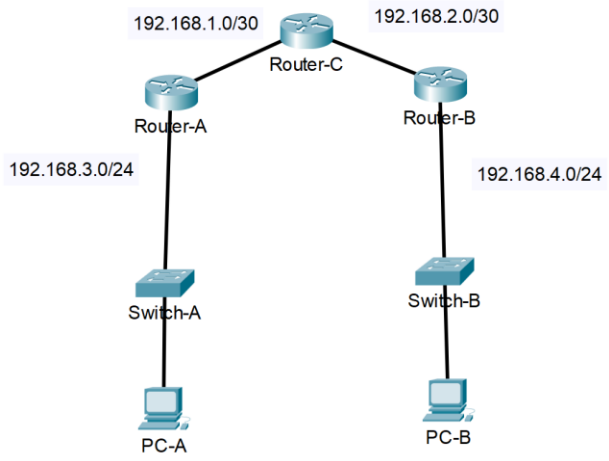
NTP Synchronization

Objective: My objective in this virtual-lab was to provide accurate time to a network. Keeping your network synchronized with the same time is just as important as maintaining the availability. If a problem occurs between 2 devices in a workplace during after hours, it is hard to determine at exactly what time the incident took place if both devices have their own clock. Also every device carries thousands of syslog entries, so to match an entry with another entry just calls for trouble. That is why it is important to maintain accurate time on devices to have accurate logs and seamless troubleshooting

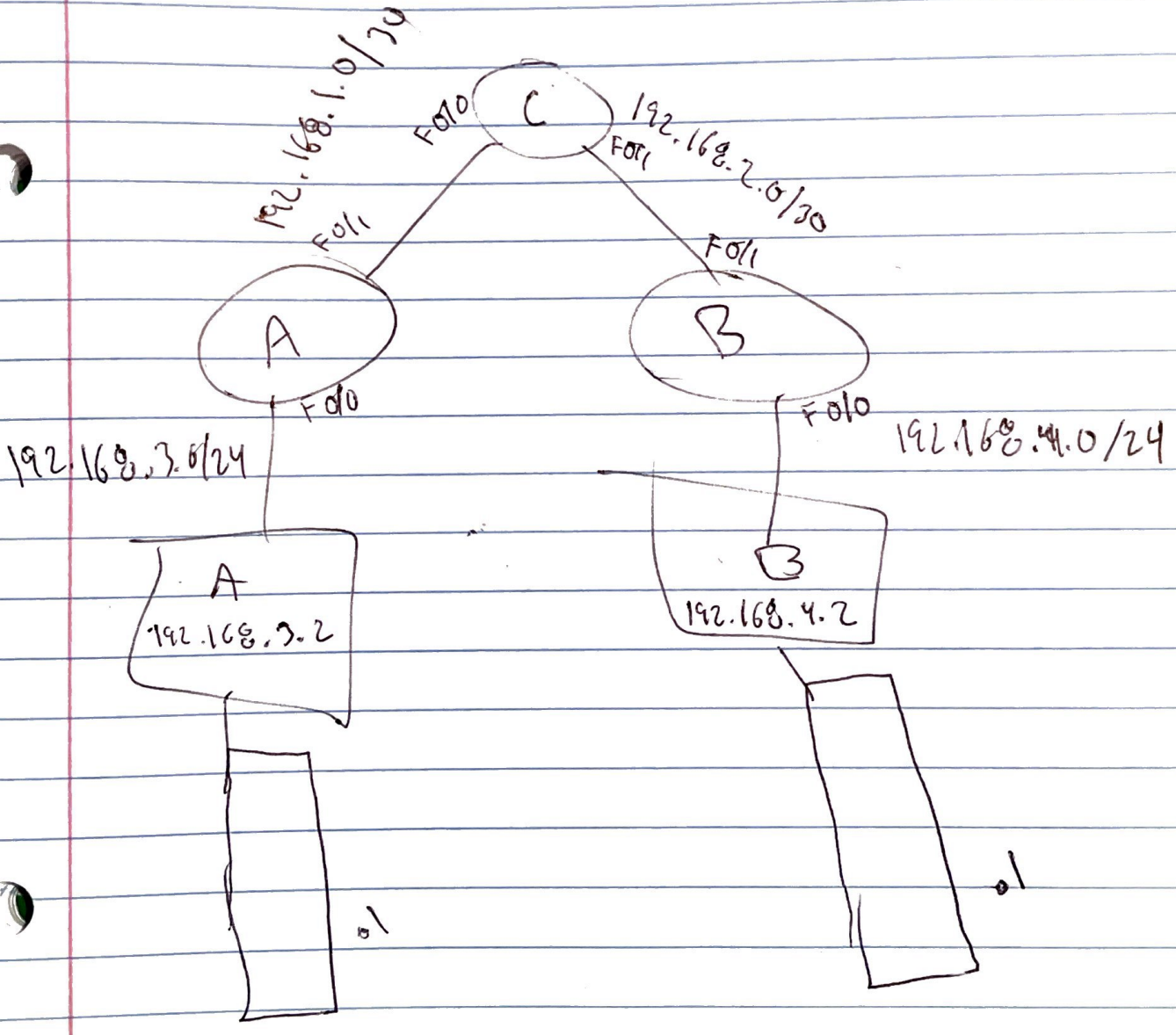
Equipment: (2) Cisco 2811, (2) Cisco 2960, PC-A, PC-B, and Cisco Packet Tracer

