

Interaktif Program CML & Automation Build, Configuration, Backup Small Network

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Latar Belakang

Not secure | <https://10.10.20.161/api/v0/ui/>

Wifi Rumah -TL-... Mobile WiFi Monkeytype MSIB project mbak mel... w3schools figma My Website Bismillah-Startup Nonton Rampag...

Swagger
Supported by SMARTBEAR

/api/v0/openapi.json **Explore**

CML 2.2 APIs 2.2.0 OAS3

/api/v0/openapi.json

API definition for the CML network simulation platform.

[Additional documentation and contact information - Website](#)
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Servers

/api/v0 **Authorize**

Authentication Authentication API endpoints to acquire an Authentication token. The token must be conveyed as a HTTP header. The name of the header is **Authorization** and the content is **Bearer token-goes-here**

Users User related endpoints like creating or deleting users.

Groups Group related endpoints like creating or updating groups.

Labs Web services for the labs themselves, including creating new labs and getting the list of all labs.



- Program Interaktif CML



```
config.py - Untitled (Workspace) - Code - OSS
File Edit Selection View Go Run Terminal Help

EXPLORER
  UNTITLED (WORKSPACE)
    CML
      > __pycache__
      > ansible
      > NXAPI
      > RESTCONF
      > script-config
      > topology
      > automation.py
      > breakout-linux-x86_amd64
      > config.py
      > config.yaml
      > Interfaces.py
      > Labs.py
      > Links.py
      > manage_cml.py
      > Nodes.py
      > script-automation-lab.py
      > utilities.py
      > src

CML > config.py
1 import requests as req
2 import json
3 req.packages.urllib3.disable_warnings()
4
5 headers = {
6     'Accept': "application/json",
7     'Content-Type': "application/json"
8 }
9
10 url = "https://10.10.20.161/api/v0/authenticate"
11 data = json.dumps({
12     'username': 'developer',
13     'password': 'C1sco12345'
14 })
15 resp_token = req.post(url, headers=headers, data=data, verify=False)
16
17
18 HOST = "https://10.10.20.161"
19 BASE_URL = "{}api/v0".format(HOST)
20 token = resp_token.json()
21
22 headers = {
```



Inisialisasi base url api
GetToken JWT CML





- Program Interaktif CML



```
1 from utilities import *
2 import json
3 import yaml
4 import time
5
6 def showDetailLab(labs):
7     clear()
8     print("="*30)
9     print("no | \t\t\t details")
10    print("="*30)
11    for i in range(len(labs)):
12        print("{} ".format(str(i+1)), end="")
13        pp.pprint(labs[i])
14
15
16 def getLabs():
17     # get all id of labs
18     URL = url('/labs')
19     resp = req.get(URL, headers=headers, verify=False)
20
21     labs = []
22
```

showDetailLab()
getLabs()
getIdLab()
startLab()
stopLab()
createLab()
deleteLab()
getTopologyLab()





- Program Interaktif CML



```
Nodes.py - Untitled (Workspace) - Code - OSS

File Edit Selection View Go Run Terminal Help

EXPLORER
  CML
    > __pycache__
    > ansible
    > NXAPI
    > RESTCONF
    > script-config
    > topology
    automation.py
    breakout-linux-x86_amd64
    config.py
    ! config.yaml
    Interfaces.py
    Labs.py
    Links.py
    manage_cml.py
    Nodes.py
    script-automation-lab.py
    utilities.py
    src

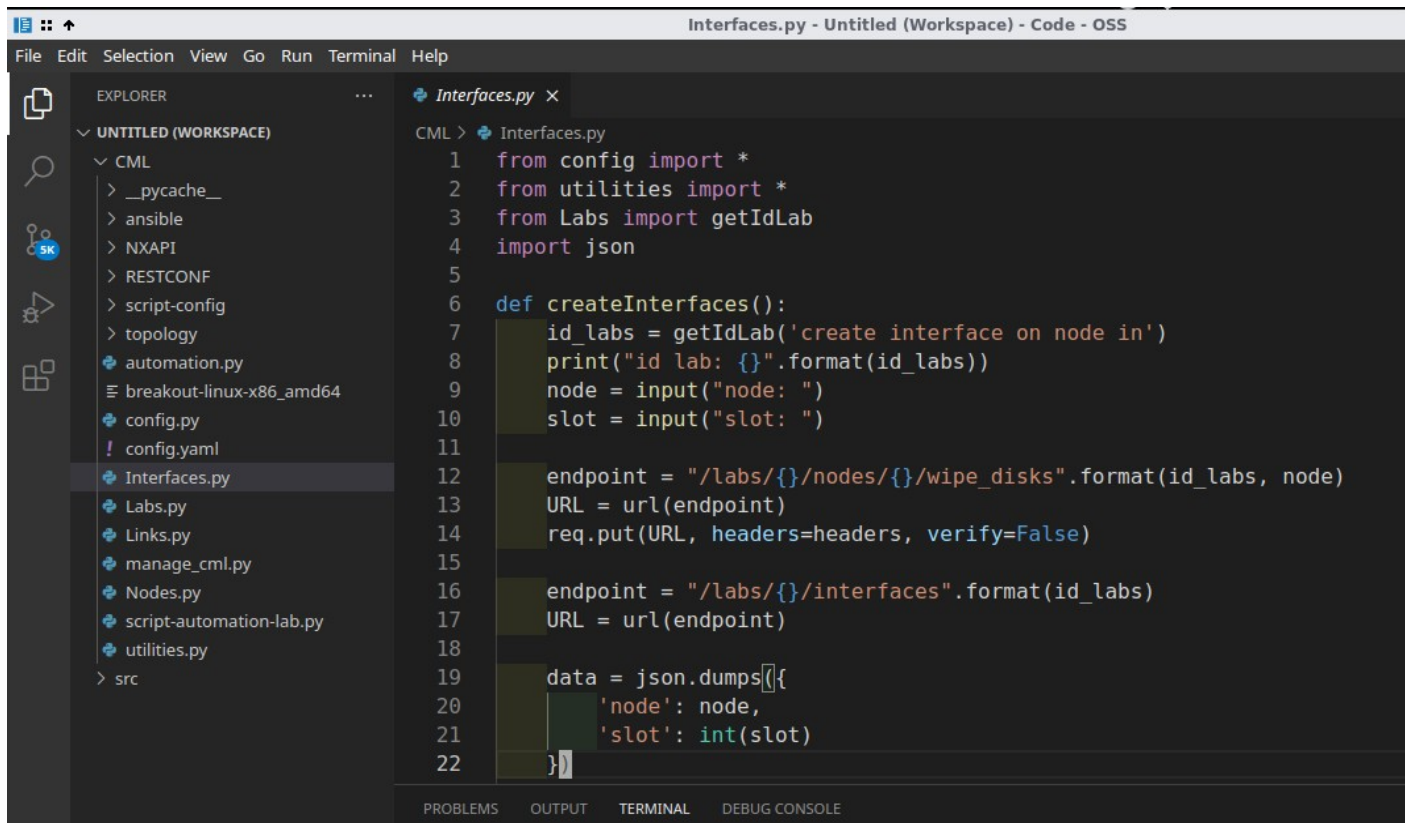
CML > Nodes.py
1 from config import *
2 from utilities import *
3 from Labs import getIdLab
4 import json
5
6 def createNode():
7     id_labs = getIdLab('create node in')
8     print("id lab: {}".format(id_labs))
9     endpoint = "/labs/{}/nodes".format(id_labs)
10    URL = url(endpoint)
11    x = input("x: ")
12    y = input("y: ")
13    label = input('label: ')
14    configuration = input('configuration: ')
15    node_definition = input("node_definition: ")
16    image_definition = input("image_definition: ")
17
18    data = json.dumps({
19        "x": int(x),
20        "y": int(y),
21        "label": label,
22        "configuration": configuration,
```

createNode()
updateConfigNodes()
deleteNode()





