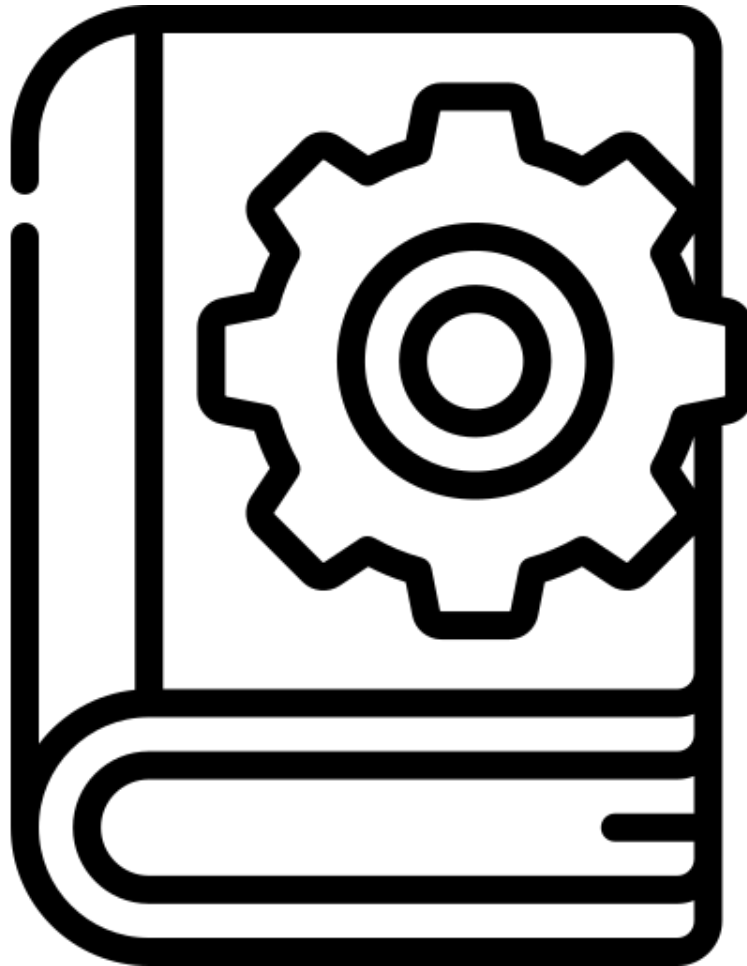


# Network Management User Guide

12/5/2022



SJSU Dept. of Computer Science

CS 158B • Paul Nguyen • Team 4

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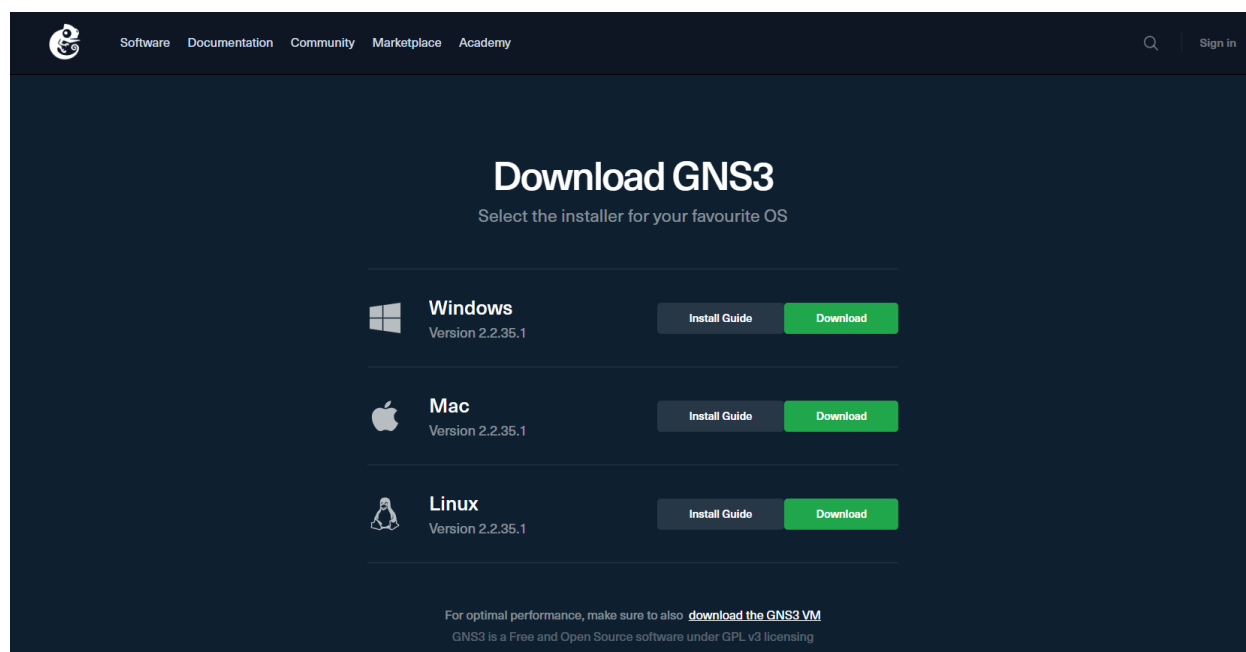
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# 1 GNS3