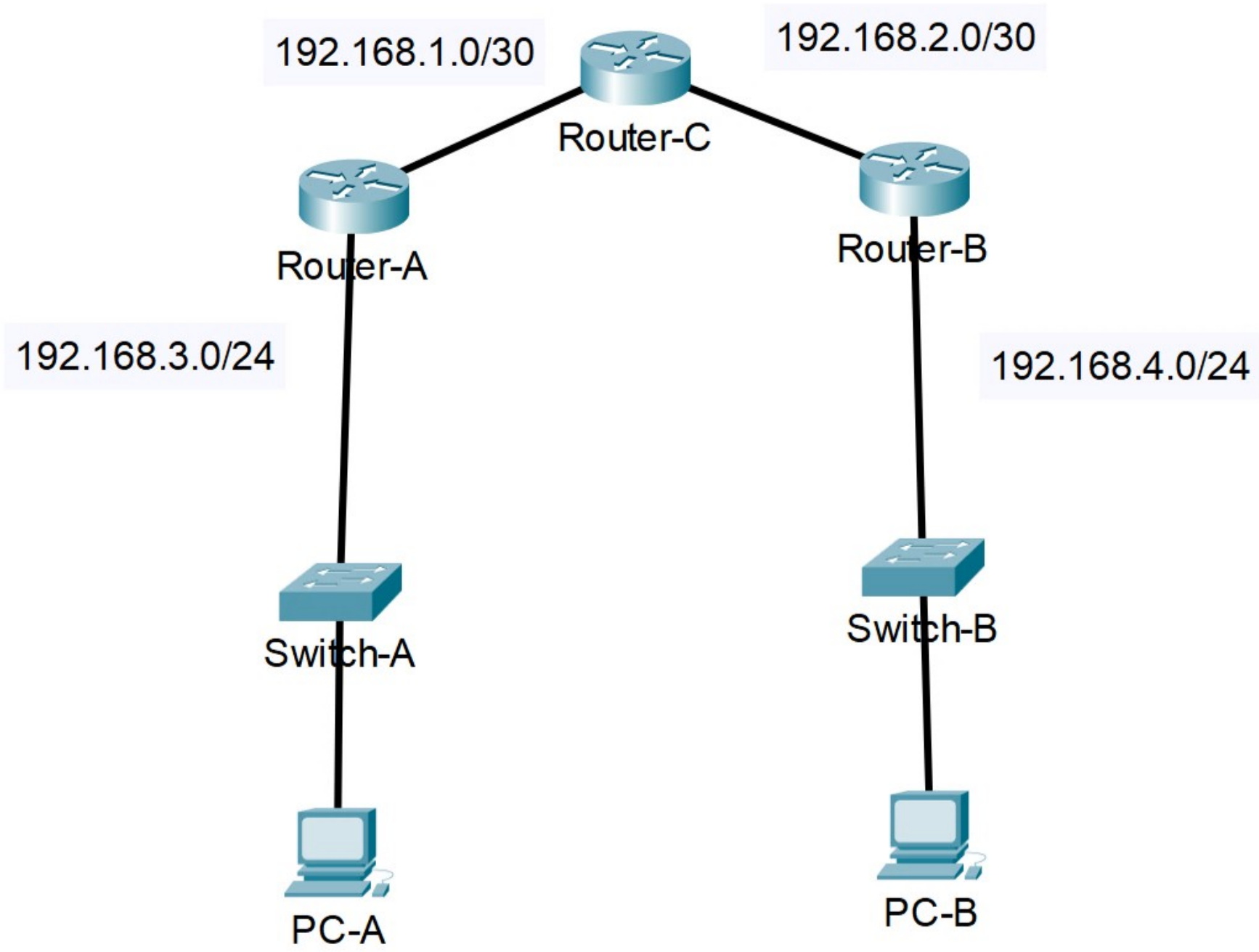
Key Steps:

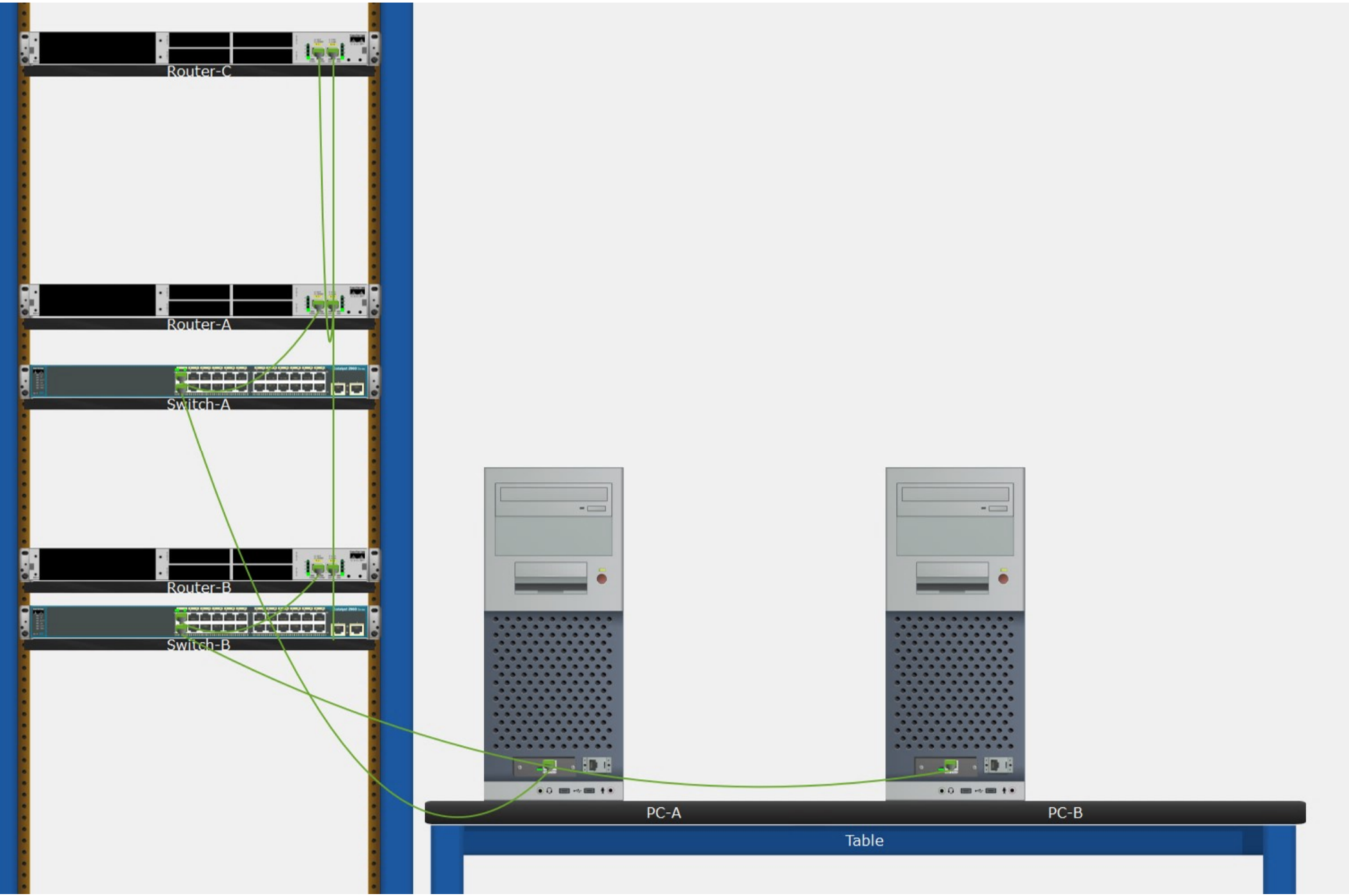
a. Assign the IP addresses to the interfaces respective to their Subnet Network
b. Ensure to configure OSPF protocols on all routers to ensure full communication between all Subnets
c. Set the time as UTC time and then configure the time zone for CST which is -6 behind UTC
d. On Router-C make it the NTP Master with a value of 2 and configure authentication with key #1 and password as David
e. For Router-A and B configure the NTP server as the IP address of Router-C respective to their Subnet
f. Authenticate each router with key #1 and password as David
g. Assign an SVI to Switch-A and B to ensure that the NTP protocol works with the switch as well
h. For Switch-A and B use the default-gateway of their respective Subnet as the NTP Server