- Program Interaktif CML



```
Interfaces.py - Untitled (Workspace) - Code - OSS

File Edit Selection View Go Run Terminal Help

EXPLORER
  UNTITLED (WORKSPACE)
    CML
      > __pycache__
      > ansible
      > NXAPI
      > RESTCONF
      > script-config
      > topology
      automation.py
      breakout-linux-x86_amd64
      config.py
      ! config.yaml
      Interfaces.py
      Labs.py
      Links.py
      manage_cml.py
      Nodes.py
      script-automation-lab.py
      utilities.py
      > src

CML > Interfaces.py
1  from config import *
2  from utilities import *
3  from Labs import getIdLab
4  import json
5
6  def createInterfaces():
7      id_labs = getIdLab('create interface on node in')
8      print("id lab: {}".format(id_labs))
9      node = input("node: ")
10     slot = input("slot: ")
11
12     endpoint = "/labs/{}/nodes/{}/wipe_disks".format(id_labs, node)
13     URL = url(endpoint)
14     req.put(URL, headers=headers, verify=False)
15
16     endpoint = "/labs/{}/interfaces".format(id_labs)
17     URL = url(endpoint)
18
19     data = json.dumps({
20         'node': node,
21         'slot': int(slot)
22     })
```

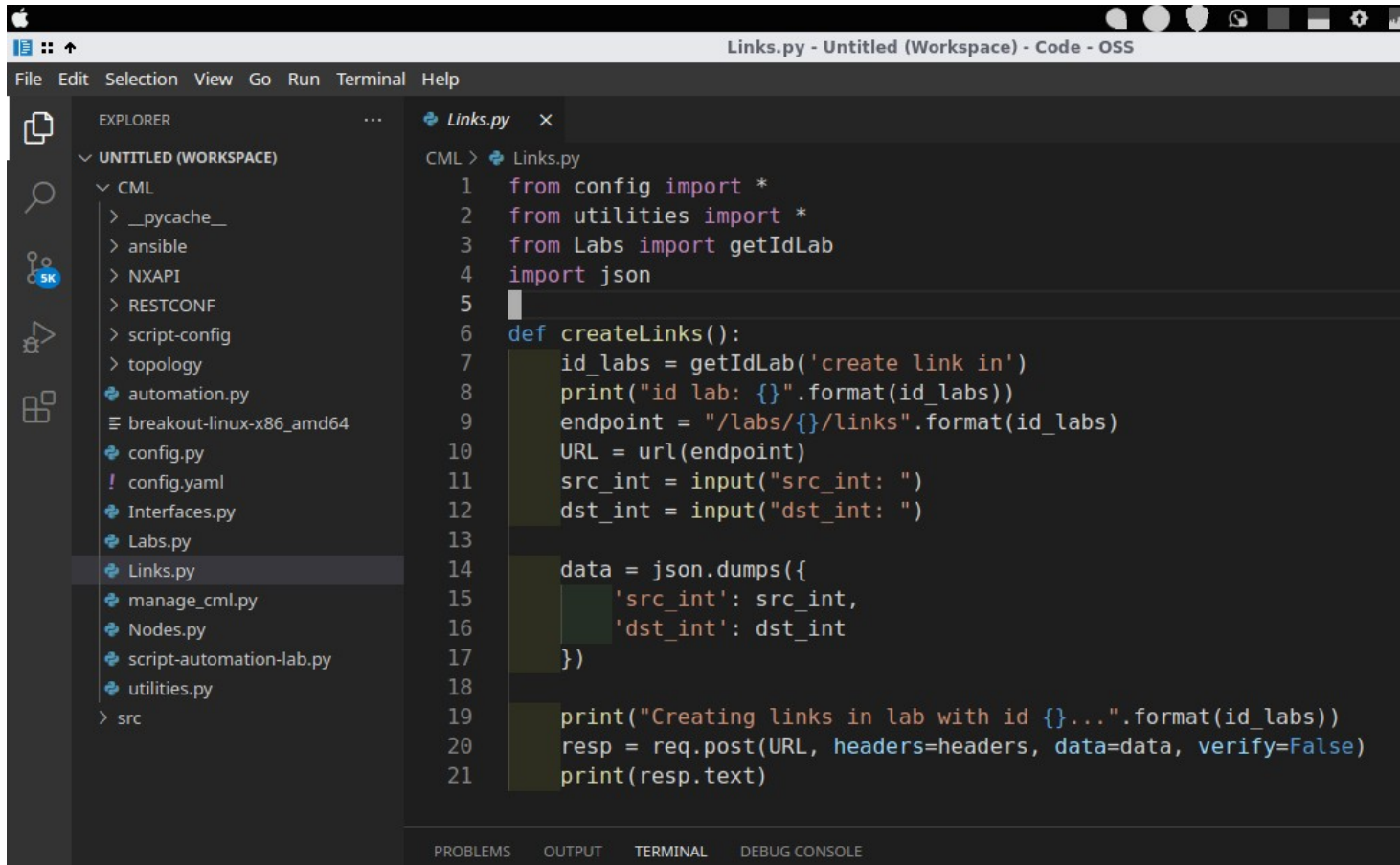


createInterfaces()





- Program Interaktif CML



```
Links.py - Untitled (Workspace) - Code - OSS

File Edit Selection View Go Run Terminal Help

EXPLORER
  UNTITLED (WORKSPACE)
    CML
      __pycache__
      ansible
      NXAPI
      RESTCONF
      script-config
      topology
      automation.py
      breakout-linux-x86_amd64
      config.py
      config.yaml
      Interfaces.py
      Labs.py
      Links.py
      manage_cml.py
      Nodes.py
      script-automation-lab.py
      utilities.py
      src

CML > Links.py
1  from config import *
2  from utilities import *
3  from Labs import getIdLab
4  import json
5
6  def createLinks():
7      id_labs = getIdLab('create link in')
8      print("id lab: {}".format(id_labs))
9      endpoint = "/labs/{}/links".format(id_labs)
10     URL = url(endpoint)
11     src_int = input("src_int: ")
12     dst_int = input("dst_int: ")
13
14     data = json.dumps({
15         'src_int': src_int,
16         'dst_int': dst_int
17     })
18
19     print("Creating links in lab with id {}".format(id_labs))
20     resp = req.post(URL, headers=headers, data=data, verify=False)
21     print(resp.text)
```



createLinks()





