

Módulo 2

Nos conectamos al enrutador Sandbox IOS-XE mediante SSH

```
Instale la versión más reciente de PowerShell para obtener nuevas características y mejoras. https://aka.ms/PSWindows

PS C:\Users\fabio> ssh -oHostKeyAlgorithms=+ssh-dss admin@sandbox-iosxe-recomm-1.cisco.com -p 830 -s netconf
admin@sandbox-iosxe-recomm-1.cisco.com's password:
<?xml version="1.0" encoding="UTF-8"?>
<hello xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <capabilities>
    <capability>urn:ietf:params:netconf:base:1.0</capability>
    <capability>urn:ietf:params:netconf:base:1.1</capability>
    <capability>urn:ietf:params:netconf:capability:writable-running:1.0</capability>
    <capability>urn:ietf:params:netconf:capability:rollback-on-error:1.0</capability>
    <capability>urn:ietf:params:netconf:capability:validate:1.0</capability>
    <capability>urn:ietf:params:netconf:capability:validate:1.1</capability>
    <capability>urn:ietf:params:netconf:capability:xpath:1.0</capability>
    <capability>urn:ietf:params:netconf:capability:notification:1.0</capability>
    <capability>urn:ietf:params:netconf:capability:interleave:1.0</capability>
    <capability>urn:ietf:params:netconf:capability:with-defaults:1.0?basic-mode=explicit&also-supported=report-all-tagged,report-all</capability>
    <capability>urn:ietf:params:netconf:capability:with-operational-defaults:1.0?basic-mode=explicit&also-supported=report-all-tagged,report-all</capability>
  </capabilities>
  <capability>urn:ietf:params:netconf:capability:yang-library:1.0?revision=2019-01-04&module-set-id=d0c193376db61db7173cac445a2b66d5</capability>
  <capability>urn:ietf:params:netconf:capability:yang-library:1.1?revision=2019-01-04&content-id=d0c193376db61db7173cac445a2b66d5</capability>
  <capability>http://tail-f.com/ns/netconf/actions/1.0</capability>
  <capability>http://cisco.com/ns/cisco-xe-ietf-ip-deviation?module=cisco-xe-ietf-ip-deviation&revision=2016-08-10</capability>
  <capability>http://cisco.com/ns/cisco-xe-ietf-ipv4-unicast-routing-deviation?module=cisco-xe-ietf-ipv4-unicast-routing-deviation&revision=2015-09-11</capability>
  <capability>http://cisco.com/ns/cisco-xe-ietf-ipv6-unicast-routing-deviation?module=cisco-xe-ietf-ipv6-unicast-routing-deviation&revision=2015-09-11</capability>
  <capability>http://cisco.com/ns/cisco-xe-ietf-ospf-deviation?module=cisco-xe-ietf-ospf-deviation&revision=2018-02-09</capability>
  <capability>http://cisco.com/ns/cisco-xe-ietf-routing-deviation?module=cisco-xe-ietf-routing-deviation&revision=2016-07-09</capability>
  <capability>http://cisco.com/ns/cisco-xe-openconfig-acl-deviation?module=cisco-xe-openconfig-acl-deviation&revision=2017-08-25</capability>
  <capability>http://cisco.com/ns/cisco-xe-openconfig-aft-deviation?module=cisco-xe-openconfig-aft-deviation&revision=2018-12-05</capability>
  <capability>http://cisco.com/ns/cisco-xe-openconfig-isis-deviation?module=cisco-xe-openconfig-isis-deviation&revision=2018-12-05</capability>
  <capability>http://cisco.com/ns/cisco-xe-openconfig-ldp-deviation?module=cisco-xe-openconfig-ldp-deviation&revision=2018-07-25</capability>
  <capability>http://cisco.com/ns/cisco-xe-openconfig-mpls-deviation?module=cisco-xe-openconfig-mpls-deviation&revision=2019-06-27</capability>
  <capability>http://cisco.com/ns/cisco-xe-openconfig-segment-routing-deviation?module=cisco-xe-openconfig-segment-routing-deviation&revision=2018-12-05</capability>
  <capability>http://cisco.com/ns/mpls-static/devs?module=common-mpls-static-devs&revision=2015-09-11</capability>
  <capability>http://cisco.com/ns/nvo/devs?module=nvo-devs&revision=2015-09-11</capability>
  <capability>http://cisco.com/ns/yang/cisco-semver?module=cisco-semver&revision=2019-03-20</capability>
  <capability>http://cisco.com/ns/yang/cisco-smart-license?module=cisco-smart-license&revision=2021-03-01</capability>
</hello>
```