Router C - F0/0 - 192.168.1.1/30
Router C - F0/1 - 192.168.2.1/30
Router A - F0/0 - 192.168.3.254/24
Router A - F0/1 - 192.168.1.2/30
Router B - F0/0 - 192.168.4.254/24
Router B - F0/1 - 192.168.2.2/30
SW-A-SVI - 192.168.3.2/24
SW-B-SVI - 192.168.4.2/24




192.168.1.0/30
192.168.2.0/30
Router-C
Router-A
Router-B
192.168.3.0/24
192.168.4.0/24
Switch-A
Switch-B
PC-A
PC-B


Router-C
Router-A
Switch-A
Router-B
Switch-B
PC-A
PC-B
Table

Cisco Packet Tracer - C:\Users\ddiaz\Desktop\At-Home Labs\NTP.pkt

File Edit Options View Tools Extensions Window Help

Logical Physical x: 683, y: 629

Root 20:33:00

Router-C

```
Router-C>en
Router-C#sh ntp status
Clock is synchronized, stratum 2, reference is
127.127.1.1
nominal freq is 250.0000 Hz, actual freq is
249.9990 Hz, precision is 2**24
reference time is EB2F583F.00000232 (9:15:43.562
UTC Fri Feb 14 2025)
clock offset is 0.00 msec, root delay is 0.00  msec
root dispersion is 0.00 msec, peer dispersion is
0.48 msec.
loopfilter state is 'CTRL' (Normal Controlled
Loop), drift is - 0.000001193 s/s system poll
interval is 6, last update was 21 sec ago.
Router-C#
```

