Title:
Cisco CCNA / CCNP Certification Exam: Troubleshooting Direct Serial Connections

Word Count:
344

Summary:
Configuring and troubleshooting directly connected Cisco routers seems simple
enough, but there are vital details you must know in order to pass the CCNA and
CCNP exams and run this config in productions and home lab networks. Learn
these details from Chris Bryant, CCIE #12933.

Keywords:
ccna, ccnp, cit, dte, dce, serial, connection, cable, show, interface, serial,
line, protocol, up

Article Body:
A prime topic of your CCNA and CCNP CIT exams will be connecting Cisco routers
directly via their Serial interfaces, and while the configuration is
straightforward, there are some vital details and show commands you must know in
order to pass the exams and configure this successfully in production and home
lab networks. Let's take a look at a sample configuration.

Connecting Cisco routers directly via their Serial interfaces works really well
once you get it running - and getting such a connection up and running is easy
enough. You can use show controller serial x to find out which endpoint is
acting as the DCE, and it's the DCE that must be configured with the clockrate
command.

R3#show controller serial 1

HD unit 1, idb = 0x11B4DC, driver structure at 0x121868

buffer size 1524 HD unit 1, V.35 DCE cable

R3(config)#int serial1

R3(config-if)#ip address 172.12.13.3 255.255.255.0

R3(config-if)#clockrate 56000

R3(config-if)#no shut

Failure to configure the clockrate has some interesting effects regarding the physical and logical state of the interfaces. Let's remove the clockrate from R3 and see what happens.

R3(config)#int s1

R3(config-if)#no clockrate 56000

R3(config-if)#

18:02:19: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1, changed state to down

The line protocol doesn't drop immediately, but it does drop. Let's run show interface serial1 to compare the physical and logical interface states.

R3#show int serial1

Serial1 is up, line protocol is down

Physically, the interface is fine, so the physical interface is up. It's only the logical part of the interface - the line protocol - that is down. It's the same situation on R1.

R1#show inter serial1

Serial1 is up, line protocol is down

While a router misconfiguration is the most likely cause of a serial connection issue, that's not the only reason for clocking issues. Cisco's website documentation mentions CSU/DSU misconfiguration, out-of-spec cables, bad patch panel connections, and connecting too many cables together as other reasons for clocking problems. Still, the number one reason for clocking problems in my experience is simply forgetting to configure the clockrate command!