers can support 10 Gbps and the ethernet cables are CAT6, which can also support 10Gbps.
2) The bandwidth between PC 1 and PC 3 is 2.5Gbps. These two computers are connected to the same LAN via the L2 switch, which can support 10Gbps bandwidth. PC 1 can support 10 Gbps and the ethernet cables are CAT6, which can also support 10Gbps. However, the NIC of PC 3 can only support 2.5 Gbps. Therefore, the overall bandwidth between PC 1 and PC 3 is that of the slowest link, which is 2.5Gbps.
3) The bandwidth between PC 1 and PC 4 is 1Gbps. These two computers are connected to the same LAN via the L2 switch, which can support 10Gbps bandwidth. PC 1 can support 10 Gbps and the ethernet cables are CAT6, which can also support 10Gbps. However, the NIC of PC 4 can only support 1 Gbps. Therefore, the overall bandwidth between PC 1 and PC 4 is that of the slowest link, which is 1Gbps.
4) The bandwidth between PC 3 and PC 4 is 1Gbps. These two computers are connected to the same LAN via the L2 switch, which can support 10Gbps and the ethernet cables are CAT6, which can also support 10Gbps. However, that is irrelevant, since PC 3 can support 2.5 Gbps and PC 4 can only support 1 Gbps. Therefore, the overall bandwidth between PC 3 and PC 4 is that of the slowest link, which is 1Gbps.
5) In order to improve the bandwidth between PC 1 and PC 4, we would need to upgrade the NIC of PC 4. If we bought a 2.5Gbps NIC, the bandwidth would be 2.5Gbps. If we bought a 10Gbps NIC, the bandwidth would be 10Gbps.

Note: In general, the bandwidth between two computers is that of the slowest link or limiting factor (i.e., bottleneck). Excluding software, limiting factors can be cables, switches, routers, the ISP connection, and wired and wireless network adapters.