

## Lab – raw NETCONF

### Objectives

#### Part 1: Verify that NETCONF is Running on the IOS XE

### Background / Scenario

In this lab, you will learn how to verify that the NETCONF service is running on the device by directly connecting to its port using an SSH client. You will be sending raw NETCONF Remote Procedure Calls encoded in XML structures.

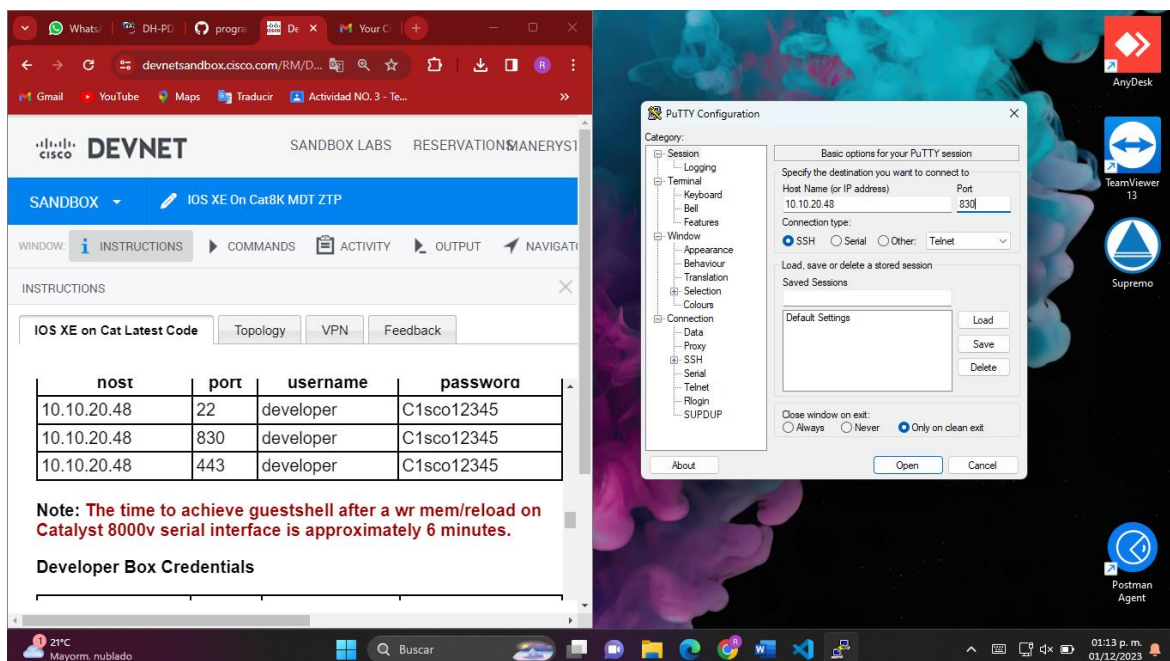
### Required Resources

- Access to a router with the IOS XE operating system version 16.6 or higher
- Putty

## Part 1: Verify that NETCONF is Running on the IOS XE

### Step 1: Use Putty as an SSH client to connect to the NETCONF service.

- Start Putty.
- Using Putty, connect to host “192.168.56.101” (Adjust the IP address to match the router’s current address.) and port “830”.
- Login as “cisco” with the password “cisco123!” that was configured in IOS XE VM.
- After a successful login to the NETCONF server, you should see a server “hello” message with an XML formatted list of supported YANG models (capabilities).
- The end of the message is identified with “]]>]]>”.



The screenshot shows a web browser window displaying the Cisco DevNet Sandbox Labs page. The page title is "DEVNET" and it includes a "SANDBOX LABS" section. Under "SANDBOX LABS", there is a link to "IOS XE On Cat8K MDT ZTP". Below this, there is a table with columns: "host", "port", "username", and "password".