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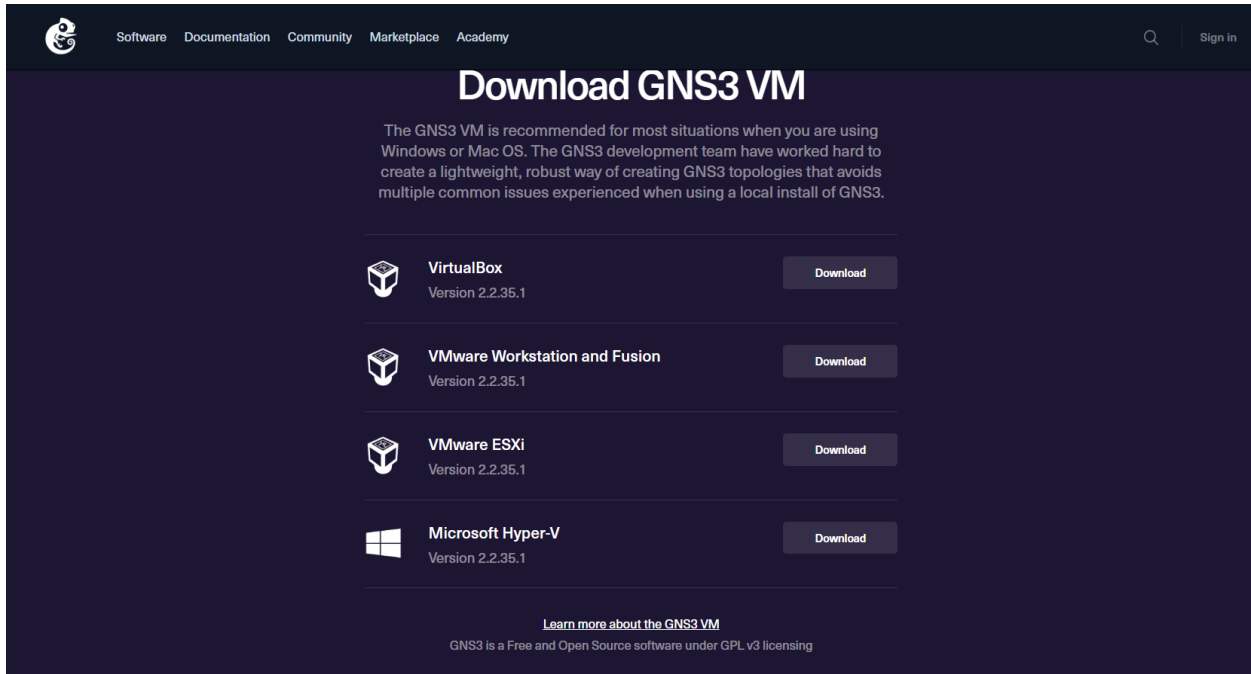
## 1.1. Download GNS3

Download GNS3 at <https://gns3.com/software/download>. It is compatible with Windows, Mac, and Linux. Follow the instructions on the GNS3 Setup wizard to complete download.



## 1.2. Download GNS3 VM

Download GNS3 VM at <https://gns3.com/software/download-vm>. The VM is essential for running the virtual devices in the network.



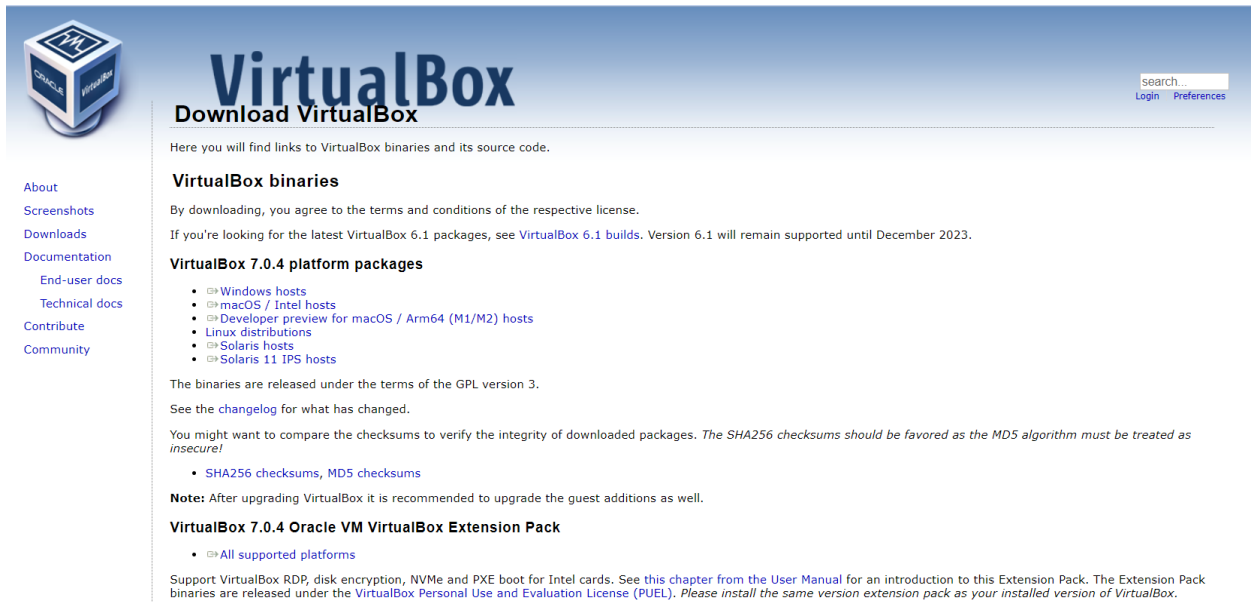
The screenshot shows the 'Download GNS3 VM' page on the GNS3 website. The page has a dark blue header with navigation links: Software, Documentation, Community, Marketplace, and Academy. A search bar and 'Sign In' link are on the right. The main heading is 'Download GNS3 VM'. Below it, a paragraph explains that the GNS3 VM is recommended for most situations on Windows or Mac OS. The page lists four download options, each with an icon, name, version, and a 'Download' button:

- VirtualBox** (Version 2.2.35.1)
- VMware Workstation and Fusion** (Version 2.2.35.1)
- VMware ESXi** (Version 2.2.35.1)
- Microsoft Hyper-V** (Version 2.2.35.1)

At the bottom, there is a link to 'Learn more about the GNS3 VM' and a note that 'GNS3 is a Free and Open Source software under GPL v3 licensing'.

### 1.3. Download VirtualBox

For this project, our group runned GNS3 VM using VirtualBox, which can be downloaded at <https://www.virtualbox.org/wiki/Downloads>.

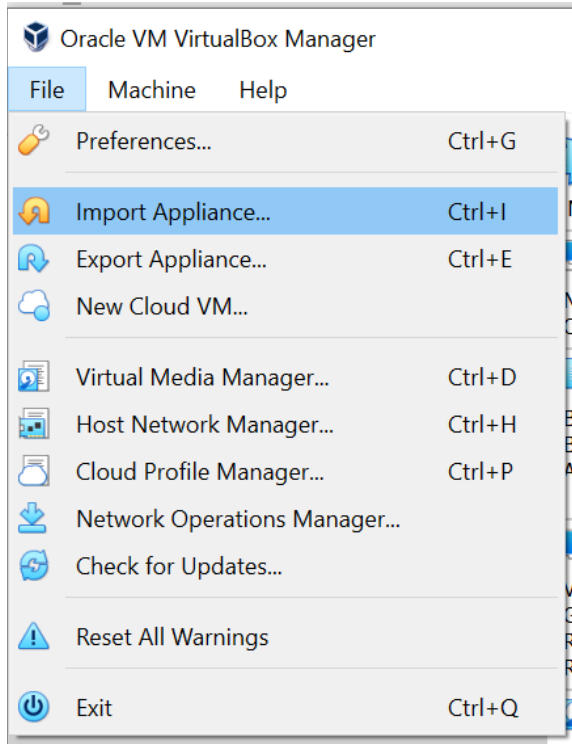


The screenshot shows the 'Download VirtualBox' page on the VirtualBox website. The page has a light blue header with the VirtualBox logo and a search bar. The main heading is 'Download VirtualBox'. Below it, a paragraph explains that the page provides links to VirtualBox binaries and source code. The page lists the following sections:

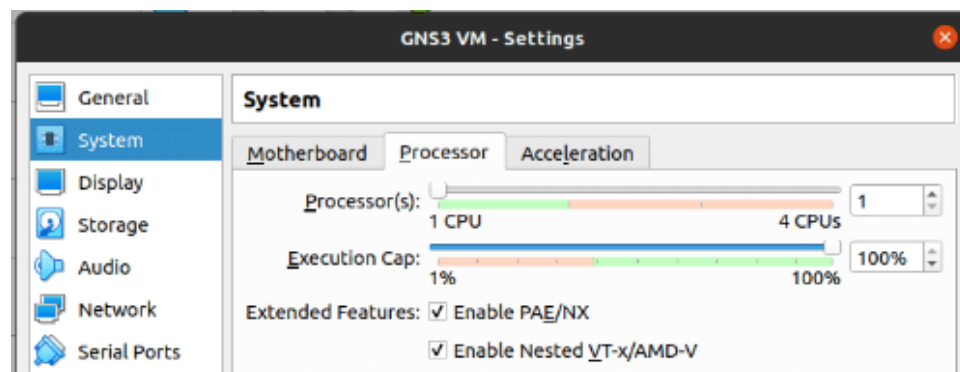
- VirtualBox binaries**: By downloading, you agree to the terms and conditions of the respective license. If you're looking for the latest VirtualBox 6.1 packages, see [VirtualBox 6.1 builds](#). Version 6.1 will remain supported until December 2023.
- VirtualBox 7.0.4 platform packages**:
  - Windows hosts
  - macOS / Intel hosts
  - Developer preview for macOS / Arm64 (M1/M2) hosts
  - Linux distributions
  - Solaris hosts
  - Solaris 11 IPS hosts
- VirtualBox 7.0.4 Oracle VM VirtualBox Extension Pack**:
  - All supported platforms

The page also includes a note about the GPL version 3 license, a changelog link, and a warning about the SHA256 checksums being favored over MD5. A note at the bottom states that after upgrading VirtualBox, it is recommended to upgrade the guest additions as well.

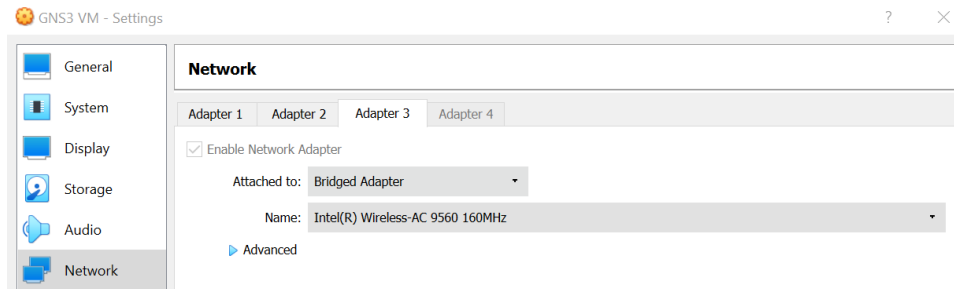
## 1.4. Import GNS3 VM into VirtualBox



- a. In GNS3 VM Settings > System, make sure the "Enable Nested VT-x/AMD-V" option is selected.

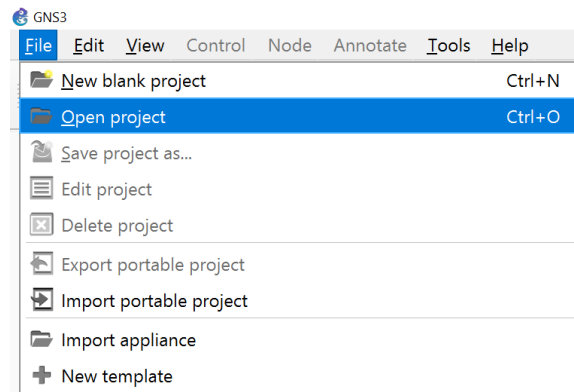


- b. In GNS3 VM Settings > Network, make sure the adapter is set to the "Bridged Adapter" option.



## 1.5. Start GNS3

Opening GNS3 should automatically start the VM. Open the "Team4\_Project.gns3project" file in GNS3.

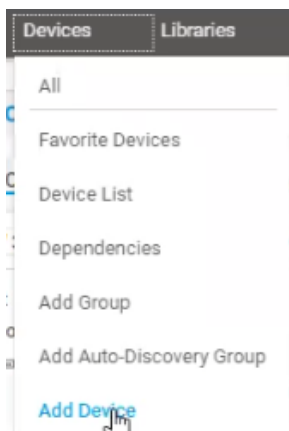


## 2 PRTG

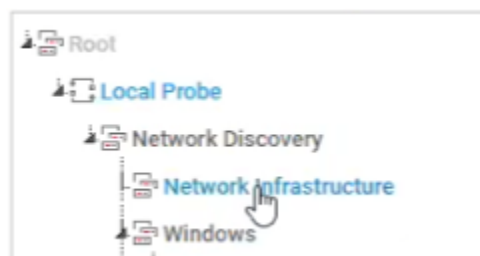
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### 2.1. Add a device

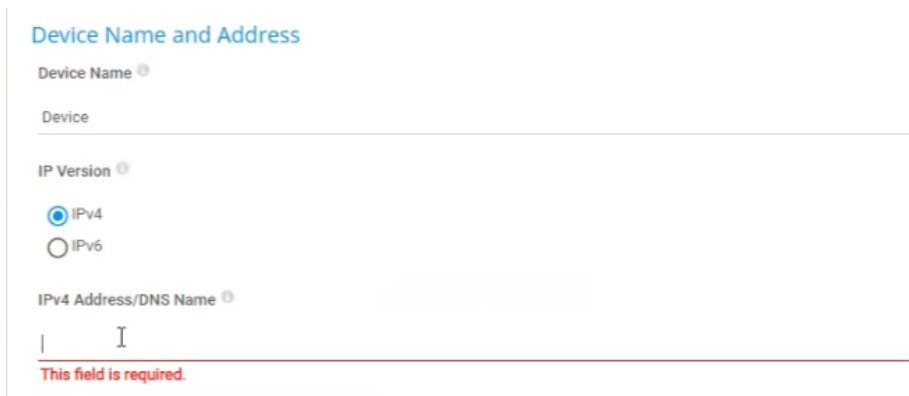
- a. Select 'Devices' from the navigation bar, and then select 'Add Device'.