Program Interaktif CML



```
manage_cml.py - Untitled (Workspace)
File Edit Selection View Go Run Terminal Help

EXPLORER
  UNTITLED (WORKSPACE)
    CML
      __pycache__
      ansible
      NXAPI
      RESTCONF
      script-config
      topology
      automation.py
      breakout-linux-x86_amd64
      config.py
      config.yaml
      Interfaces.py
      Labs.py
      Links.py
      manage_cml.py
      Nodes.py
      script-automation-lab.py
      utilities.py
      src

CML > manage_cml.py
12
13 def main():
14     intro = ""
15     =====
16     Menu:
17     =====
18     0. exit
19     1. start lab
20     2. stop lab
21     3. create lab
22     4. delete lab
23     5. get topology lab
24
25     6. create node
26     7. delete node
27     8. update config node
28
29     9. create interfaces
30
31     10. create links
32     =====
33     ""
34     print(intro, end="")
```

```
manage_cml.py - Untitled (Workspace) - Code - OSS
File Edit Selection View Go Run Terminal Help

EXPLORER
  UNTITLED (WORKSPACE)
    CML
      __pycache__
      ansible
      NXAPI
      RESTCONF
      script-config
      topology
      automation.py
      breakout-linux-x86_amd64
      config.py
      config.yaml
      Interfaces.py
      Labs.py
      Links.py
      manage_cml.py
      Nodes.py
      script-automation-lab.py
      utilities.py
      src

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
=====
no | details
=====
1. { 'state': 'STOPPED',
    'created': '2021-07-27 12:49:04',
    'lab_title': 'Small NXOS/IOSXE Network',
    'lab_description': 'A sample network built with IOS XE, NX-OS, IOS XR, and '
    'ASA devices. Includes Linux hosts.',
    'owner': 'developer',
    'node_count': 8,
    'link_count': 16,
    'id': 'b4bb2d'}
2. { 'state': 'STARTED',
    'created': '2022-07-02 10:55:20',
    'lab_title': 'project lab',
    'lab_description': '',
    'owner': 'developer',
    'node_count': 8,
    'link_count': 9,
    'id': '8cf7ab'}

=====
Menu:
=====
0. exit
1. start lab
2. stop lab
3. create lab
4. delete lab
5. get topology lab

6. create node
7. delete node
8. update config node

9. create interfaces

10. create links
=====
choose (1-9) / 0 for exit: 
```




Program Interaktif CML



```
manage_cml.py - Untitled (Workspace)
File Edit Selection View Go Run Terminal Help

EXPLORER
  UNTITLED (WORKSPACE)
    CML
      __pycache__
      ansible
      NXAPI
      RESTCONF
      script-config
      topology
      automation.py
      breakout-linux-x86_amd64
      config.py
      config.yaml
      Interfaces.py
      Labs.py
      Links.py
      manage_cml.py
      Nodes.py
      script-automation-lab.py
      utilities.py
      src

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

'link_count': 16,
'id': 'b4bb2d'}
2. {
  'state': 'STARTED',
  'created': '2022-07-02 10:55:20',
  'lab_title': 'project_lab',
  'lab_description': '',
  'owner': 'developer',
  'node_count': 8,
  'link_count': 9,
  'id': '8cf7ab'}

=====
Menu:
=====
0. exit
1. start lab
2. stop lab
3. create lab
4. delete lab
5. get topology lab

6. create node
7. delete node
8. update config node

9. create interfaces

10. create links

=====
choose (1-9) / 0 for exit: 2
stop lab no : 5
only input lab no that show in screen!
stop lab no : 0
only input lab no that show in screen!
stop lab no : g
only input lab no that show in screen!
stop lab no : 2
Stopping Lab with id 8cf7ab ...
status: Success
```

```
manage_cml.py - Untitled (Workspace) - Code - OSS
File Edit Selection View Go Run Terminal Help

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

=====
no | details
=====
1. {
  'state': 'STOPPED',
  'created': '2021-07-27 12:49:04',
  'lab_title': 'Small NXOS/IOSXE Network',
  'lab_description': 'A sample network built with IOS XE, NX-OS, IOS XR, and '
                    'ASA devices. Includes Linux hosts.',
  'owner': 'developer',
  'node_count': 8,
  'link_count': 16,
  'id': 'b4bb2d'}
2. {
  'state': 'STOPPED',
  'created': '2022-07-02 10:55:20',
  'lab_title': 'project_lab',
  'lab_description': '',
  'owner': 'developer',
  'node_count': 8,
  'link_count': 9,
  'id': '8cf7ab'}

=====
Menu:
=====
0. exit
1. start lab
2. stop lab
```





- Program Interaktif CML



10. create links

choose (1-9) / 0 for exit: 3

lab title : testing presentasi

Creating Lab with title 'testing presentasi' ...

```
{
  "state": "DEFINED_ON_CORE",
  "created": "2022-07-03 01:00:56",
  "lab_title": "testing presentasi",
  "lab_description": "",
  "owner": "developer",
  "node_count": 0,
  "link_count": 0,
  "id": "76ed54"
}
```

PROBLEMS OUTPUT **TERMINAL** DEBUG CONSOLE

no | details

```
=====
1. { 'state': 'STOPPED',
    'created': '2021-07-27 12:49:04',
    'lab_title': 'Small NXOS/IOSXE Network',
    'lab_description': 'A sample network bui
                      ASA devices. Includ
    'owner': 'developer',
    'node_count': 8,
    'link_count': 16,
    'id': 'b4bb2d' }
2. { 'state': 'STOPPED',
    'created': '2022-07-02 10:55:20',
    'lab_title': 'project lab',
    'lab_description': '',
    'owner': 'developer',
    'node_count': 8,
    'link_count': 9,
    'id': '8cf7ab' }
3. { 'state': 'DEFINED ON CORE',
    'created': '2022-07-03 01:00:56',
    'lab_title': 'testing presentasi',
    'lab_description': '',
    'owner': 'developer',
    'node_count': 0,
    'link_count': 0,
    'id': '76ed54' }
```

Cisco Modeling Labs Dashboard

Search: [] Show List Show All

ADD IMPORT

Small NXOS/IOSXE Network project_lab testing presentasi

CPU 0.04% MEMORY 2.05% DISK 42.84% Server Disconnected





- Program Interaktif CML



9. create interfaces

10. create links

=====

choose (1-9) / 0 for exit: 6

create node in lab no : 3

id lab: 76ed54

x: 0

y: 0

label: R1

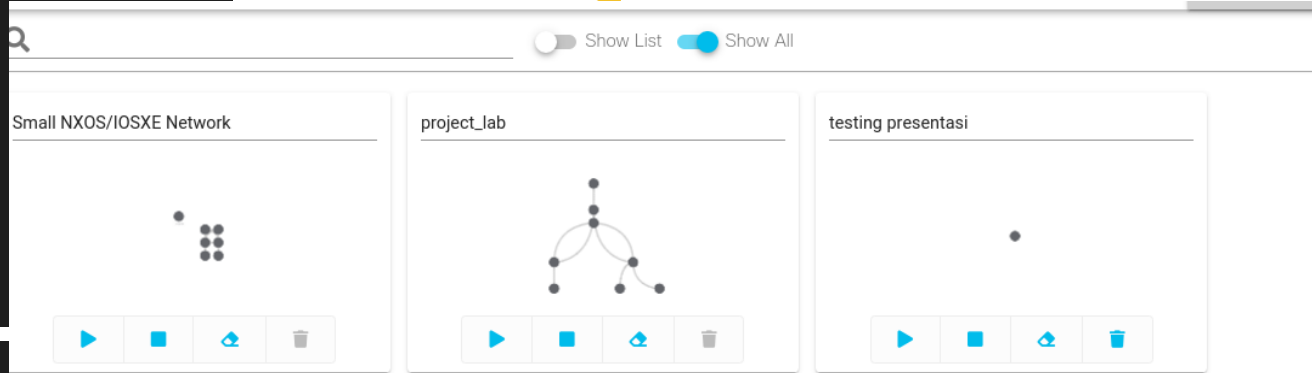
configuration:

node_definition: csr1000v

image_definition: csr1000v

Creating node in lab with id 76ed54...

```
{  
  "id": "n0"  
}
```



```
{  
  'link_count': 9,  
  'id': '8cf7ab'  
}  
3. {  
  'state': 'DEFINED ON CORE',  
  'created': '2022-07-03 01:00:56',  
  'lab_title': 'testing presentasi',  
  'lab_description': '',  
  'owner': 'developer',  
  'node_count': 1,  
  'link_count': 0,  
  'id': '76ed54'  
}
```

=====

Menu:





- Program Interaktif CML

```
10. create links
```

```
=====
```

```
choose (1-9) / 0 for exit: 9
```

```
create interface on node in lab no : 3
```

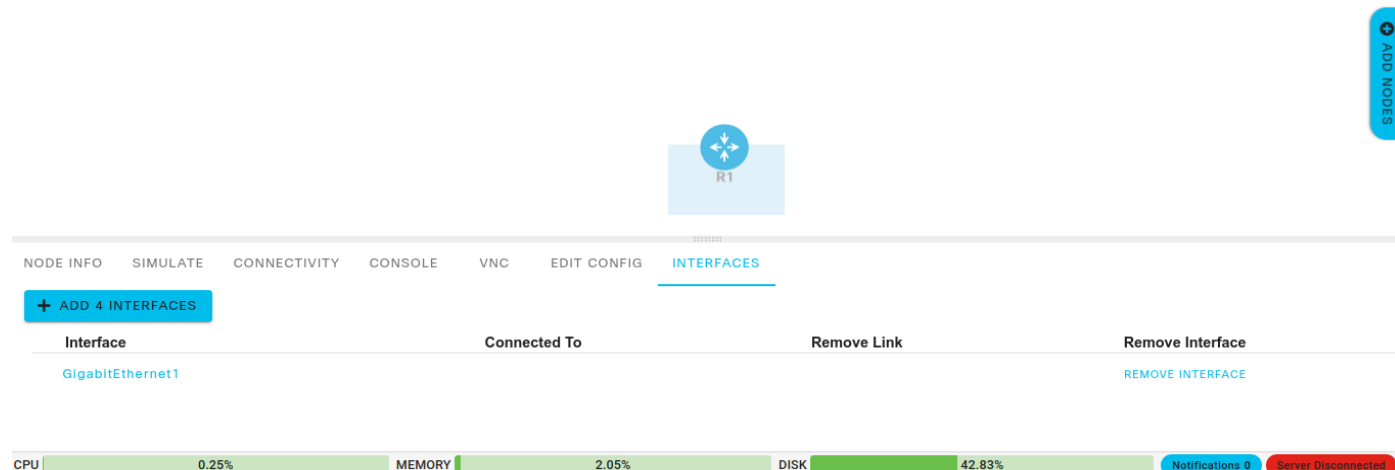
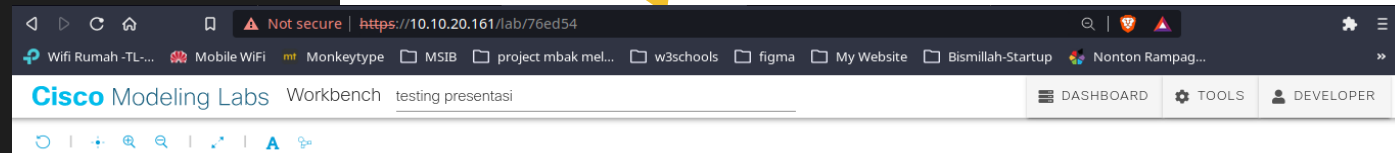
```
id lab: 76ed54
```

```
node: n0
```

```
slot: 0
```

```
Creating interface on node n0 in lab with id 76ed54...
```

```
[  
  {  
    "id": "i1",  
    "label": "GigabitEthernet1",  
    "slot": 0  
  }  
]
```

