Requirements for Candidate Config/ Rollback config.

In order for us to implement candidate config or rollback, we require space on router. GNS3 emulator images don't have any disk, so here we are going to add PCMCIA disk0 slot to store our candidate config on Cisco 7200 router. We will need to configure few pre-requisites on the router as well. First we will add disk.

GNS3: Configure Cisco Router 7200

➔ Right click on the router and Select Configure as shown in Figure 1.

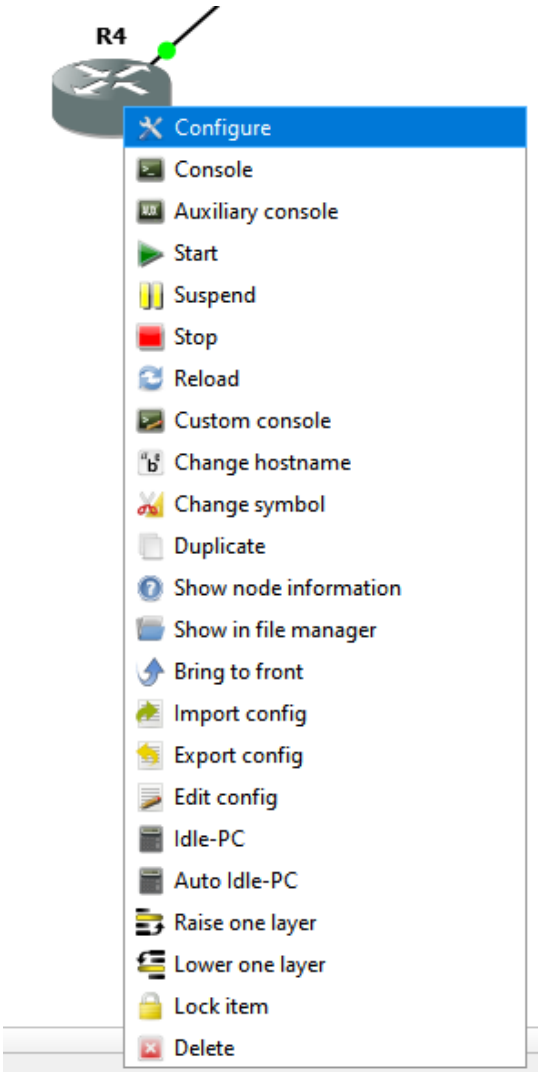

Figure 1 Router Configure

Figure 2 shows Router's General Configuration Dialogue box

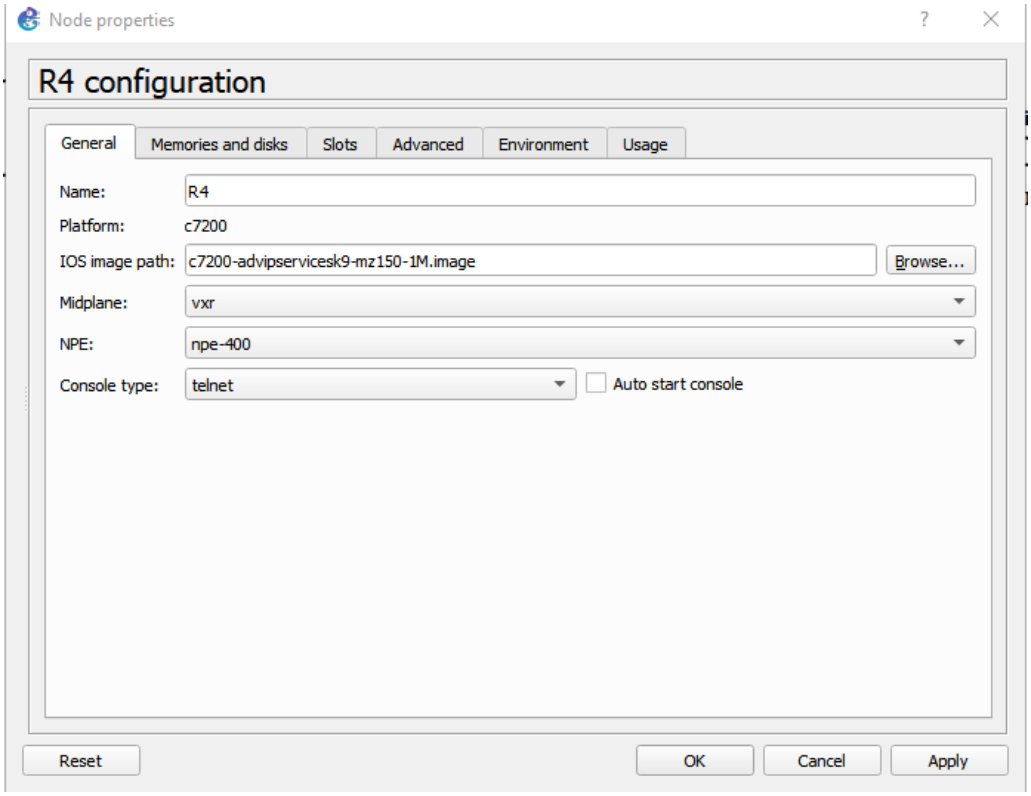

Figure 2 General Configuration

➔ On Memories and disks, Select PCMCIA disk0, set 32MB

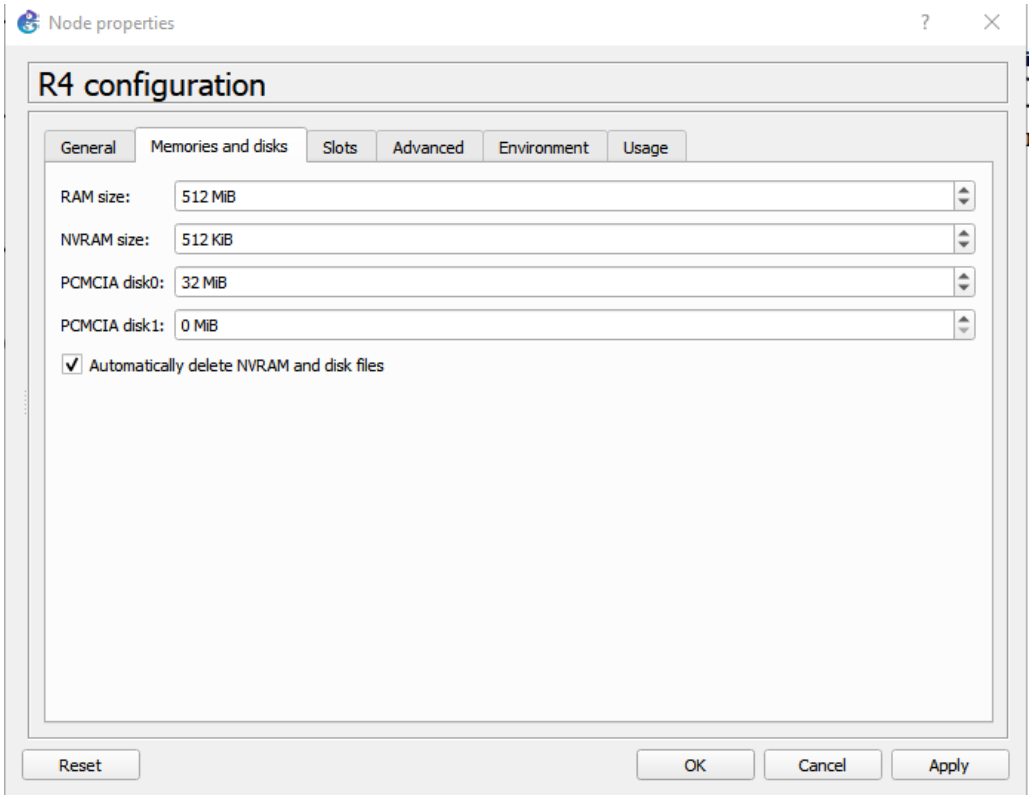

Figure 3 Configure PCMCIA Disk0

Click ok. Disk0 is now configured on the router to be used.

Prepare Cisco device for SCP/Candidate Config/Rollback Config

We must format the added file system on to the router. All operations would be performed by admin user on the router.

- ➔ User should be configured with privilege level 15
  R4(config)# username netlab privilege 15 secret netlab
- ➔ SSH server must be configured on the device to login via ssh.
- ➔ To enable SCP (Secure Copy) service on the router.
  R4(config)# ip scp server enable
- ➔ Configure AAA
  R4(config)#aaa new-model
  R4(config)#aaa authentication login default local
  R4(config)#aaa authorization exec default local none

To check the disk on the router, it is good practice as the disk could be numbered differently.