- b. When prompted to select a Parent, click on 'Network Infrastructure'.



- c. Input the IP address of the device.

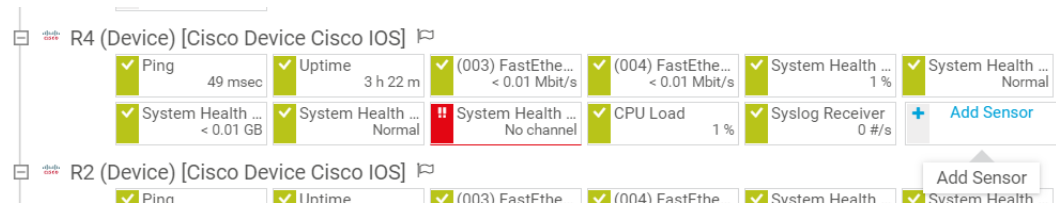
A screenshot of the 'Device Name and Address' form in PRTG. The form has the following fields: 'Device Name' (with a help icon), 'Device' (a text input field), 'IP Version' (with a help icon), 'IPv4' (selected with a radio button), 'IPv6' (unselected with a radio button), and 'IPv4 Address/DNS Name' (with a help icon). The 'IPv4 Address/DNS Name' field is empty, and a red error message 'This field is required.' is displayed below it.

- d. Make sure to turn off 'Credentials for SNMP Devices'.

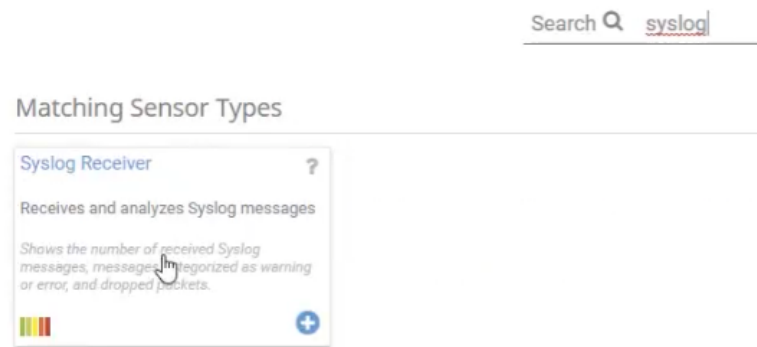


## 2.2. Add Syslog Receiver sensor

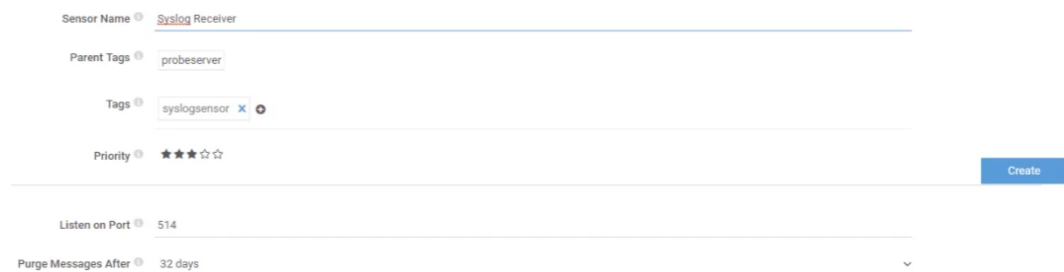
- a. Navigate to the PRTG website. Under the desired router, click on 'Add Sensor'.



- b. In the search bar, type in 'Syslog Receiver'. Then, click on the blue plus icon.



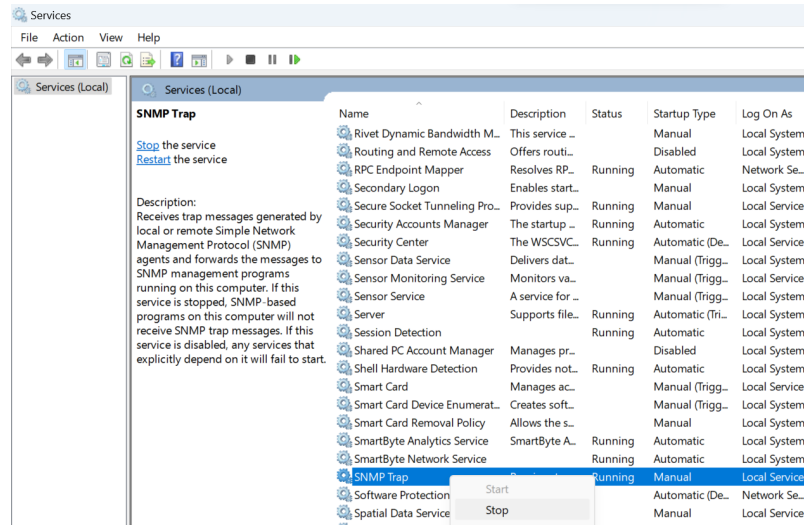
- c. Keep default settings. Press 'Create'.





### 2.3. Setup SNMP trap alert sensor

- a. To ensure that the port used for SNMP communication, port 161, is not being used by another application, access Services, scroll to SNMP Trap and right click to manually stop.



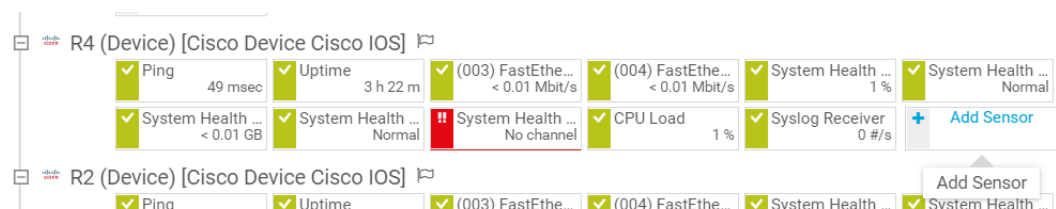
- b. In the console of the desired router in GNS3, type in the following commands (x.x.x.x is the IP address of your local machine):

```

en
conf t
snmp-server host x.x.x.x version 2c public ds3 snmp
Snmp-server enable traps
end
wr mem


```

- c. Navigate to the PRTG website. Under the desired router, click on 'Add Sensor'.