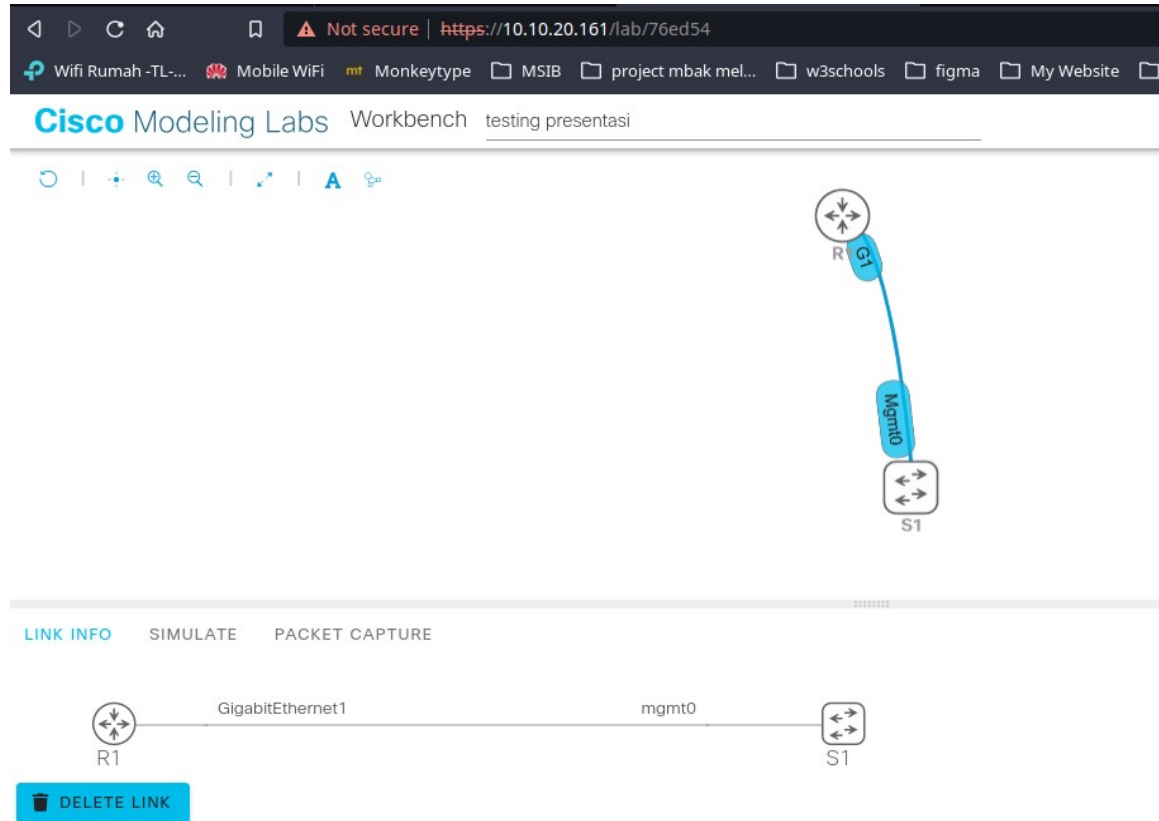




- Program Interaktif CML



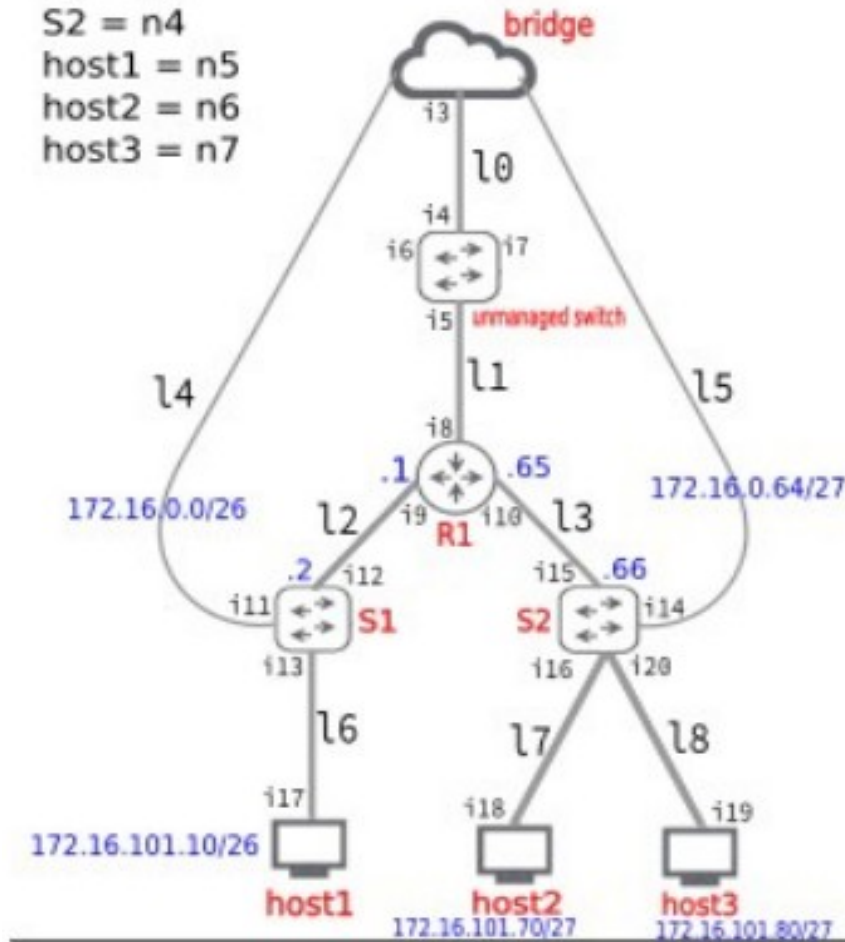
```
10. create links
=====
choose (1-9) / 0 for exit: 10
create link in lab no : 3
id lab: 76ed54
src_int: i1
dst_int: i3
Creating links in lab with id 76ed54...
{
  "id": "l0"
}
```





Design Small Network

bridge = n0
unmanaged switch = n1
R1 = n2
S1 = n3
S2 = n4
host1 = n5
host2 = n6
host3 = n7





- Module Automation



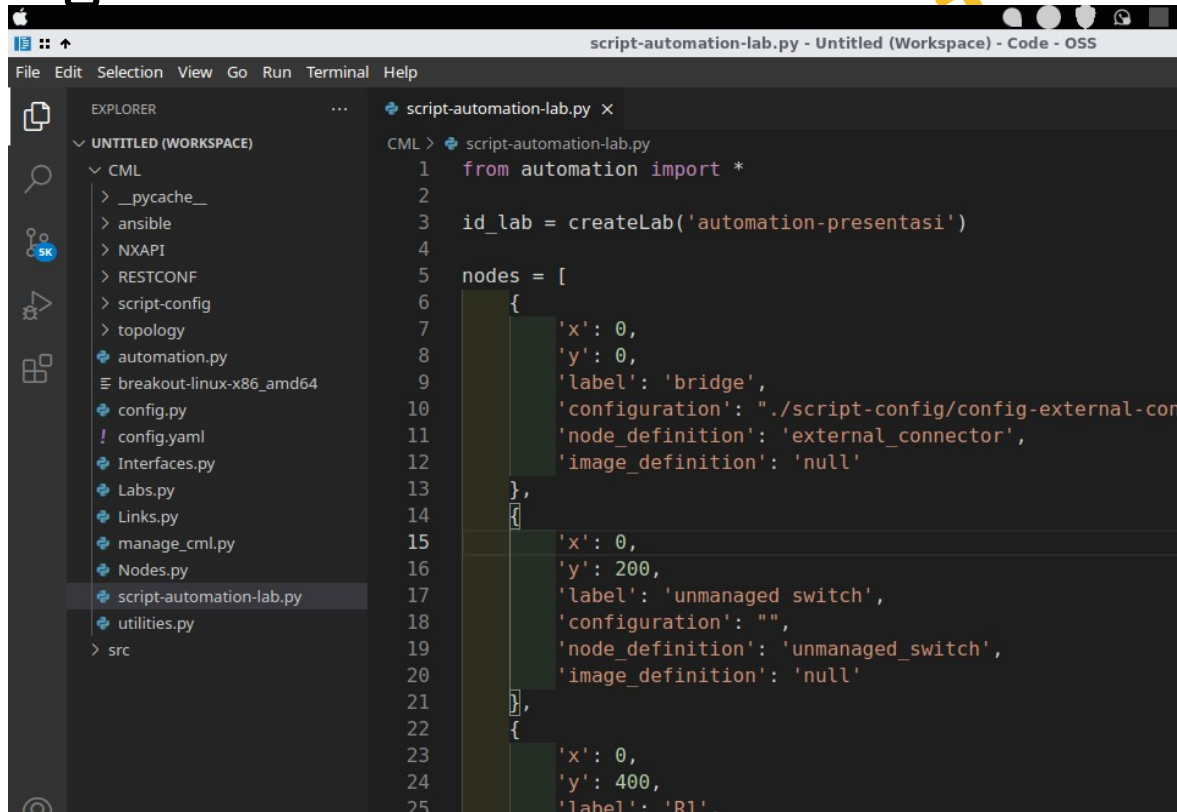
The screenshot shows a code editor window titled "automation.py - Untitled (Workspace) - Code - OSS". The editor has a menu bar with "File", "Edit", "Selection", "View", "Go", "Run", "Terminal", and "Help". The left sidebar shows the "EXPLORER" view with a tree structure of files and folders. The main editor area displays the code for "automation.py".

```
CML > automation.py
1  from config import *
2  from utilities import *
3  import json
4  import yaml
5  import time
6
7  # LABS
8  def createLab(getTitle: str):
9      title = getTitle
10
11      endpoint = "/labs?title={}".format(title)
12      URL = url(endpoint)
13      print("Creating Lab with title '{}' ...".format(title))
14      resp = req.post(URL, headers=headers, verify=False)
15      idlab = resp.json()
16      return idlab['id']
17
18
19 # NODES
20 def createNode(getId, data):
21     id_labs = getId
22     print("id lab: {}".format(id_labs))
23     endpoint = "/labs/{}/nodes".format(id_labs)
24     URL = url(endpoint)
25
```

createLab()
createNode()
updateConfigNodes()
createInterfaces()
createLinks()



