

Mini Project Report

GNS3 Web Configuration Tool

Yassine LATRECHE

ESI-SBA

1CS - 4th Group

28th June, 2022



Table of content:

Introduction:	2
Project Goal:	2
Used Technologies:	2
Python:	2
GNS3:	2
Oracle VM VirtualBox:	3
Django:	3
Python telnetlib:	3
Gns3fy:	3
Netmiko:	3
D3.js:	3
Bootstrap Studio:	4
Installation:	4
Usage:	5
Connecting:	5
Connections:	5
Projects:	6
Project Main Page:	7
Creating a device:	8
Device Linking:	9
Device Configuration:	9
Routers:	9
Switches:	13
Guest (PC):	16



Introduction:

GNS3 Web Configuration Tool aims to assist with building and managing GNS3 topologies as well as configuring routers, switches, and computers.

Project Goal:

The main goal of this project is to provide a simple and clean Web interface that helps its users apply basic configuration in GNS3, including:

- Creating and managing GNS3 projects.
- Viewing Current topology.
- Adding and managing devices.
- Creating and deleting links between devices.
- Starting, suspending, reloading and stopping devices.
- Checking Running and Startup configurations for each device.
- Viewing and creating Vlan.
- Setting IP addresses for devices (routers and PCs).
- Configuring Static Routes.
- Pinging other existing devices.

Used Technologies:

Python:

Python is a high-level, interpreted, general-purpose programming language. Its design philosophy emphasizes code readability with the use of significant indentation.

GNS3:

Graphical Network Simulator-3 is a network software emulator first released in 2008. It allows the combination of virtual and real devices, used to simulate complex networks. It uses Dynamips emulation software to simulate Cisco IOS.



Oracle VM VirtualBox:

Oracle VM VirtualBox is a type-2 hypervisor for x86 virtualization developed by Oracle Corporation. VirtualBox was originally created by Innotek GmbH, which was acquired by Sun Microsystems in 2008, which was in turn acquired by Oracle in 2010.

Django:

Django is a free and open-source, Python-based web framework that follows the model–template–views architectural pattern, and it is maintained by the Django Software Foundation.

Python telnetlib:

The telnetlib is a python module that provides a Telnet class that implements the Telnet protocol. In addition, it provides symbolic constants for the protocol characters, and for the telnet options.

Gns3fy:

Python wrapper around GNS3 Server API. Minimal GNS3 version is 2.2. Its main objective is to interact with the GNS3 server in a programmatic way, so it can be integrated with the likes of Ansible, docker and scripts. Ideal for network CI/CD pipeline tooling.

Netmiko:

netmiko is a multi-vendor SSH Python library that simplifies the process of connecting to network devices via SSH. This library adds vendor-specific logic to paramiko, which is the de-facto SSH library in Python.

It should be noted that Netmiko also supports Telnet.

D3.js:

D3.js is a JavaScript library for producing dynamic, interactive data visualizations in web browsers. It makes use of Scalable Vector Graphics, HTML5, and Cascading Style Sheets standards. It is the successor to the earlier Protovis framework.



Bootstrap Studio:

Bootstrap Studio is a proprietary web design and development application. It offers a large number of components for building responsive pages including headers, footers, galleries and slideshows along with basic elements such as spans and divs. The program can be used for building websites and prototypes.

The software was activated using the Github Student Hub license.

Installation:

- Clone the project source code from its [Github repository](https://github.com/Yassine-Latreche/GNS3-Web-Configuration-Tool):

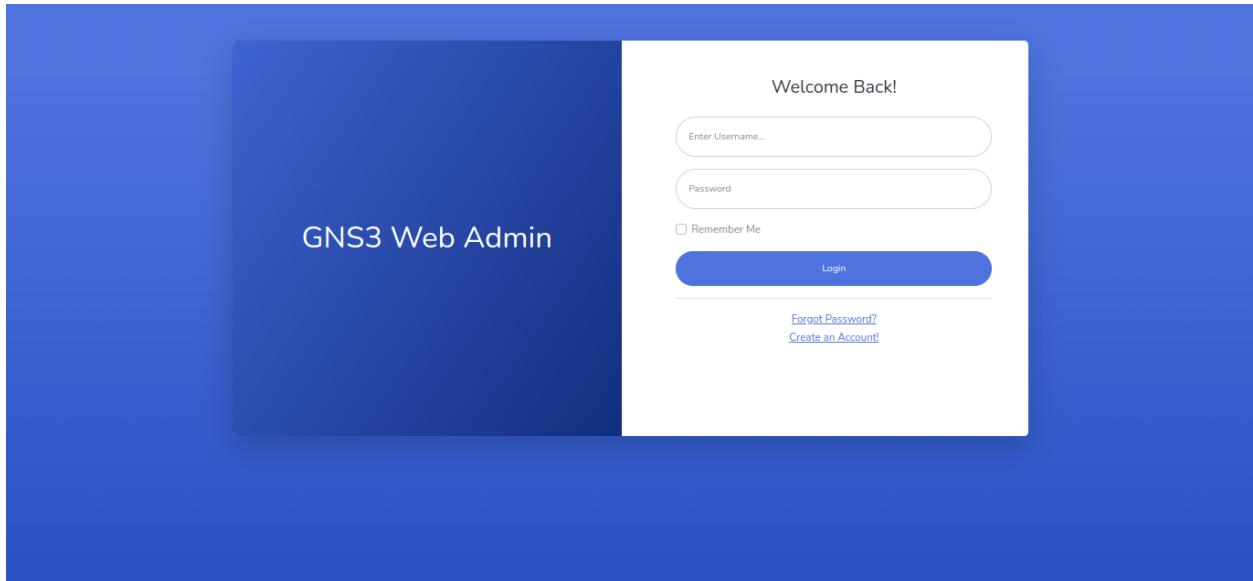
<https://github.com/Yassine-Latreche/GNS3-Web-Configuration-Tool>