Creamos una conexión NETCONF, activa el dispositivo y al último finalizamos la sesión

```
<capability>urn:ietf:params:xml:ns:yang:smiv2:RFC-1215?module=RFC-1215</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:RFC1155-SMI?module=RFC1155-SMI</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:RFC1213-MIB?module=RFC1213-MIB</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:RFC1315-MIB?module=RFC1315-MIB</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:RMON-MIB?module=RMON-MIB&revision=2000-05-11</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:RMON2-MIB?module=RMON2-MIB&revision=1996-05-27</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:RSVP-MIB?module=RSVP-MIB&revision=1998-08-25</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:SNMP-FRAMEWORK-MIB?module=SNMP-FRAMEWORK-MIB&revision=2002-10-14</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:SNMP-PROXY-MIB?module=SNMP-PROXY-MIB&revision=2002-10-14</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:SNMP-TARGET-MIB?module=SNMP-TARGET-MIB&revision=1998-08-04</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:SNMPv2-MIB?module=SNMPv2-MIB&revision=2002-10-16</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:SNMPv2-TC?module=SNMPv2-TC</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:SONET-MIB?module=SONET-MIB&revision=2003-08-11</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:TCP-MIB?module=TCP-MIB&revision=2005-02-18</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:TOKEN-RING-RMON-MIB?module=TOKEN-RING-RMON-MIB</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:TOKENRING-MIB?module=TOKENRING-MIB&revision=1994-10-23</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:TUNNEL-MIB?module=TUNNEL-MIB&revision=2005-05-16</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:UDP-MIB?module=UDP-MIB&revision=2005-05-20</capability>
<capability>urn:ietf:params:xml:ns:yang:smiv2:VPN-TC-STD-MIB?module=VPN-TC-STD-MIB&revision=2005-11-15</capability>
<capability>
  urn:ietf:params:netconf:capability:notification:1.1
</capability>
</capabilities>
<session-id>481</session-id></hello>]]]><?xml version="1.0" encoding="UTF-8"?>
  <hello xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
    <capabilities>
      <capability>urn:ietf:params:netconf:base:1.0</capability>
    </capabilities>
  </hello>]]]>

<?xml version="1.0" encoding="UTF-8"?>
  <rpc message-id="1239123" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">

    <close-session />
  </rpc>
]]>]]><?xml version="1.0" encoding="UTF-8"?>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="1239123"><ok/></rpc-reply>]]>]]>
PS C:\Users\fabio>
```

Clonamos el repositorio de GitHub y nos despliega todos los directorios del repositorio

```
Microsoft Windows [Versión 10.0.26100.2314]
(c) Microsoft Corporation. Todos los derechos reservados.

C:\Users\fabio\OneDrive\sfunc\Documentos\Progresdes_2024\Unidad 3>git clone https://github.com/CiscoDevNet/dne-dna-code
Cloning into 'dne-dna-code'...
remote: Enumerating objects: 1619, done.
remote: Counting objects: 100% (91/91), done.
remote: Compressing objects: 100% (69/69), done.
remote: Total 1619 (delta 37), reused 58 (delta 20), pack-reused 1528 (from 1)
Receiving objects: 100% (1619/1619), 2.53 MiB | 2.85 MiB/s, done.
Resolving deltas: 100% (798/798), done.
```

Entramos a la carpeta

```
C:\Users\fabio\OneDrive\sfunc\Documentos\Progresdes_2024\Unidad 3>cd dne-dna-code/intro-mdp
```

