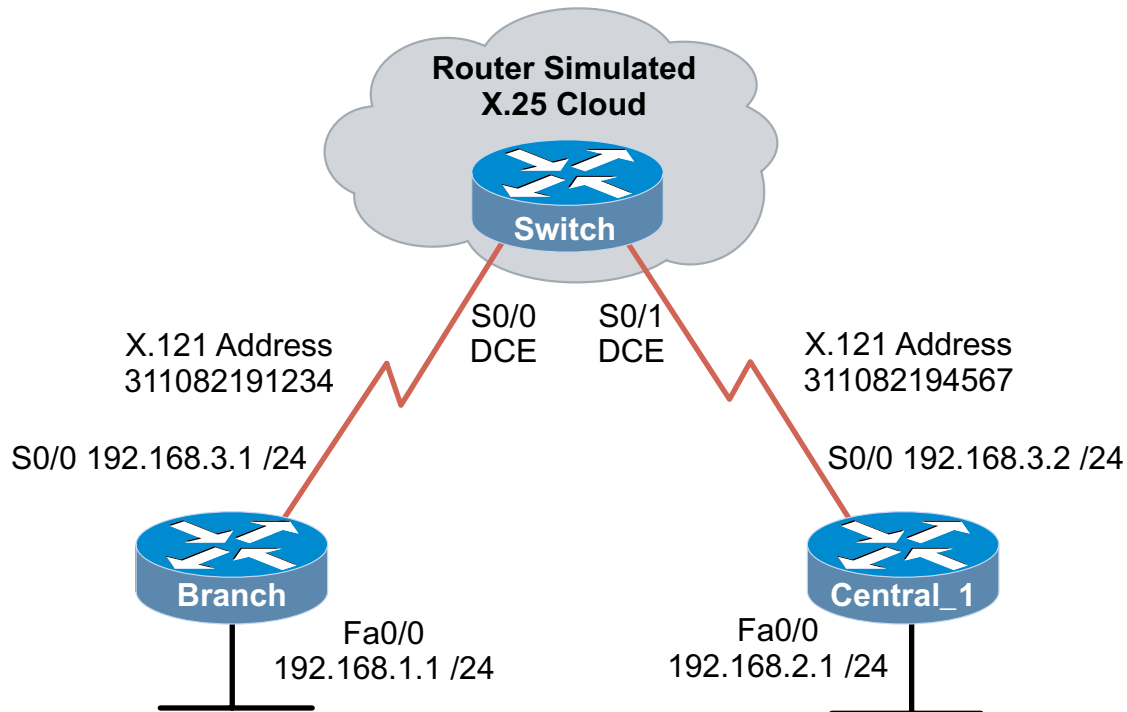


### 6.3.1 Configuring X.25 SVCs



#### Objective

Configure X.25 SVCs to connect a central office router to a branch location using a third router as a simulated X.25 switch.

#### Scenario

International Travel Agency (ITA) has a small branch office in an area that is not served by either Frame Relay or ISDN technology. You have been asked to put together an X.25 prototype to see if the technology will meet ITA's requirements. In this first trial, you will be using switched virtual circuits (SVCs).

Because an X.25 test network is not available, you will first configure a router to act as an X.25 switch. Once the switch is configured, you will configure two routers to interface with the X.25 network. Use X.25 SVCs to create a functional link between the two routers. The branch router (Branch) connects a stub network, so configure a default route on the branch router side and a static route on the central router (Central\_1) side.

#### Step 1

Before beginning this lab, it is recommended that you reload the routers after erasing their startup configuration. This will prevent you from having problems caused by residual configurations. Cable the lab as shown in the diagram.

## Step 2

The first router to be configured will be the X.25 switch router, which will simulate the X.25 network. Configure the following information on the router:

Set the hostname to Switch on the router.

```
Router(config)#hostname Switch
```

Turn on the X.25 switching feature with the following command:

```
Switch(config)#x25 routing
```

Configure each of the serial interfaces on the X.25 switch (Switch) router to use X.25 encapsulation:

```
Switch(config)#interface serial 0/0
Switch(config-if)#encapsulation x25 dce
Switch(config-if)#clockrate 56000
Switch(config-if)#no shutdown
Switch(config-if)#interface serial 0/1
Switch(config-if)#encapsulation x25 dce
Switch(config-if)#clockrate 56000
Switch(config-if)#no shutdown
Switch(config-if)#^Z
```

Use the following commands to set up the static X.121 address for each connection so that the router will know which interfaces to switch the X.25 packets out:

```
Switch(config)#x25 route 311082191234 interface serial 0/0
Switch(config)#x25 route 311082194567 interface serial 0/1
```

## Step 3

Configure the branch (Branch) router using the following steps:

Set the hostname to Branch on the router:

```
router(config)#hostname Branch
```