- d. In the search bar, type in 'SNMP Trap Receiver'. Then, click on the blue plus icon.

< Cancel sensor creation

Search  snmp trap receiver

### Matching Sensor Types

SNMP Trap Receiver ?

Receives and analyzes SNMP trap messages

Does not support SNMP v3 traps. Use SNMP v1 or v2c instead.

- e. Keep default settings. Press 'Create'.

Add Sensor to Device R4 (Device) [Cisco Device Cisco IOS] [11.80.3.2]

(Step 2 of 2)

< Cancel

### Basic Sensor Settings

Sensor Name ⓘ SNMP Trap Receiver

Parent Tags ⓘ vendors\_Cisco

Tags ⓘ snmptrapsensor x +

Priority ⓘ ★★☆☆☆

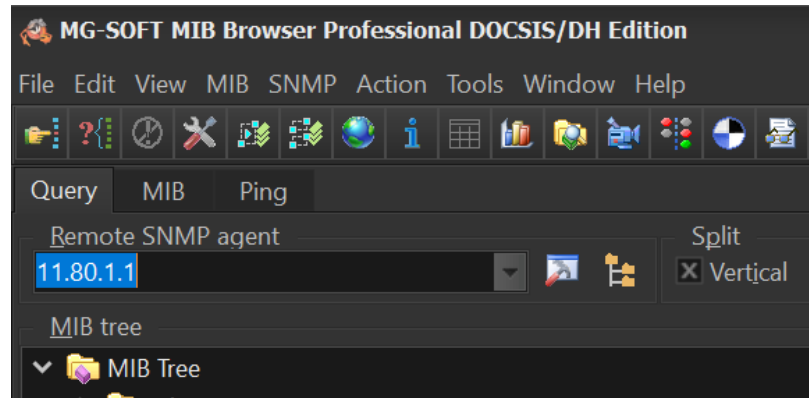
Create



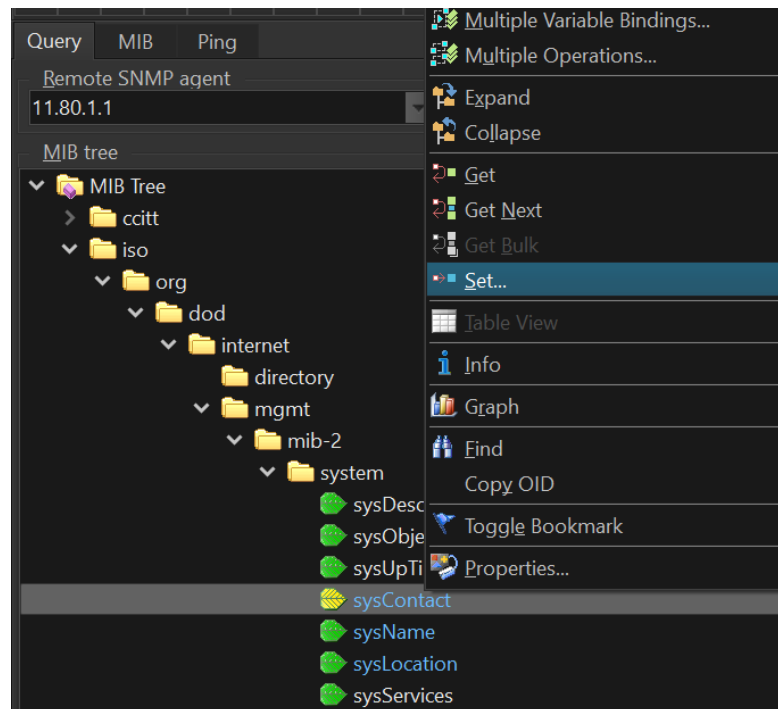
## 3 MGSoft

### 3.1. Make changes through SNMP set operation

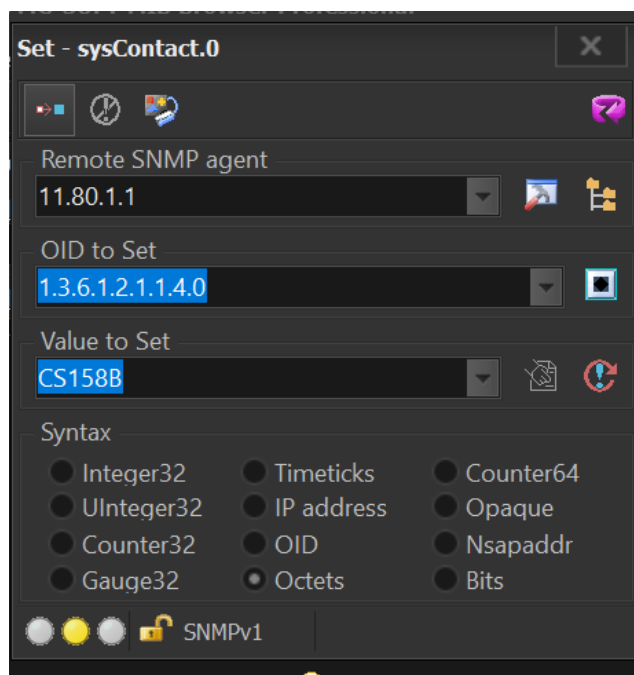
- a. In MIB Browser, input the IP address of the remote SNMP agent to change.



- b. Right click on any variable and click on 'Set'.

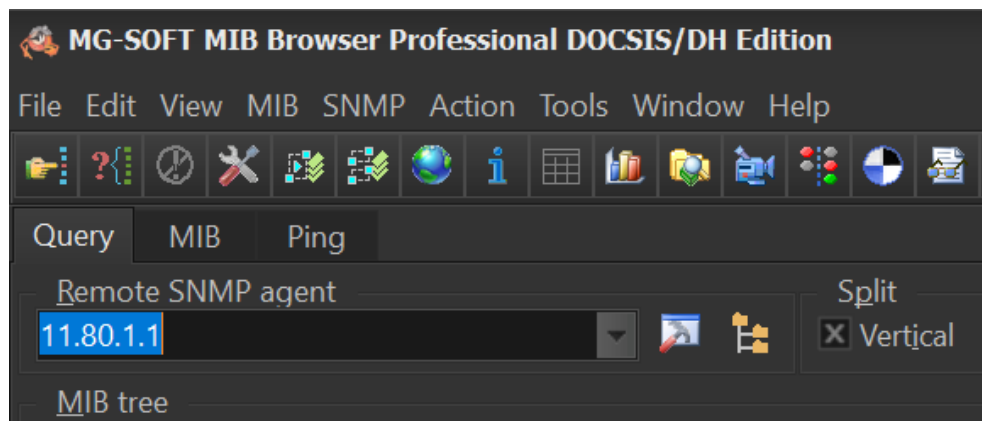


- c. Change the value in the textbox labeled 'Value to Set' and press 'Enter'.