R4#show all-filesystem (show file systems – command can be used here too)

R4#show disk0

Output cropped for show all-filesystem command in Figure 4.

```
No space information available
Directory of nvram:/

  504  -rw-        1311                    <no date>  startup-config
  505  ----        3561                    <no date>  private-config
  506  -rw-        1311                    <no date>  underlying-config
    1  ----          72                    <no date>  persistent-data

522232 bytes total (516284 bytes free)
Directory of disk0:/

No files in directory

33218560 bytes total (33218560 bytes free)
R4#show disk0
No files on device

33218560 bytes available (0 bytes used)
```

Figure 4 Router Disc information

Format the disk0

R4#format disk0:

Figure 5 shows the operation formatting of the disk0 on the router.

```
R4#format disk0:
Format operation may take a while. Continue? [confirm]
Format operation will destroy all data in "disk0:".  Continue? [confirm]
Writing Monlib sectors....
Monlib write complete

Format: All system sectors written. OK...

Format: Total sectors in formatted partition: 65504
Format: Total bytes in formatted partition: 33538048
Format: Operation completed successfully.

Format of disk0: complete
```

Figure 5 Formatting Disk0

Confirm SSH is enabled

R4(config)#ip domain-name netlab.net
R4(config)#crypto key generate rsa 1024
R4(config)#ip ssh version 2
R4(config)#line vty 0 1869
R4(config)#transport input telnet ssh
R4(config)#login local

Router is now ready to be used for SCP(Secure Copy).