Configure the interfaces and assign the IP addresses:

```
Branch(config)#interface fastethernet 0/0
Branch(config-if)#ip address 192.168.1.1 255.255.255.0
Branch(config-if)#no shutdown
Branch(config)#interface serial 0/0
Branch(config-if)#encapsulation x25
Branch(config-if)#ip address 192.168.3.1 255.255.255.0
Branch(config-if)#no shutdown
```

Assign the X.121 address to this interface:

```
Branch(config-if)#x25 address 311082191234
```

Set up the X.25 mapping to the other side:

```
Branch(config-if)#x25 map ip 192.168.3.2 311082194567 broadcast
```

Add the necessary default route to facilitate successful routing:

```
Branch(config)#ip route 0.0.0.0 0.0.0.0 192.168.3.2
```

#### Step 4

Configure the central office (Central\_1) router using the following steps:

Set the hostname to Central\_1 on the router:

```
router(config)#hostname Central_1
```

Configure the interfaces and assign the IP addresses:

```
Central_1(config)#interface fastethernet 0/0
Central_1(config-if)#ip address 192.168.2.1 255.255.255.0
Central_1(config-if)#no shutdown
Central_1(config)#interface serial 0/0
Central_1(config-if)#encapsulation x25
Central_1(config-if)#ip address 192.168.3.2 255.255.255.0
Central_1(config-if)#no shutdown
```

Assign the X.121 address to this interface:

```
Central_1(config-if)#x25 address 311082194567
```

Set up the X.25 mapping to the other side:

```
Central_1(config-if)#x25 map ip 192.168.3.1 311082191234
broadcast
```

Add the necessary static route to facilitate successful routing:

```
Central_1(config)#ip route 192.168.1.0 255.255.255.0 192.168.3.1
```

#### Step 5

Verify end-to-end connectivity.

From either Branch or Central\_1, ping the other's FastEthernet interface.

If it doesn't work you have a problem with your configuration. Make sure that the Ethernet interfaces are up and connected at least to a hub or switch.

Remember connectivity is between Branch and Central\_1; the other router is working as a switch.

## Step 6

On all three routers, use the appropriate show interfaces command and see what X.25 information is available. The following is an example of what the output for Central\_1 might look like:

```
Central_1#show interfaces serial 0/0
Serial 0/0 is up, line protocol is up
  Hardware is HD64570 with 5-in-1 module
  Internet address is 192.168.3.2/24
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation X25, loopback not set
  X.25 DTE, address 311082194567, state R1, modulo 8, timer 0
    Defaults: idle VC timeout 0
      cisco encapsulation
        input/output window sizes 2/2, packet sizes 128/128
    Timers: T20 180, T21 200, T22 180, T23 180
    Channels: Incoming-only none, Two-way 1-1024, Outgoing-only
none
  RESTARTs 0/0 CALLs 0+0/0+0/0+0 DIAGs 0/0
  LAPB DTE, state CONNECT, modulo 8, k 7, N1 12056, N2 20
    T1 3000, T2 0, interface outage (partial T3) 0, T4 0
    VS 3, VR 1, tx NR 1, Remote VR 3, Retransmissions 0
    Queues: U/S frames 0, I frames 0, unack. 0, reTx 0
    IFRAMES 27/17 RNRs 0/0 REJs 0/0 SABM/Es 0/1 FRMRs 0/0 DISCs
0/0
  Last input 00:01:05, output 00:00:49, output hang never
  Last clearing of "show interface" counters 00:01:41
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    45 packets input, 645 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    36 packets output, 3087 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out
    0 carrier transitions
    DCD=up DSR=up DTR=up RTS=up CTS=up
Central_1#
```

Note the encapsulation and the DTE/DCE designation.

1. In the above output, what is the LAPB state?

---

2. In the above output, what is the X.25 address of the interface?

---

On any of the three routers, use the **show x25 ?** command to see the available options.

```
Central_1#show x25 ?
context      Show X.25 state for one or more interfaces
hunt-group   Show X.25 hunt group(s)
interface    Show X.25, CMNS, or Annex-G VCs on one interface
map          Show x25 map table
profile      Show X.25 profile(s)
route        Show x25 routing table
services     Show X.25 services information (default)
vc           Show specific X.25/CMNS/ANNEXG virtual circuit(s)
xot          Show XOT (X.25-Over-TCP) VCs
|           Output modifiers
<cr>
pad          X25 pad connection status
remote-red   X25 REMOTE-RED table
Central_1#
```

Try the context option and compare the results to the show interfaces result. Try map, services and any others that interest you. Note that not all of the commands will display results, depending on which router you are using. The map option works on either end of the router but not the switch, for example.

On the Switch router, try the **show x25 route** command. This command shows nothing on the other two routers because they are not acting like an X.25 switch (x25 routing).

```
Switch#show x25 route
# Match          Substitute      Route to
1 dest 311082191234      serial 0/0
2 dest 311082194567      serial 0/1
Switch#
```