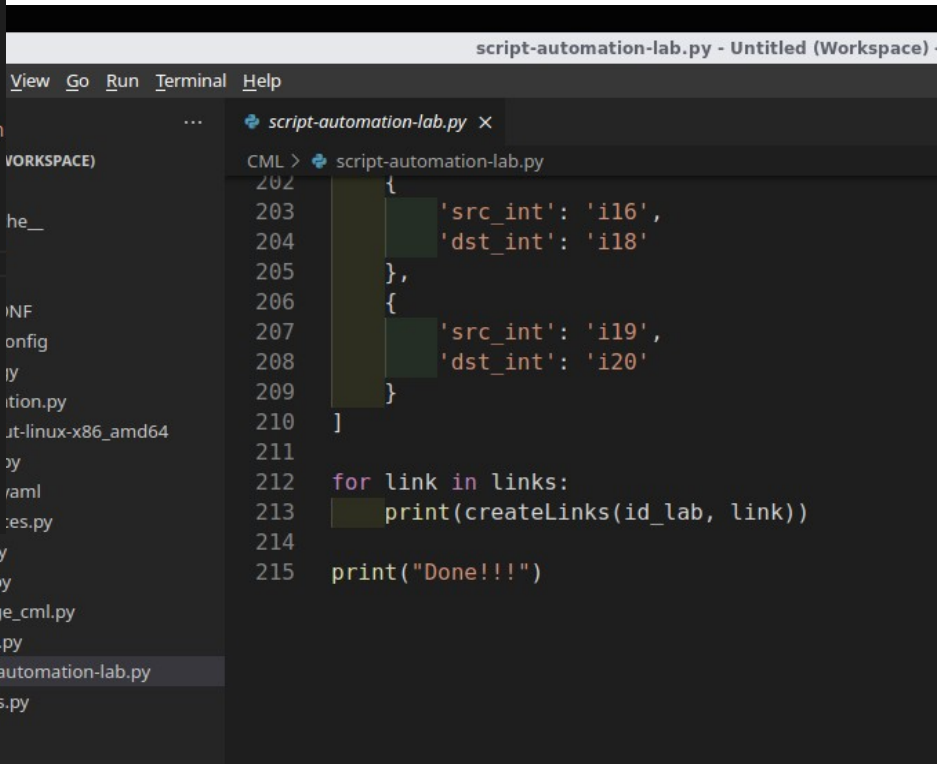
- Script Automation Build



```
script-automation-lab.py - Untitled (Workspace) - Code - OSS
File Edit Selection View Go Run Terminal Help

EXPLORER
  UNTITLED (WORKSPACE)
    CML
      __pycache__
      > ansible
      > NXAPI
      > RESTCONF
      > script-config
      > topology
      automation.py
      breakout-linux-x86_amd64
      config.py
      config.yaml
      Interfaces.py
      Labs.py
      Links.py
      manage_cml.py
      Nodes.py
      script-automation-lab.py
      utilities.py
      > src

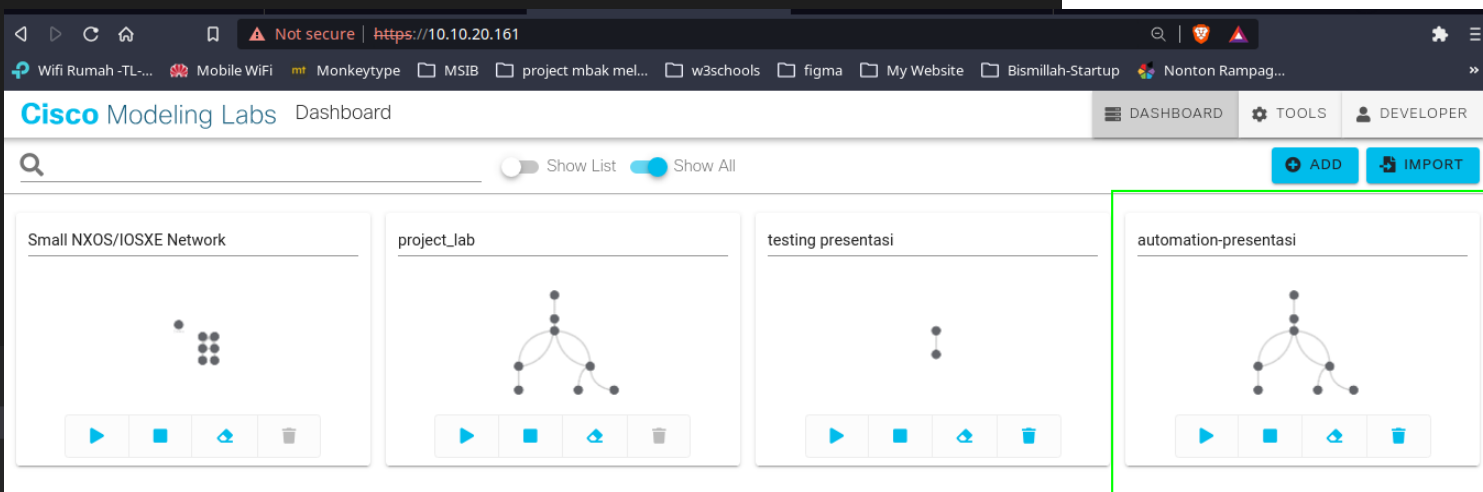
CML > script-automation-lab.py
1  from automation import *
2
3  id_lab = createLab('automation-presentasi')
4
5  nodes = [
6      {
7          'x': 0,
8          'y': 0,
9          'label': 'bridge',
10         'configuration': './script-config/config-external-con
11         'node_definition': 'external_connector',
12         'image_definition': 'null'
13     },
14     {
15         'x': 0,
16         'y': 200,
17         'label': 'unmanaged switch',
18         'configuration': '',
19         'node_definition': 'unmanaged_switch',
20         'image_definition': 'null'
21     },
22     {
23         'x': 0,
24         'y': 400,
25         'label': 'R1'
```



```
script-automation-lab.py - Untitled (Workspace)
View Go Run Terminal Help

script-automation-lab.py x
CML > script-automation-lab.py
202     {
203         'src_int': 'i16',
204         'dst_int': 'i18'
205     },
206     {
207         'src_int': 'i19',
208         'dst_int': 'i20'
209     }
210 ]
211
212 for link in links:
213     print(createLinks(id_lab, link))
214
215 print("Done!!!")

EXPLORER
  WORKSPACE
    Labs.py
    Links.py
    manage_cml.py
    Nodes.py
    script-automation-lab.py
    utilities.py
    > src
```



> OUTLINE

> TIMELINE

```
main*  ↺  ⊗ 0 △ 0  -- INSERT --
```

```

{
  "id": "l7"
}
id lab: 7cale4
Creating links in lab with id 7cale4...
{
  "id": "l8"
}
Done!!!
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Do

```



Configuration



```
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_project/finalProject/src/CML $ ./breakout-linux
-x86 amd64 ui
Starting up...
W0703 12:28:18.868226 7877 run.go:238] open labs.yaml: no such file or directory
Running... Serving UI/API on http://[::1]:8080, Ctrl-C to stop.
```



10. create links

```
=====
choose (1-9) / 0 for exit: 1
start lab no : 4
Starting Lab with id 7cale4 ...
status: Success
```

Cisco Modeling Labs Workbench automation-presentasi

DASHBOARD TOOLS DEVELOPER

LAB INFO PERMISSIONS SIMULATE **NODES** DESIGN LOGS LAB NOTES

START STOP EXTRACT CONFIGS WIPE DELETE

Node	State	Uptime	CPU
BRIDGE	BOOTED	00:00:00	0.00%
UNMANAGED SWITCH	BOOTED	00:00:00	0.00%
R1	BOOTED	00:00:00	0.00%
S1	BOOTED	00:00:00	0.00%
S2	BOOTED	00:00:00	0.00%
HOST1	BOOTED	00:00:00	0.00%
HOST2	BOOTED	00:00:00	0.00%
HOST3	BOOTED	00:00:00	0.00%

Rows per page: 10 1-8 of 8

CPU 27.44% MEMORY 52.66% DISK 53.51% Notifications 0 Server Disconnected

DevNet Sandbox - Sorry Dashboard :: CML² Swagger UI

http://localhost:8080/#/

WiFi Monkeytype MSIB project mbak mel... w3schools figma

Breakout UI

Labs

All Labs

Type to search

ID

Title

Description

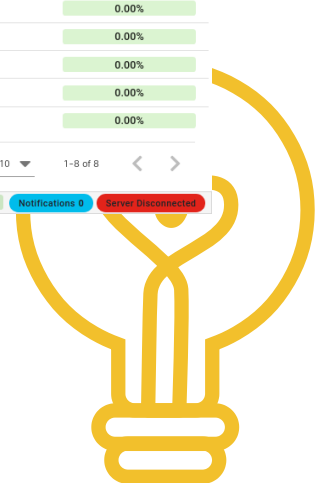
Status

7ca1e4

automation-presentasi

Off On

For more information visit the CML² website.