Error al ejecutar el pip install -r requirements.txt

```
C:\Users\fabio\OneDrive\sfunc\Documentos\Progresdes_2024\Unidad 3\dne-dna-code\intro-mdp>pip
install -r requirements.txt
Collecting ciscosparkapi==0.9.2 (from -r requirements.txt (line 1))
  Using cached ciscosparkapi-0.9.2.tar.gz (45 kB)
  Installing build dependencies ... done
  Getting requirements to build wheel ... error
error: subprocess-exited-with-error

x Getting requirements to build wheel did not run successfully.
  exit code: 1
  [33 lines of output]
    C:\Users\fabio\AppData\Local\Temp\pip-install-eh0vgmtl\ciscosparkapi_f052d404397c450f
842579a2d802e682\versioneer.py:421: SyntaxWarning: invalid escape sequence '\s'
      LONG_VERSION_PY['git'] = ''
    Traceback (most recent call last):
      File "C:\Users\fabio\AppData\Local\Programs\Python\Python313\Lib\site-packages\pip\
_vendor\pyproject_hooks\_in_process\_in_process.py", line 353, in <module>
        main()
        ~~~~^
      File "C:\Users\fabio\AppData\Local\Programs\Python\Python313\Lib\site-packages\pip\
_vendor\pyproject_hooks\_in_process\_in_process.py", line 335, in main
        json_out['return_val'] = hook(**hook_input['kwargs'])
        ~~~~~^
      File "C:\Users\fabio\AppData\Local\Programs\Python\Python313\Lib\site-packages\pip\
_vendor\pyproject_hooks\_in_process\_in_process.py", line 118, in get_requires_for_build_w
heel
```

Instalamos la biblioteca de Python ncclient

```
C:\Users\fabio\OneDrive\sfunc\Documentos\Progresos_2024\Unidad 3\dne-dna-code\intro-mdp>pip
install ncclient
Collecting ncclient
  Downloading ncclient-0.6.16.tar.gz (112 kB)
  Installing build dependencies ... done
  Getting requirements to build wheel ... done
  Preparing metadata (pyproject.toml) ... done
Collecting setuptools>0.6 (from ncclient)
  Using cached setuptools-75.6.0-py3-none-any.whl.metadata (6.7 kB)
Collecting paramiko>=1.15.0 (from ncclient)
  Downloading paramiko-3.5.0-py3-none-any.whl.metadata (4.4 kB)
Collecting lxml>=3.3.0 (from ncclient)
  Downloading lxml-5.3.0-cp313-cp313-win_amd64.whl.metadata (3.9 kB)
Collecting six (from ncclient)
  Downloading six-1.16.0-py2.py3-none-any.whl.metadata (1.8 kB)
Collecting bcrypt>=3.2 (from paramiko>=1.15.0->ncclient)
  Downloading bcrypt-4.2.1-cp39-abi3-win_amd64.whl.metadata (10 kB)
Collecting cryptography>=3.3 (from paramiko>=1.15.0->ncclient)
  Downloading cryptography-43.0.3-cp39-abi3-win_amd64.whl.metadata (5.4 kB)
Collecting pynacl>=1.5 (from paramiko>=1.15.0->ncclient)
  Downloading PyNaCl-1.5.0-cp36-abi3-win_amd64.whl.metadata (8.7 kB)
Collecting cffi>=1.12 (from cryptography>=3.3->paramiko>=1.15.0->ncclient)
  Downloading cffi-1.17.1-cp313-cp313-win_amd64.whl.metadata (1.6 kB)
Collecting pycparser (from cffi>=1.12->cryptography>=3.3->paramiko>=1.15.0->ncclient)
  Downloading pycparser-2.22-py3-none-any.whl.metadata (943 bytes)
Downloading lxml-5.3.0-cp313-cp313-win_amd64.whl (3.8 MB)
  3.8/3.8 MB 12.9 MB/s eta 0:00:00
Downloading paramiko-3.5.0-py3-none-any.whl (227 kB)
Using cached setuptools-75.6.0-py3-none-any.whl (1.2 MB)
Downloading six-1.16.0-py2.py3-none-any.whl (11 kB)
Downloading bcrypt-4.2.1-cp39-abi3-win_amd64.whl (153 kB)
Downloading cryptography-43.0.3-cp39-abi3-win_amd64.whl (3.1 MB)
  3.1/3.1 MB 16.2 MB/s eta 0:00:00
Downloading PyNaCl-1.5.0-cp36-abi3-win_amd64.whl (212 kB)
Downloading cffi-1.17.1-cp313-cp313-win_amd64.whl (182 kB)
Downloading pycparser-2.22-py3-none-any.whl (117 kB)
Building wheels for collected packages: ncclient
  Building wheel for ncclient (pyproject.toml) ... done
  Created wheel for ncclient: filename=ncclient-0.6.16-py2.py3-none-any.whl size=90051 sha2
56=7f695aee70ce393a5ae0e8d6aad89b9bda174a9c5934d2790f285d494d5d865
```

