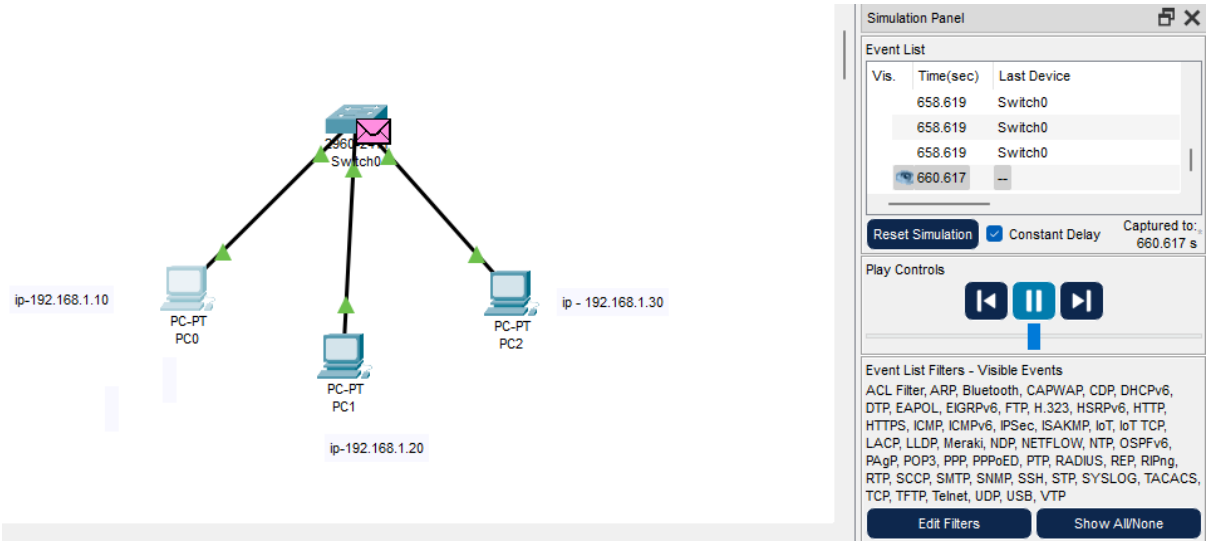
4) Troubleshoot Ethernet Communication with ping and traceroute -> Using cisco packet tracer:

Function of traceroute:

traceroute is a network diagnostic tool used to **track the path** packets take from a source device to a destination across a network. It helps identify delays, network congestion, and points of failure.

Key Functions:

1. **Path Discovery** – Displays each hop (router) along the route from source to destination.
2. **Latency Measurement** – Shows the time taken for packets to travel through each hop.
3. **Fault Identification** – Helps locate network failures by showing where packets stop responding.
4. **Loop Detection** – Identifies routing loops if packets circulate indefinitely.




```
C:\>ping 192.168.1.20

Pinging 192.168.1.20 with 32 bytes of data:

Reply from 192.168.1.20: bytes=32 time=4ms TTL=128
Reply from 192.168.1.20: bytes=32 time=4ms TTL=128
Reply from 192.168.1.20: bytes=32 time=4ms TTL=128
Reply from 192.168.1.20: bytes=32 time=4ms TTL=128

Ping statistics for 192.168.1.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 4ms, Average = 4ms

C:\>tracert 192.168.1.20

Tracing route to 192.168.1.20 over a maximum of 30 hops:

  1    4 ms      4 ms      4 ms      192.168.1.20

Trace complete.

C:\>
```

Output Interpretation:

- Each line represents a hop (router) with its IP address and response times.
- * * * means a hop is not responding (could be a firewall or network issue).