- Configuration



```
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network
elnet localhost 9000
Trying ::1...
Connected to localhost.
Escape character is '^['.
```

```
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_project/finalProject/src/CML $ s
```

```
sh admin@10.10.20.200
```

```
The authenticity of host '10.10.20.200 (10.10.20.200)' can't be established.
```

```
RSA key fingerprint is SHA256:MWjFlCqjKPbcst1BQeJkSh0qnAJ2mXnIdNragIgqtiQ.
```

```
This key is not known by any other names
```

```
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
```

```
Warning: Permanently added '10.10.20.200' (RSA) to the list of known hosts.
```

```
(admin@10.10.20.200) Password:
```

```
R1#
```

≡ config-host1.txt	8	
≡ config-host2.txt	9	enable secret Admin12345
≡ config-host3.txt	10	
≡ config-R1.txt	11	no ip domain lookup
≡ config-S1.txt	12	ip domain name admin.info
≡ config-S2.txt	13	username admin privilege 15 secret Admin1
> topology	14	crypto key generate rsa general-keys modu
⚡ automation.py	15	ip ssh version 2
≡ breakout-linux-x86_amd64	16	
⚡ config.py	17	int GigabitEthernet1
! config.yaml	18	no ip dhcp client client-id

```
Router>
Router>
Router>
Router>
Router>
Router>
Router>
Router>
Router>
```

New Terminal Ctrl+Shift+`

Split Terminal Ctrl+Shift+5

Copy Ctrl+Shift+C

Paste Ctrl+Shift+V

Select All

```
R1(config-line)#transport input ssh
R1(config-line)#exit
R1(config)#
R1(config)#ip route vrf Mgmt-intf 0.0.0.0 0.0.0.0 10.10.20.254
R1(config)#restconf
R1(config)#end
R1#copy run start
*Jul 3 05:38:26.119: %CRYPTO_ENGINE-5-KEY_ADDITION: A key named
crypto-engine
*Jul 3 05:38:26.579: %SYS-5-CONFIG I: Configured from console by
Destination filename [startup-config]?
*Jul 3 05:38:27.618: %PSD_MOD-5-DMI_NOTIFY_RESTCONF_START: R0/0:
to start
Building configuration...
[OK]
R1#
```

- Configuration



```
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_pi
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_pi
telnet localhost 9002
Trying ::1...
Connected to localhost.
Escape character is '^['.
```

```
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_project/finalProject/src/CML $ ssh admin@10.10.20.201
The authenticity of host '10.10.20.201 (10.10.20.201)' can't be established.
RSA key fingerprint is SHA256:ZiPbDJsxE04f80hX2KW5w59FnGXZPeucI7ha+EJHHVY.
User login: This key is not known by any other names
User login: Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.10.20.201' (RSA) to the list of known hosts.
Password:
User Access Verification
Cisco NX- (admin@10.10.20.201) Password:
```

```
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```

```
> ansible 3
> NXAPI 4 feature interface-vlan
> RESTCONF 5 feat
> script-config 6 feat
  config-external-connector.txt 7
  config-host1.txt
  config-host2.txt
  config-host3.txt
  config-R1.txt
  config-S1.txt
  config-S2.txt
```

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```

New Terminal Ctrl+Shift+'
Split Terminal Ctrl+Shift+5
Copy Ctrl+Shift+C
Paste Ctrl+Shift+V

```
S1(config)# end
S1#
S1# copy run start
[#####] 100%
Copy complete, now saving to disk (please wait)...
Copy complete.
S1#
```


- Configuration



```
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability
elnet localhost 9004
Trying ::1...
Connected to localhost.
Escape character is '^]'.
```

User Access Verification

```
login: cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_project/finalProject/src/CML $ ssh admin@10.10.20.282
User Access Verification
The authenticity of host '10.10.20.202 (10.10.20.202)' can't be established.
RSA key fingerprint is SHA256:i9pJ3EPfMPRgx02zma0Tyf2Gk8yvVx7orFu4wY4KWPm.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.10.20.202' (RSA) to the list of known hosts.
```

```
> User Access Verification
> (admin@10.10.20.202) Password:
```

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```

```
≡ config-host3.txt
≡ config-R1.txt
≡ config-S1.txt
≡ config-S2.txt
> topology
+ automation.py
≡ breakout-linux-x86_amd64
! config.yaml
+ Interfaces.py
+ Labs.py
+ Links.py
```

Change All Occurrences Ctrl+F2

Cut Ctrl+X

Copy Ctrl+C

Paste Ctrl+V

Command Palette... Ctrl+Shift+P

```
≡ config-S1.txt
≡ config-S2.txt
> topology
+ automation.py
≡ breakout-linux-x86_amd64
+ config.py
! config.yaml
+ Interfaces.py
+ Labs.py
+ Links.py
+ manage_cml.py
+ Nodes.py
```

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New Terminal Ctrl+Shift+T

Split Terminal Ctrl+Shift+S

Copy Ctrl+Shift+C

Paste Ctrl+Shift+V

```
S2#
S2# copy run start
[#####] 100%
Copy complete, now saving to disk (please wait)...
Copy complete.
S2#
```





Configuration



```
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_project/finalProject/src/CML $ p
ython3 RESTCONF/config.py
<Response [204]>
<Response [204]>
save {
  "cisco-ia:output": {
    "result": "Save running-config successful"
  }
}
```

cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_project/finalProject/src/CML \$

```
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_project/finalProject/src/CML $ p
ython3 NXAPI/config.py
[{'code': '200', 'msg': 'Success', 'body': {}}, {'code': '200', 'msg': 'Success', 'body': {}}]
[{'code': '200', 'msg': 'Success', 'body': {}}, {'code': '200', 'msg': 'Success', 'body': {}}, {'code': '200', 'ms
g': 'Success', 'body': {}}, {'code': '200', 'msg': 'Success', 'body': {}}, {'code': '200', 'msg': 'Success', 'body
... 6223
```

```
##### ] 96%\n[##### ] 97%\n[##### ] 98%\n[##### ] 100%\nCopy complete, now saving to disk (plea
se wait)...\nCopy complete.\n', 'code': '200', 'msg': 'Success'}
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_project/finalProject/src/CML $
```





- Configuration

```
R1#show run | s
interface GigabitEthernet1/0/24
description interface GigabitEthernet1/0/24
vrf forwarding Vlan101
ip address 10.10.10.1/24
negotiation auto
no mop enabled
no mop sysid
interface GigabitEthernet1/0/25
description Connected to R2
ip address 172.16.0.2/24
negotiation auto
no mop enabled
no mop sysid
interface GigabitEthernet1/0/26
description Connected to R3
ip address 172.16.0.65/24
negotiation auto
no mop enabled
no mop sysid
R1#
```

```
S1# show run | section interface
feature interface-vlan
interface Vlan1
interface Vlan101
description config by NXAPI prod
```

```
S2# show run | section interface
feature interface-vlan
interface Vlan1
interface Vlan101
description config by NXAPI prod
no shutdown
no ip redirects
ip address 172.16.101.66/27
interface Ethernet1/1
description config by NXAPI connect to R2
ip address 172.16.0.66/27
no shutdown
interface Ethernet1/2
description config by NXAPI connect to host
switchport
switchport access vlan 101
spanning-tree port type edge
no shutdown
interface Ethernet1/3
description config by NXAPI connect to host
switchport
switchport access vlan 101
spanning-tree port type edge
```



- Configuration



```
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_project/finalProject/src/CML $ t
elnet localhost 9006
Trying ::1...
Connected to localhost.
Escape character is '^]'.
```

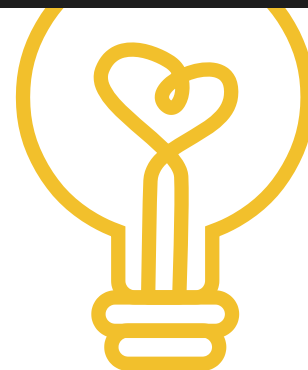
```
Welcome to Alpine Linux 3.13
Kernel 5.10.16-0-virt on an x86_64 (/dev/ttyS0)
```