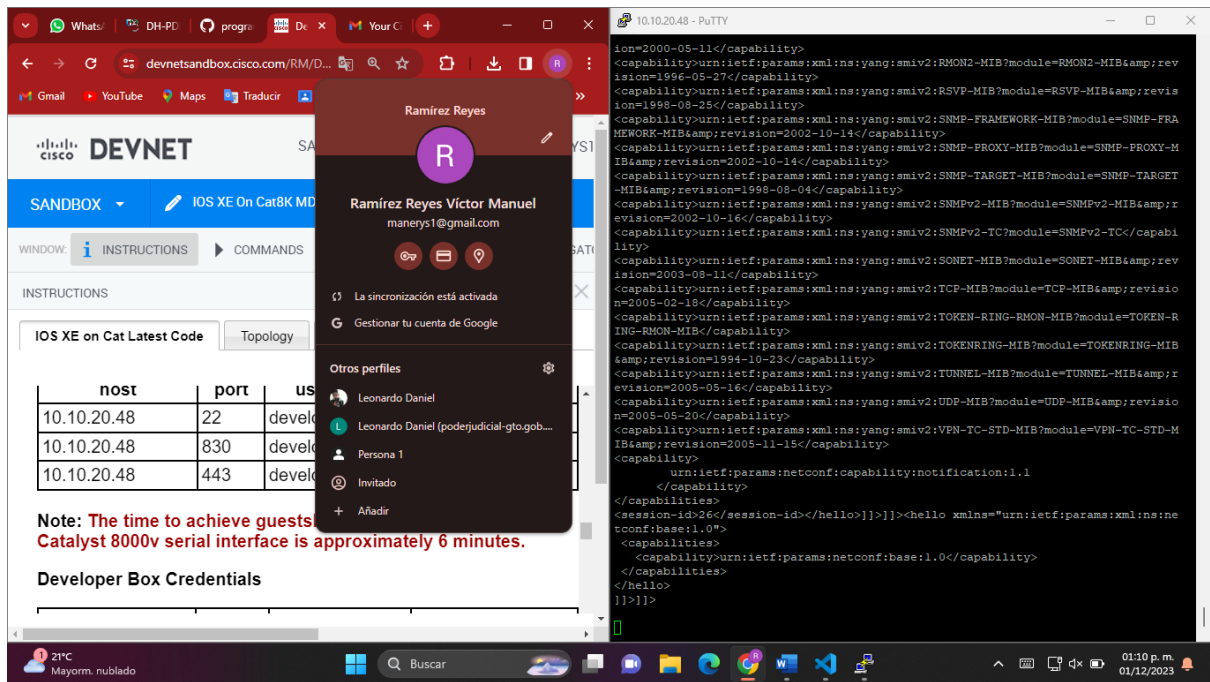
host	port	username	password
10.10.20.48	22	developer	C1sco12345
10.10.20.48	830	developer	C1sco12345
10.10.20.48	443	developer	C1sco12345

Below the table, there is a note: "Note: The time to achieve guestshell after a wr mem/reload on Catalyst 8000v serial interface is approximately 6 minutes." and a section titled "Developer Box Credentials".

Overlaid on the right side of the browser window is the "PuTTY Configuration" dialog box. The "Category" list on the left includes Session, Logging, Terminal, Keyboard, Bell, Features, Window, Appearance, Behaviour, Translation, Selection, Colours, Connection, Data, Proxy, SSH, Serial, Telnet, Rlogin, and SUPDUP. The "Basic options for your PuTTY session" section is active, showing "Host Name (or IP address)" as "10.10.20.48" and "Port" as "830". The "Connection type" is set to "SSH". The "Close window on exit" option is set to "Only on clean exit". The "Open" button is highlighted.