Figure 6 shows the script to perform SCP from local desktop to router.

NAPALM uses scp for configuration management.

Candidate Config using SCP

```
#!/usr/bin/python3
from netmiko import ConnectHandler
from netmiko import file_transfer
cisco_device = {
    'device_type': 'cisco_ios','host': '192.168.1.80', 'port': 22,
    'username': 'netlab','password': 'netlab',
    'verbose': True
}
conn = ConnectHandler(**cisco_device)
transfer_output = file_transfer(
                conn, source_file='config.txt',
                dest_file='candidate_config.txt',
                file_system='disk0:',direction='put', overwrite_file=True)
print(transfer_output)
conn.disconnect()
```

Figure 6 Netmiko SCP Script

Result after running the script is shown in Figure 7.

```
R4#dir disk0:
Directory of disk0:/

    1  -rw-        1287  Jun 21 2022 11:02:36 +00:00  candidate_config.txt

33218560 bytes total (33214464 bytes free)
```

Figure 7 SCP Config from Script

For Load Replace Configuration

One most important thing to keep in mind while using NAPALM is, archive and path for the configuration should be given before proceeding.

R4(config)#archive
R4(config-archive)#path disk0:

Figure 8 shows sample script to check if there is any difference in current configuration and configuration file(myconfig.txt). If there is any difference, It will display.

Compare Configuration with NAPALM

```
#!/usr/bin/python3
from napalm import get_network_driver
driver = get_network_driver('ios')
ios = driver('192.168.1.80', 'netlab', 'netlab')
ios.open()
ios.load_replace_candidate('myconfig.txt')
diff = ios.compare_config()
print(diff)
ios.close()
```

Figure 8 NAPALM Compare Configuration

Further we can create a script which would create a script to replace current configuration if there are any configuration changes are found.

Figure 9 shows us the example.

Load Replace Config with NAPALM

```
#!/usr/bin/python3
from napalm import get_network_driver
driver = get_network_driver('ios')
ios = driver('192.168.1.80', 'netlab', 'netlab')
ios.open()
ios.load_replace_candidate('myconfig.txt')
diff = ios.compare_config()
if len(diff):
    print(diff)
    print("Applying Config...")
    ios.commit_config()
else:
    print("No Changes to the config..")
    ios.discard_config()
ios.close()
```

Figure 9 Load Replace Configuration with NAPALM

Figure 10 shows the script to merge configuration with existing config.

Load Merge Config with NAPALM

```
#!/usr/bin/python3
from napalm import get_network_driver
driver = get_network_driver('ios')
ios = driver('192.168.1.80', 'netlab', 'netlab')
ios.open()
ios.load_replace_candidate('config.txt')
merge = ios.load_merge_candidate('acl.txt')
diff = ios.compare_config()
print(diff)
if len(diff) > 0:
    print(diff)
    answer = input('Do you want to commit changes?><yes|no> ')
    if answer == 'yes':
        print('Committing changes..')
        ios.commit_config()
        print('Done!!')
    else:
        print('No changes required')
        ios.discard_config()
ios.close()
```

Figure 110 Load Merge Configuration with NAPALM

NAPALM offers great feature to rollback the configuration. In case of misconfiguration, we can rollback the configuration to the old original case.

Rollback Config with NAPALM

```
#!/usr/bin/python3
from napalm import get_network_driver
driver = get_network_driver('ios')
ios = driver('192.168.1.80', 'netlab', 'netlab')
ios.open()
ios.load_replace_candidate('config.txt')
merge = ios.load_merge_candidate('acl.txt')
diff = ios.compare_config()
print(diff)
if len(diff) > 0:
    print(diff)
    answer = input('Do you want to commit changes?><yes|no> ')
    if answer == 'yes':
        print('Committing changes..')
        ios.commit_config()
        print('Done!!')
    else:
        print('No changes required')
        ios.discard_config()
answer = input('Do you want to Rollback the config? <yes|no>')
if answer == 'yes':
    ios.rollback()
    print('Done')
ios.close()
```

Figure 11 Rollback Configuration with NAPALM

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2. "Changing the configuration," Changing the Configuration - NAPALM 3 documentation. (Online). Available: https://napalm.readthedocs.io/en/develop/tutorials/changing_the_config.html. (Accessed: 21-Apr-2022).