```
host1 login:
Welcome to Alpine Linux 3.13
Kernel 5.10.16-0-virt on an x86_64 (/dev/ttyS0)
```

```
host1 login: host1
Password:
Welcome to Alpine!
```

```
host1:~$ ping 172.16.101.2
PING 172.16.101.2 (172.16.101.2): 56 data bytes
64 bytes from 172.16.101.2: seq=1 ttl=42 time=2.791 ms
64 bytes from 172.16.101.2: seq=2 ttl=42 time=1.895 ms
64 bytes from 172.16.101.2: seq=3 ttl=42 time=1.741 ms
64 bytes from 172.16.101.2: seq=4 ttl=42 time=1.753 ms
64 bytes from 172.16.101.2: seq=5 ttl=42 time=1.870 ms
64 bytes from 172.16.101.2: seq=6 ttl=42 time=1.549 ms
64 bytes from 172.16.101.2: seq=7 ttl=42 time=1.854 ms
^C
--- 172.16.101.2 ping statistics ---
8 packets transmitted, 7 packets received, 12% packet loss
round-trip min/avg/max = 1.549/1.921/2.791 ms
host1:~$
```

```
host1:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 52:54:00:04:06:BE
          inet addr:172.16.101.10  Bcast:172.16.101.63  Mask:255.255.255.192
          inet6 addr: fe80::5054:ff:fe04:6be/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
```





Configuration



PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_project/finalProject/src/CML $ telnet localhost 9007
Trying ::1...
Connected to localhost.
Escape character is '^['.
```

```
Welcome to Alpine Linux 3.13
Kernel 5.10.16-0-virt on an x86_64 (/dev/ttyS0)
```

```
host2 login:
Welcome to Alpine Linux 3.13
Kernel 5.10.16-0-virt on an x86_64 (/dev/ttyS0)
```

```
host2 login: host2
Password:
Welcome to Alpine!
```

```
host2:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 52:54:00:18:5E:E3
          inet addr:172.16.101.70  Bcast:172.16.101.95  Mask:255.255.255.224
          inet6 addr: fe80::5054:ff:fe18:5ee3/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:257 errors:0 dropped:0 overruns:0 frame:0
          TX packets:631 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:87330 (85.2 KiB)  TX bytes:211546 (206.5 KiB)
```

```
host3:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 52:54:00:05:2A:E5
          inet addr:172.16.101.80  Bcast:172.16.101.95  Mask:255.255.255.224
          inet6 addr: fe80::5054:ff:fe05:2ae5/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
```

```
host2:~$ ping 172.16.101.80
PING 172.16.101.80 (172.16.101.80): 56 data bytes
64 bytes from 172.16.101.80: seq=0 ttl=42 time=2.675 ms
64 bytes from 172.16.101.80: seq=1 ttl=42 time=1.413 ms
64 bytes from 172.16.101.80: seq=2 ttl=42 time=1.481 ms
64 bytes from 172.16.101.80: seq=3 ttl=42 time=1.368 ms
64 bytes from 172.16.101.80: seq=4 ttl=42 time=1.380 ms
64 bytes from 172.16.101.80: seq=5 ttl=42 time=1.453 ms
^C
--- 172.16.101.80 ping statistics ---
6 packets transmitted, 6 packets received, 0% packet loss
round-trip min/avg/max = 1.368/1.628/2.675 ms
host2:~$
```



- Configuration



```
ect/src/CML $ cd ansible/  
(finalProject) cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_project/finalProj  
ect/src/CML/ansible $ ansible-playbook playbook.yml
```

```
PLAY [AUTOMATIC BACKUP OF RUNNING CONFIG Project Lab R1] *****
```

```
TASK [DISPLAYING THE RUNNING-CONFIG] *****  
ok: [R1]
```

```
TASK [SAVE OUTPUT TO ./backups/] *****  
changed: [R1]
```

```
PLAY [AUTOMATIC BACKUP OF RUNNING CONFIG Project Lab S1] *****
```

```
TASK [DISPLAYING THE RUNNING-CONFIG] *****  
ok: [S1]
```

```
TASK [SAVE OUTPUT TO ./backups/] *****  
changed: [S1]
```

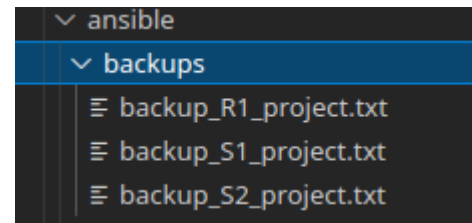
```
PLAY [AUTOMATIC BACKUP OF RUNNING CONFIG Project Lab S2] *****
```

```
TASK [DISPLAYING THE RUNNING-CONFIG] *****  
ok: [S2]
```

```
TASK [SAVE OUTPUT TO ./backups/] *****  
changed: [S2]
```

```
PLAY RECAP *****  
R1      : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0  
S1      : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0  
S2      : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

```
(finalProject) cakdeny49@cakdeny-hplaptop14ck0xxx ~/Documents/msib-network-programmability/Final_project/finalProj  
ect/src/CML/ansible $
```



- Configuration



```
3. {  'state': 'STARTED',  
    'created': '2022-07-03 01:22:37',  
    'lab_title': 'automation-presentasi',  
    'lab_description': '',  
    'owner': 'developer',  
    'node_count': 8,  
    'link_count': 9,  
    'id': '7cale4'}
```

Menu:

```
0. exit  
1. start lab  
2. stop lab  
3. create lab  
4. delete lab  
5. get topology lab
```

```
6. create node  
7. delete node  
8. update config node
```

```
9. create interfaces
```

```
10. create links
```

```
=====
```

```
choose (1-9) / 0 for exit: 5  
get topology lab no : 3  
Processing get topology 7cale4...  
do u want to save the topology to the file? (y/n): y  
Success save topology in ./topology/lab_7cale4.json and ./topology/lab_7cale4.yaml
```

```
lab_7cale4.json - Untitled (Workspace) - Code - OSS
```

File Edit Selection View Go Run Terminal Help

EXPLORER

- UNTITLED (WORKSPACE)
- CML
 - __pycache__
 - ansible
 - NXAPI
 - RESTCONF
 - script-config
 - topology
 - lab_7cale4.json
 - lab_7cale4.yaml
 - automation.py
 - breakout-linux-x86_amd64
 - config.py
 - config.yaml
 - Interfaces.py
 - Labs.py
 - Links.py
 - manage_cml.py
 - Nodes.py
 - script-automation-lab.py

lab_7cale4.json

```
1 {  
2   "nodes": [  
3     {  
4       "id": "n0",  
5       "data": {  
6         "node_definition":  
7         "external_connector",  
8         "image_definition": null,  
9         "label": "bridge",  
10        "configuration": "bridge0",  
11      }  
12    }  
13  ]  
14}
```

lab_7cale4.yaml

```
1 cluster_id: cluster_1  
2 created_timestamp: 1656825757.22  
3 interfaces:  
4 - data:  
5   label: Loopback0  
6   slot: null  
7   state: STARTED  
8   type: loopback  
9   id: i0  
10 node: n2
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
3. {  'id': '76ed54'}  
    'state': 'STARTED',  
    'created': '2022-07-03 01:22:37',  
    'lab_title': 'automation-presentasi',  
    'lab_description': '',  
    'owner': 'developer',  
    'node_count': 8,  
    'link_count': 9,  
    'id': '7cale4'}
```





THANK YOU

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