- Create a Python virtual environment.
- Install requirements using requirements.txt file.
- Create an administrator account using Django manage.py script.
- Start the server.
- Install GNS3 and configure it.
- Login to your account.
- Create a connection to your GNS3 server.
- Select the connection and create a project.

Usage:

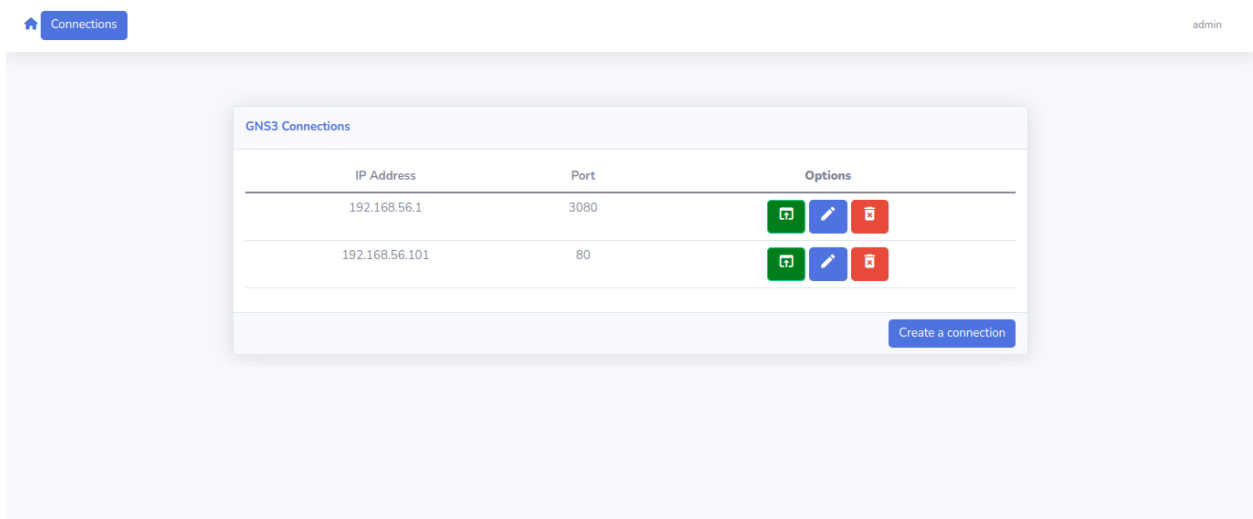
Connecting:

The application provides an authentication interface for each user.