- f. To start a NETCONF session, the client needs to send its own hello message in a response:

```
<hello xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <capabilities>
    <capability>urn:ietf:params:netconf:base:1.0</capability>
  </capabilities>
</hello>
]]>]]>
```



- g. After the client hello message has been sent, the NETCONF session is ready to process RPC messages. For example, the following XML formatted RPC message will return the ietf-interfaces model data. Please note that the returned XML data are designed to be consumed by an application. By default, this data might be difficult to for humans to read.

```
<rpc message-id="103" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <get>
    <filter>
      <interfaces xmlns="urn:ietf:params:xml:ns:yang:ietf-interfaces"/>
    </filter>
  </get>
</rpc>
]]>]]>
```

The screenshot shows a web browser window with the Cisco DevNet Sandbox interface. The page title is "DEVNET" and the sub-header is "Sandbox". The main content area shows "IOS XE on Cat8K MD" and a table of configurations. A modal window for "Ramírez Reyes" is open, showing a profile card and a list of other profiles. In the background, a terminal window titled "10.10.20.48 - PuTTY" displays NETCONF XML messages. The messages show a successful configuration of a network device, including the creation of a management interface and the configuration of various network interfaces (Loopback, Ethernet, and Virtual Port Group).

host	port	user
10.10.20.48	22	devl
10.10.20.48	830	devl
10.10.20.48	443	devl

```
<rpc message-id="103" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <get>
    <filter>
      <interfaces xmlns="urn:ietf:params:xml:ns:yang:ietf-interfaces"/>
    </filter>
  </get>
</rpc>
]]>]]>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="103"><data>
  <interfaces xmlns="urn:ietf:params:xml:ns:yang:ietf-interfaces"><interface><name>GigabitEthernet1</name><description>MANAGEMENT INTERFACE - DON'T TOUCH ME</description><type><type><name>ianaift:ethernet</name><type><name>ianaift:ethernet</type><enabled>true</enabled><ipv4 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"><address><ip>10.10.20.48</ip><netmask>255.255.255.0</netmask></address></ipv4><ipv6 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"></ipv6></interface></interfaces><name>GigabitEthernet2</name><description>Network Interface</description><type><name>ianaift:ethernet</type><enabled>true</enabled><ipv4 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"><address><ip>10.10.20.48</ip><netmask>255.255.255.0</netmask></address></ipv4><ipv6 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"></ipv6></interface></interfaces><name>GigabitEthernet3</name><description>Network Interface</description><type><name>ianaift:ethernet</type><enabled>false</enabled><ipv4 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"><address><ip>10.10.20.48</ip><netmask>255.255.255.0</netmask></address></ipv4><ipv6 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"></ipv6></interface></interfaces><name>Loopback0</name><type><name>ianaift:software-loopback</type><enabled>true</enabled><ipv4 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"><address><ip>10.0.0.1</ip><netmask>255.255.255.0</netmask></address></ipv4><ipv6 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"></ipv6></interface></interfaces><name>Loopback10</name><type><name>ianaift:software-loopback</type><enabled>true</enabled><ipv4 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"><address><ip>10.0.0.1</ip><netmask>255.255.255.0</netmask></address></ipv4><ipv6 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"></ipv6></interface></interfaces><name>Loopback109</name><description>Configured by RESTCONF ga jadi</description><type><name>ianaift:software-loopback</type><enabled>true</enabled><ipv4 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"><address><ip>10.255.255.9</ip><netmask>255.255.255.0</netmask></address></ipv4><ipv6 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"></ipv6></interface></interfaces><name>VirtualPortGroup0</name><type><name>ianaift:virtual-port-group</type><enabled>true</enabled><ipv4 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"><address><ip>192.168.1.1</ip><netmask>255.255.255.0</netmask></address></ipv4><ipv6 xmlns="urn:ietf:params:xml:ns:yang:ietf-ip"></ipv6></interface></interfaces></data></rpc-reply>
]]>]]>
```

- h. To close the NETCONF session, the client needs to send the following message:

```
<rpc message-id="9999999" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <close-session />
</rpc>
]]>]]>
```