Ingresamos a la carpeta de Netconf

```
C:\Users\fabio\OneDrive\sfunc\Documentos\Progresos_2024\Unidad 3\dne-dna-code\intro-mdp>cd
netconf
```

Abrimos un intérprete interactivo de Python y ejecutamos el archivo prep.py.

```
C:\Users\fabio\OneDrive\sfunc\Documentos\Progresdes_2024\Unidad 3\dne-dna-code\intro-mdp\netconf>python -i prep.py
```

Se imprime la lista con print(env_lab.IOS_XE_1)

```
>>> print(env_lab.IOS_XE_1)
{'host': 'sandbox-iosxe-recomm-1.cisco.com', 'username': 'developer', 'password': 'lastoran
gerestoreball8876', 'netconf_port': 830, 'restconf_port': 443, 'ssh_port': 22}
```

Importamos en el manager, sin embargo da un error y al parecer no la importa

```
>>> from ncclient import manager
Traceback (most recent call last):
  File "<python-input-1>", line 1, in <module>
    from ncclient import manager
  File "C:\Users\fabio\AppData\Local\Programs\Python\Python313\Lib\site-pack
ages\ncclient\manager.py", line 21, in <module>
    from ncclient import operations
  File "C:\Users\fabio\AppData\Local\Programs\Python\Python313\Lib\site-pack
ages\ncclient\operations\__init__.py", line 16, in <module>
    from ncclient.operations.rpc import RPC, RPCReply, RPCError, RaiseMode,
GenericRPC
  File "C:\Users\fabio\AppData\Local\Programs\Python\Python313\Lib\site-pack
ages\ncclient\operations\rpc.py", line 20, in <module>
    from ncclient.transport import SessionListener
  File "C:\Users\fabio\AppData\Local\Programs\Python\Python313\Lib\site-pack
ages\ncclient\transport\__init__.py", line 20, in <module>
    from ncclient.transport.unixSocket import UnixSocketSession
  File "C:\Users\fabio\AppData\Local\Programs\Python\Python313\Lib\site-pack
ages\ncclient\transport\unixSocket.py", line 18, in <module>
    from socket import AF_UNIX, SOCK_STREAM
ImportError: cannot import name 'AF_UNIX' from 'socket' (C:\Users\fabio\AppData\Local\Programs\Python\Python313\Lib\socket.py)
```

Intentamos abrir una conexión a IOS_XE_1 utilizando el objeto administrador, pero también nos sale un código de error

```
>>> m = manager.connect(
...     host=env_lab.IOS_XE_1["host"],
...     port=env_lab.IOS_XE_1["netconf_port"],
...     username=env_lab.IOS_XE_1["username"],
...     password=env_lab.IOS_XE_1["password"],
...     hostkey_verify=False
... )
Traceback (most recent call last):
  File "<python-input-2>", line 1, in <module>
    m = manager.connect(
        ^^^^^^^
NameError: name 'manager' is not defined
```