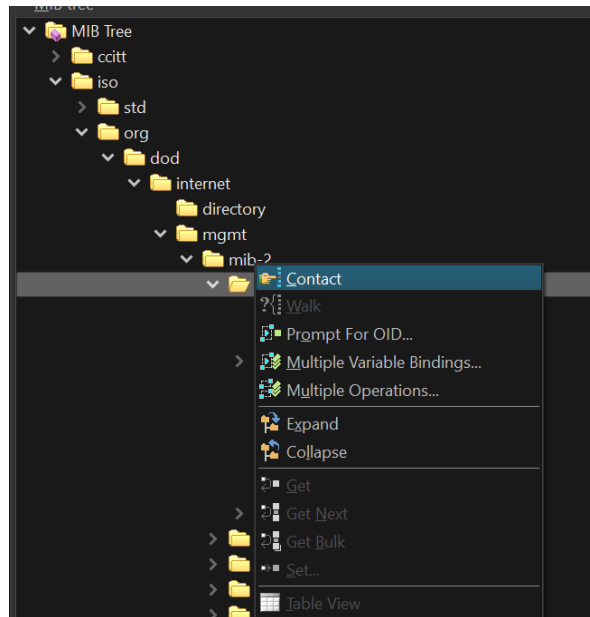


### 3.2. SNMP Mibwalk

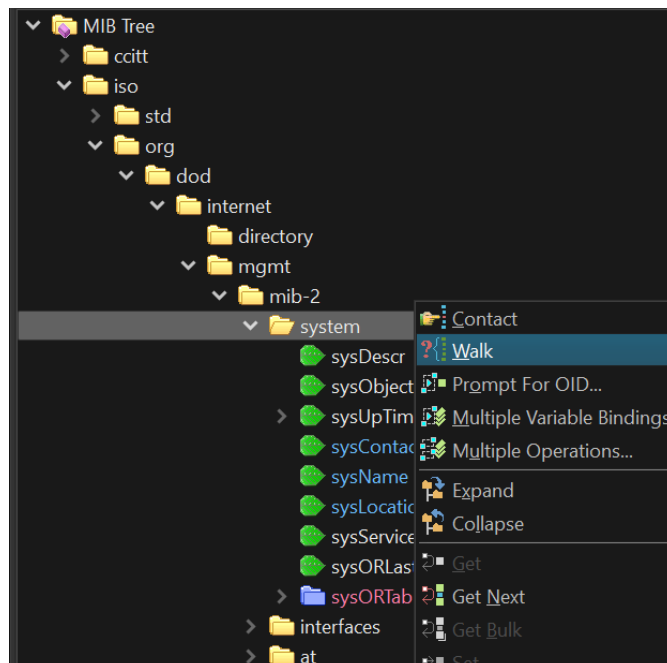
- a. In MIB Browser, input the IP address of the remote SNMP agent to walk through.



- b. Right click on any folder and click on 'Contact'.

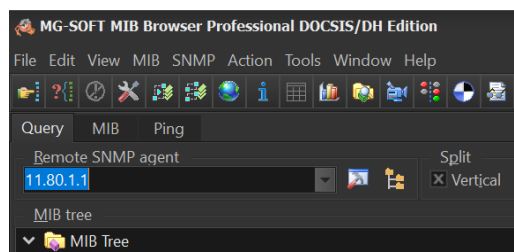


- c. Right click on any folder and click on 'Walk'. View results on the right in the 'Query results' tab.

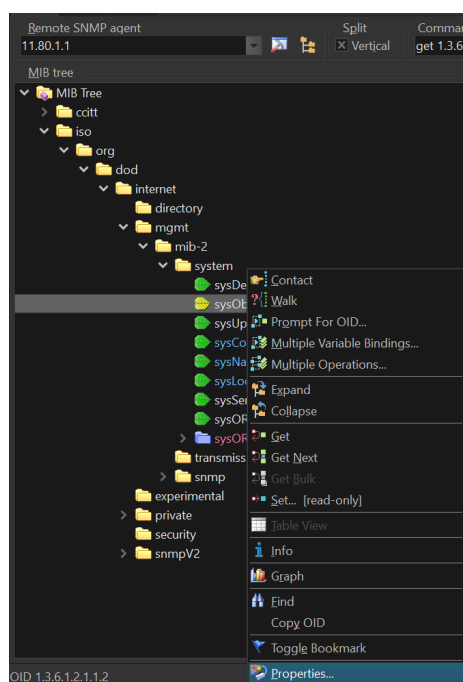


### 3.3. Browse OIDs

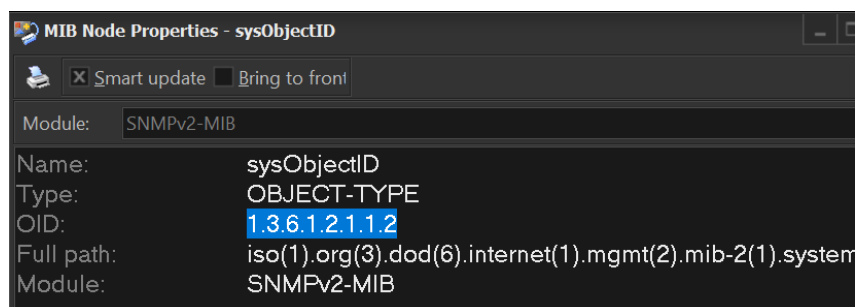
- a. In MIB Browser, input the IP address of the remote SNMP agent to find the OID of.