Copy Paste

Top

Switch-A

```
SW-A>en
SW-A#sh ntp statu
Clock is synchronized, stratum 4, reference is
192.168.3.254
nominal freq is 250.0000 Hz, actual freq is
249.9990 Hz, precision is 2**24
reference time is EB2F5914.000002C4 (9:19:16.708
UTC Fri Feb 14 2025)
clock offset is 0.00 msec, root delay is 0.00  msec
root dispersion is 20.29 msec, peer dispersion is
0.12 msec.
loopfilter state is 'CTRL' (Normal Controlled
Loop), drift is - 0.000001193 s/s system poll
interval is 4, last update was 3 sec ago.
SW-A#
```

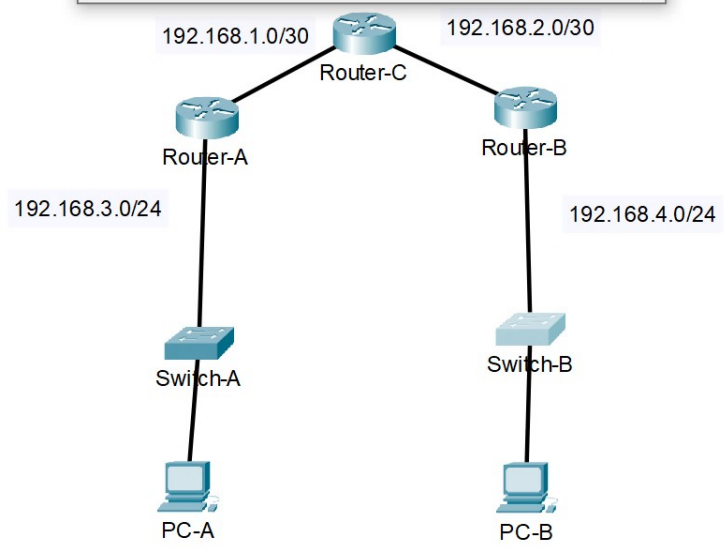
Copy Paste

Router-A

```
Router-A>en
Router-A#sh ntp statu
Clock is synchronized, stratum 3, reference is
192.168.1.1
nominal freq is 250.0000 Hz, actual freq is
249.9990 Hz, precision is 2**24
reference time is EB2F5893.0000021F (9:17:7.543 UTC
Fri Feb 14 2025)
clock offset is 1.00 msec, root delay is 0.00  msec
root dispersion is 10.29 msec, peer dispersion is
0.12 msec.
loopfilter state is 'CTRL' (Normal Controlled
Loop), drift is - 0.000001193 s/s system poll
interval is 4, last update was 7 sec ago.
Router-A#
```

Copy Paste

Top



Router-B

```
Router-b>en
Router-b#sh ntp stat
Clock is synchronized, stratum 3, reference is 192.168.2.1
nominal freq is 250.0000 Hz, actual freq is 249.9990 Hz,
precision is 2**24
reference time is EB2F5872.000001F4 (9:16:34.500 UTC Fri
Feb 14 2025)
clock offset is 0.00 msec, root delay is 0.00  msec
root dispersion is 10.75 msec, peer dispersion is 0.12
msec.
loopfilter state is 'CTRL' (Normal Controlled Loop), drift
is - 0.000001193 s/s system poll interval is 4, last
update was 6 sec ago.
Router-b#
```

Copy Paste

Switch-B

IOS Command Line Interface

```
SW-B>en
SW-B#sh ntp statu
Clock is synchronized, stratum 4, reference is
192.168.4.254
nominal freq is 250.0000 Hz, actual freq is 249.9990 Hz,
precision is 2**24
reference time is EB2F5932.0000027C (9:19:46.636 UTC Fri
Feb 14 2025)
clock offset is 0.00 msec, root delay is 0.00  msec
root dispersion is 20.72 msec, peer dispersion is 0.24
msec.
loopfilter state is 'CTRL' (Normal Controlled Loop), drift
is - 0.000001193 s/s system poll interval is 4, last
update was 11 sec ago.
SW-B#
```

Copy Paste

Top

Scenario 0 New Delete Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec

e Workspace)