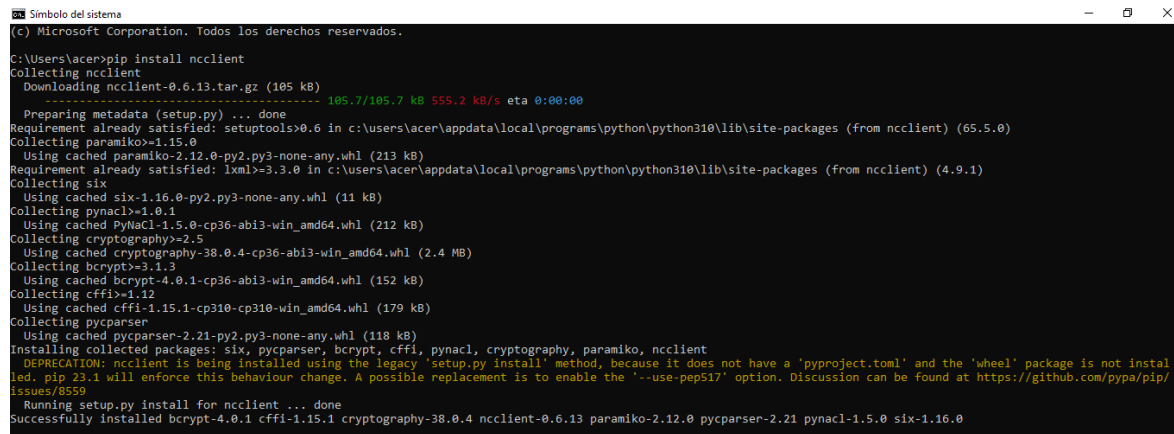


2.7 Lab - NETCONF wPython List Capabilities

Trabajar con NETCONF no requiere trabajar con mensajes RPC de NETCONF sin procesar y XML. En este laboratorio aprenderá a usar el módulo ncclient Python para interactuar fácilmente con dispositivos de red utilizando NETCONF. Aprenderá a identificar qué modelos YANG son compatibles con el dispositivo. Esta información es útil cuando se construye un sistema de automatización de red de producción, que requiere que los modelos YANG específicos sean compatibles con el dispositivo de red dado.

Instalar el módulo ncclient Python

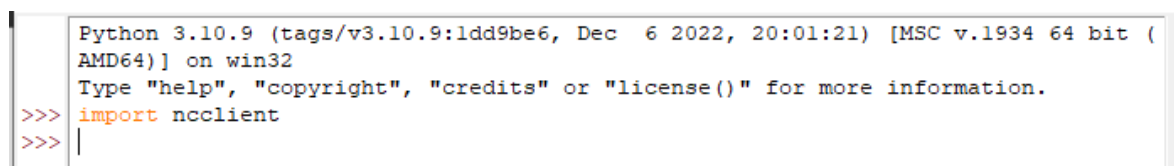
Utilice pip para instalar ncclient.



```
Símbolo del sistema
(c) Microsoft Corporation. Todos los derechos reservados.

C:\Users\acer>pip install ncclient
Collecting ncclient
  Downloading ncclient-0.6.13.tar.gz (105 kB)
    ----- 105.7/105.7 kB 555.2 kB/s eta 0:00:00
  Preparing metadata (setup.py) ... done
Requirement already satisfied: setuptools>0.6 in c:\users\acer\appdata\local\programs\python\python310\lib\site-packages (from ncclient) (65.5.0)
Collecting paramiko>=1.15.0
  Using cached paramiko-2.12.0-py2.py3-none-any.whl (213 kB)
Requirement already satisfied: lxml>=3.3.0 in c:\users\acer\appdata\local\programs\python\python310\lib\site-packages (from ncclient) (4.9.1)
Collecting six
  Using cached six-1.16.0-py2.py3-none-any.whl (11 kB)
Collecting pynacl>=1.0.1
  Using cached PyNaCl-1.5.0-cp36-abi3-win_amd64.whl (212 kB)
Collecting cryptography>=2.5
  Using cached cryptography-38.0.4-cp36-abi3-win_amd64.whl (2.4 MB)
Collecting bcrypt>=3.1.3
  Using cached bcrypt-4.0.1-cp36-abi3-win_amd64.whl (152 kB)
Collecting cffi>=1.12
  Using cached cffi-1.15.1-cp310-cp310-win_amd64.whl (179 kB)
Collecting pycparser
  Using cached pycparser-2.21-py2.py3-none-any.whl (118 kB)
Installing collected packages: six, pycparser, bcrypt, cffi, pynacl, cryptography, paramiko, ncclient
DEPRECATION: ncclient is being installed using the legacy 'setup.py install' method, because it does not have a 'pyproject.toml' and the 'wheel' package is not installed. pip 23.1 will enforce this behaviour change. A possible replacement is to enable the '--use-pep517' option. Discussion can be found at https://github.com/pypa/pip/issues/8559
Running setup.py install for ncclient ... done
Successfully installed bcrypt-4.0.1 cffi-1.15.1 cryptography-38.0.4 ncclient-0.6.13 paramiko-2.12.0 pycparser-2.21 pynacl-1.5.0 six-1.16.0
```

Compruebe que ncclient se ha instalado correctamente. Inicie Python IDLE y en el shell interactivo intente importar el módulo ncclient:



```
Python 3.10.9 (tags/v3.10.9:1dd9be6, Dec 6 2022, 20:01:21) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> import ncclient
>>> |
```

Conéctese al servicio NETCONF de IOS XE usando ncclient

```
*untitled*
File Edit Format Run Options Window Help
from ncclient import manager

m = manager.connect(
    host="10.10.20.48",
    port=830,
    username="developer",
    password="C1scol2345",
    hostkey_verify=False
)
```