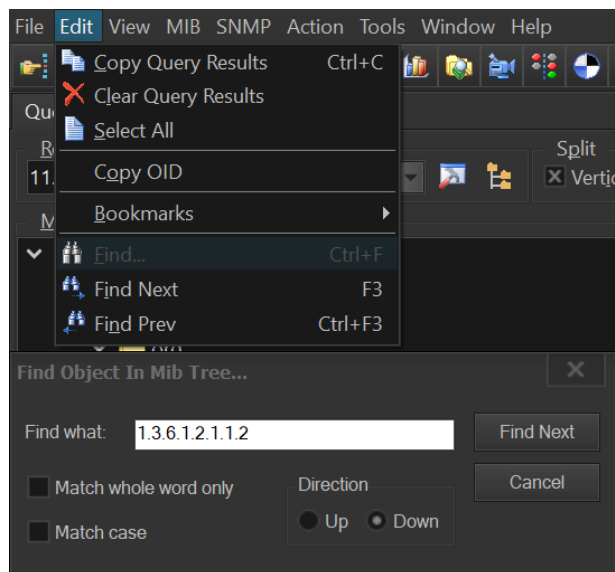
- b. Right click on any variable and click on 'Properties'.



- c. Copy the OID.



- d. Go to Edit -> Find. A new tab will appear. Paste the OID into the text box and press enter.



### 3.4. Compile a new MIB and add to MIB tree

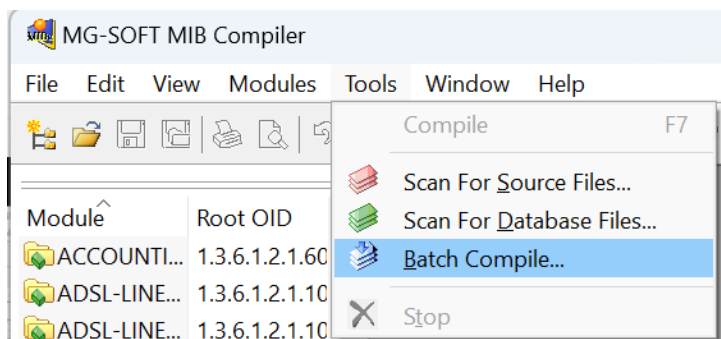
- a. Prepare some source code for a new MIB and store it in a directory.

```

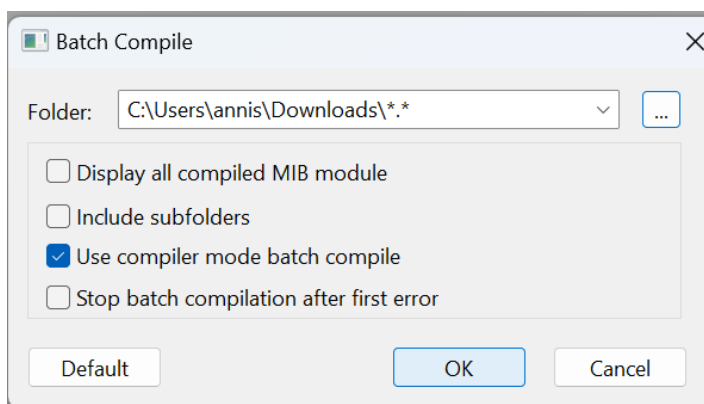
C:\Users\annis\Downloads\ARUBA-MIB.mib - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
ARUBA-MIB.mib
400 emsProducts OBJECT IDENTIFIER ::= { products 3 }
401
402
403 --Partner Products
404 partnerProducts OBJECT IDENTIFIER ::= {products 4}
405
406 ecsE50 OBJECT IDENTIFIER ::= {partnerProducts 1}
407 ecsE100C OBJECT IDENTIFIER ::= {partnerProducts 2}
408 ecsE100A OBJECT IDENTIFIER ::= {partnerProducts 3}
409 ecsENSM OBJECT IDENTIFIER ::= {partnerProducts 4}
410
411 --Amigopod
412 amigopodProducts OBJECT IDENTIFIER ::= { products 5 }
413
414 -- List of all the Enterprise MIB Modules.
415
416 -- common node will contain all the objects which can be shared between
417 -- Aruba products.
418
419 common OBJECT IDENTIFIER ::= { arubaEnterpriseMibModules 1 }
420
421 -- switch node will contain all the objects for the switch products
422
423 switch OBJECT IDENTIFIER ::= { arubaEnterpriseMibModules 2 }
424
425 -- Aruba AP will contain all the objects for the Aruba AP.
426 arubaAp OBJECT IDENTIFIER ::= { arubaEnterpriseMibModules 3 }
427
428 arubaEcs OBJECT IDENTIFIER ::= {arubaEnterpriseMibModules 4}
429
430 -- Common MIB Modules shared across Aruba products.
431 arubaMIBModules OBJECT IDENTIFIER ::= { common 1 }
432
433 -- Switch Mib Modules

```

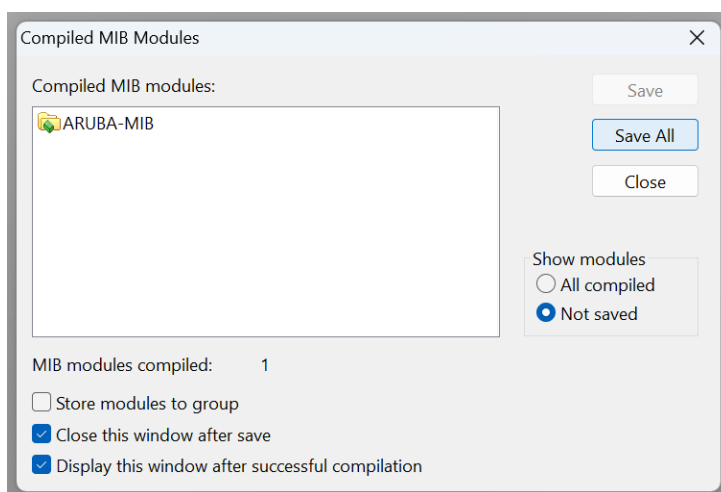
b. In MIB Compiler, go to Tools -> Batch Compile.



c. Provide the directory where the source code was saved. Keep default changes and press OK.

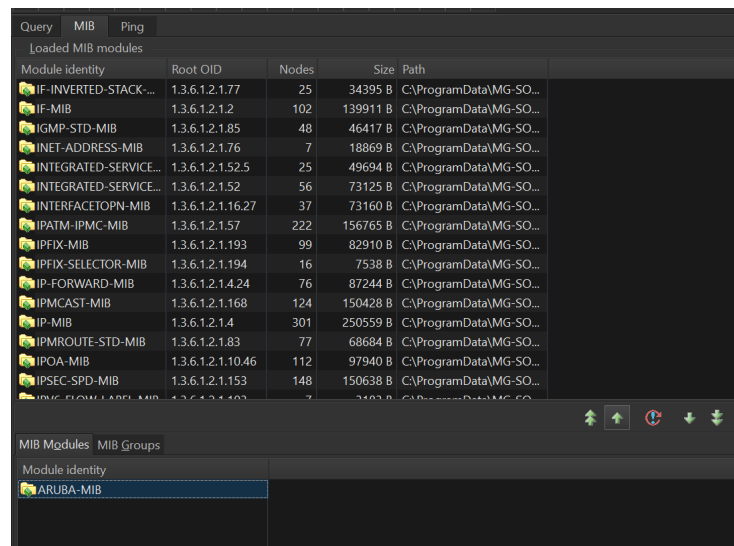


d. Press save all.