Enviar comandos show y mostrar la salida

```
*untitled*
File Edit Format Run Options Window Help
from ncclient import manager

m = manager.connect(
    host="10.10.20.48",
    port=830,
    username="developer",
    password="C1scol2345",
    hostkey_verify=False
)

print("#Supported capabilities (YANG models):")
for capability in m.server_capabilities:
    print(capability)
```

```
IDLE Shell 3.10.9
File Edit Shell Debug Options Window Help
urn:ietf:params:netconf:capability:notification:1.1
>>>
===== RESTART: D:/Laboratorio/Lab 2.7.py =====
#Supported capabilities (YANG models):
urn:ietf:params:netconf:base:1.0
urn:ietf:params:netconf:base:1.1
urn:ietf:params:netconf:capability:writable-running:1.0
urn:ietf:params:netconf:capability:ssh:1.0
urn:ietf:params:netconf:capability:validate:1.0
urn:ietf:params:netconf:capability:validate:1.1
urn:ietf:params:netconf:capability:rollback-on-error:1.0
urn:ietf:params:netconf:capability:notification:1.0
urn:ietf:params:netconf:capability:interleave:1.0
urn:ietf:params:netconf:capability:with-defaults:1.0?basic-mode=explicit&also-supported=report-all-tagged
urn:ietf:params:netconf:capability:yang-library:1.0?revision=2016-06-21&module-set-id=7294e20b121b24ec71a8fb609b7d3afd
http://tail-f.com/ns/netconf/actions/1.0
http://tail-f.com/ns/netconf/extensions
http://cisco.com/ns/cisco-xe-ietf-ip-deviation?module=cisco-xe-ietf-ip-deviation&revision=2016-08-10
http://cisco.com/ns/cisco-xe-ietf-ip-v4-unicast-routing-deviation?module=cisco-xe-ietf-ip-v4-unicast-routing-deviation&revision=2015-09-11
http://cisco.com/ns/cisco-xe-ietf-ip-v6-unicast-routing-deviation?module=cisco-xe-ietf-ip-v6-unicast-routing-deviation&revision=2015-09-11
http://cisco.com/ns/cisco-xe-ietf-ospf-deviation?module=cisco-xe-ietf-ospf-deviation&revision=2018-02-09
http://cisco.com/ns/cisco-xe-ietf-routing-deviation?module=cisco-xe-ietf-routing-deviation&revision=2016-07-09
http://cisco.com/ns/cisco-xe-openconfig-acl-deviation?module=cisco-xe-openconfig-acl-deviation&revision=2017-08-25
http://cisco.com/ns/mpls-static/devs?module=common-mpls-static-devs&revision=2015-08-11
http://cisco.com/ns/nvo/devs?module=nvo-devs&revision=2015-09-11
http://cisco.com/ns/yang/Cisco-IOS-XE-aaa?module=Cisco-IOS-XE-aaa&revision=2018-12-07
http://cisco.com/ns/yang/Cisco-IOS-XE-aaa-oper?module=Cisco-IOS-XE-aaa-oper&revision=2018-04-16
http://cisco.com/ns/yang/Cisco-IOS-XE-acl?module=Cisco-IOS-XE-acl&revision=2018-11-15
http://cisco.com/ns/yang/Cisco-IOS-XE-acl-oper?module=Cisco-IOS-XE-acl-oper&revision=2017-02-07
http://cisco.com/ns/yang/Cisco-IOS-XE-arf?module=Cisco-IOS-XE-arf&revision=2018-06-28
http://cisco.com/ns/yang/Cisco-IOS-XE-arf-oper?module=Cisco-IOS-XE-arf-oper&revision=2017-12-13
http://cisco.com/ns/yang/Cisco-IOS-XE-bba-group?module=Cisco-IOS-XE-bba-group&revision=2017-02-07
http://cisco.com/ns/yang/Cisco-IOS-XE-bfd?module=Cisco-IOS-XE-bfd&revision=2018-10-10
http://cisco.com/ns/yang/Cisco-IOS-XE-bfd-oper?module=Cisco-IOS-XE-bfd-oper&revision=2017-09-10
http://cisco.com/ns/yang/Cisco-IOS-XE-bgp?module=Cisco-IOS-XE-bgp&revision=2019-01-09
http://cisco.com/ns/yang/Cisco-IOS-XE-bgp-common-oper?module=Cisco-IOS-XE-bgp-common-oper&revision=2017-02-07
http://cisco.com/ns/yang/Cisco-IOS-XE-bgp-oper?module=Cisco-IOS-XE-bgp-oper&revision=2017-09-25
http://cisco.com/ns/yang/Cisco-IOS-XE-bgp-route-oper?module=Cisco-IOS-XE-bgp-route-oper&revision=2017-09-25
http://cisco.com/ns/yang/Cisco-IOS-XE-bridge-domain?module=Cisco-IOS-XE-bridge-domain&revision=2017-02-07
http://cisco.com/ns/yang/Cisco-IOS-XE-call-home?module=Cisco-IOS-XE-call-home&revision=2018-10-11
```

ncclient es una librería Python para clientes NETCONF. Su objetivo es ofrecer una API intuitiva que mapee de forma sensible la naturaleza codificada en XML de NETCONF a construcciones y modismos de Python, y facilitar la escritura de scripts de gestión de red. Otras características clave son:

- Soporta todas las operaciones y capacidades definidas en RFC 6241.
- Canalización de peticiones.
- Peticiones RPC asíncronas.
- Mantener XML fuera del camino a menos que sea realmente necesario.
- Extensible. Se pueden añadir fácilmente nuevas asignaciones de transporte y capacidades/operaciones.