- e. Now, navigate to MIB Browser MIB tab. There should be a new module under the MIB Modules tab. Click on the green up arrow key to load it into the MIB tree.



### 3.5. SNMP Trap Ring Console

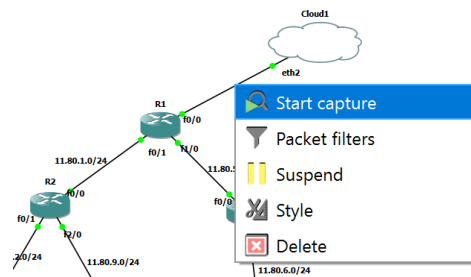
- a. In the console of all routers in GNS3, type in the following commands (x.x.x.x is the IP address of your local machine):

```

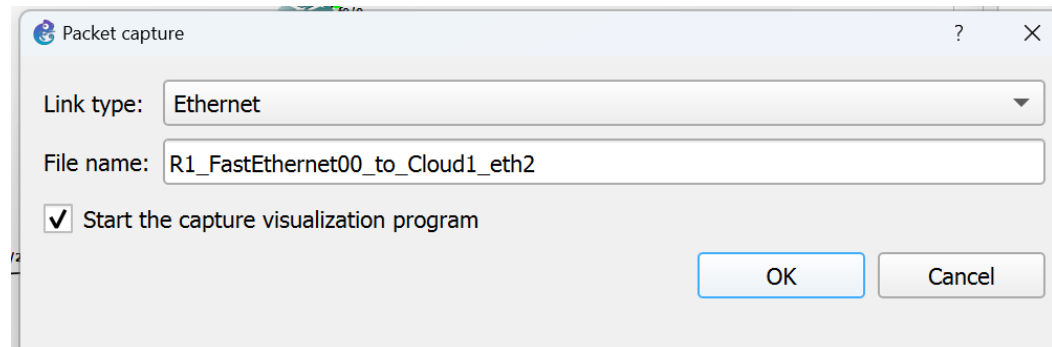
en
conf t
snmp-server host x.x.x.x version 2c public ds3 snmp
Snmp-server enable traps
end
wr mem

```

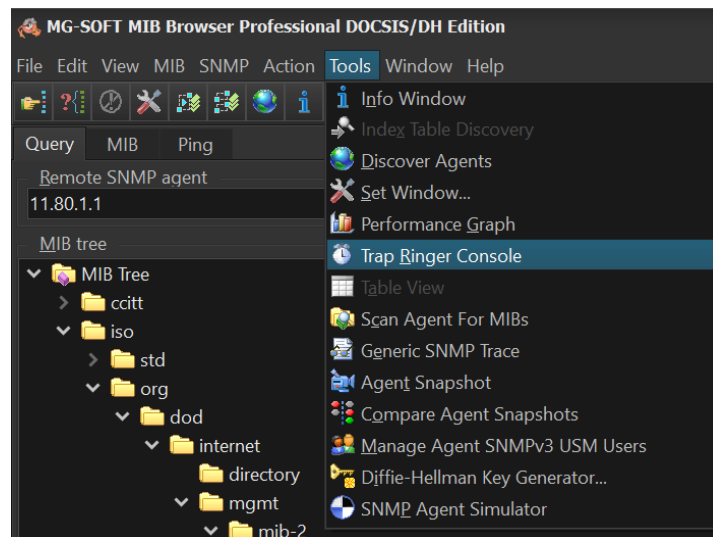
- b. In GNS3, right click on a link to start capturing packets.



c. Keep default settings and press OK.



d. In MIB Browser, go to Tools -> Trap Ringer Console.

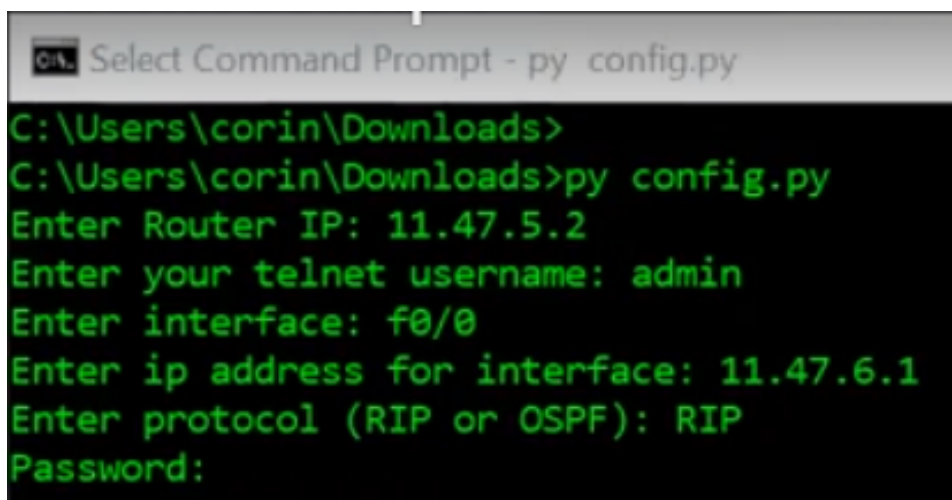


## 4 Automation Script

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### 4.1. Run automation python script config.py

- a. Navigate to the directory with config.py and run it.
- b. Enter the IP address of the router you want to configure.
- c. Enter your telnet username to access the specified router.
- d. Enter the interface you would like to configure.
- e. Set an IP address for the specified interface.
- f. Set a protocol (RIP or OSPF) for the specified router.
- g. Enter your password to complete configuration.



```
Select Command Prompt - py config.py
C:\Users\corin\Downloads>
C:\Users\corin\Downloads>py config.py
Enter Router IP: 11.47.5.2
Enter your telnet username: admin
Enter interface: f0/0
Enter ip address for interface: 11.47.6.1
Enter protocol (RIP or OSPF): RIP
Password:
```