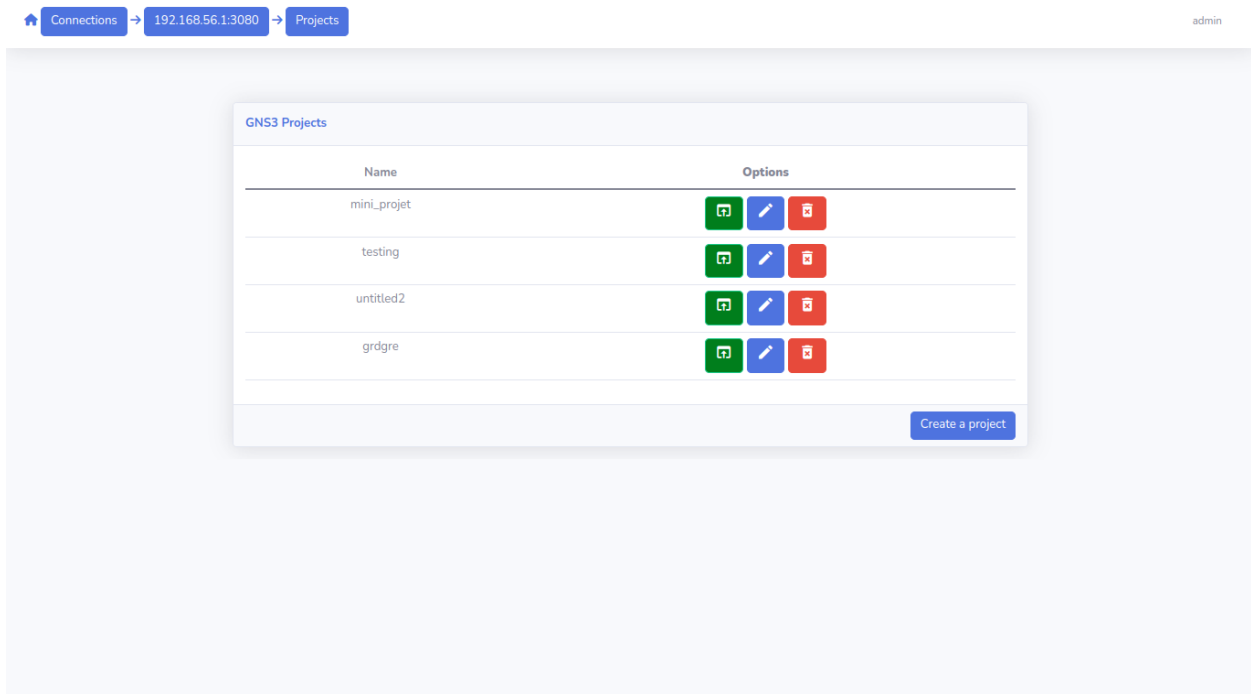
Connections:

After login in, the application shows all the GNS3 Server connections, with the ability to add, edit and delete existing connections.



Projects:

After choosing a connection, the application shows all the existing projects with the ability to create new ones, or edit and delete existing ones.



Project Main Page:

After choosing a project, the application shows basic information about it and it draws the current topology using D3.js.

A list of all the devices that are available is displayed at the bottom of the page, and we may do some simple operations on each one, such as turning it on, reloading it, suspending it, stopping it and deleting it.

The screenshot displays the GNS3 Web Admin interface for a project named 'mini_project'. The top navigation bar shows the path: Home → Connections → 192.168.56.1:3080 → Projects → mini_project → Dashboard. The user is logged in as 'admin'.

Dashboard Summary:

- PROJECT NAME: mini_project
- PROJECT STATUS: opened
- NUMBER OF DEVICES: 6
- RUNNING DEVICES: 0

Current Topology:

The topology diagram shows a network structure with the following components and connections:

- PC1** is connected to **R1**.
- R1** is connected to **ESW1**.
- ESW1** is connected to **R3**.
- R3** is connected to **R2**.
- R2** is connected to **R4**.

Nodes List:

Node Name	Type	Status	Console Host	Console Port	Console Type
ESW1 - dynamips	Switch	stopped	192.168.56.101	5002	telnet
R1 - dynamips	Router	stopped	192.168.56.101	5001	telnet
R2 - dynamips	Router	stopped	192.168.56.101	5000	telnet
PC1 - vpcs	Guest	stopped	192.168.56.1	5000	telnet
R3 - dynamips	Router	stopped	192.168.56.101	5003	telnet
R4 - dynamips	Router	stopped	192.168.56.101	5004	telnet

Each node card includes a set of control buttons: Play (start), Refresh, Pause, Stop, Reload, and Delete.

Copyright © GNS3 Web Admin 2022

Creating a device:

A form with a text field for the device's name and a dropdown list for the device type is displayed when the "New device" button is clicked.

The screenshot displays the GNS3 Web Admin interface. On the left is a blue sidebar with the title 'GNS3 WEB ADMIN' and navigation links for 'Dashboard' and 'Device Linking'. The main content area has a breadcrumb trail: 'Connections' → '192.168.56.1:3080' → 'Projects' → 'mini_project' → 'Dashboard'. The 'Dashboard' page features a 'New Device' form with a 'Device Name' text input (containing the placeholder 'Device') and a 'Device Template' dropdown menu (showing 'Open this select menu'). A 'Create' button is located at the bottom of the form. The footer includes the copyright notice 'Copyright © GNS3 Web Admin 2022' and a small upward arrow icon.

Device Linking:

The “Device Linking” page contains all the existing links between devices, with the ability to create new links and delete existing ones.

The screenshot shows the GNS3 Web Admin interface. The left sidebar contains the 'GNS3 WEB ADMIN' header and navigation links for 'Dashboard' and 'Device Linking'. The main content area is titled 'Device Linking' and includes a breadcrumb trail: 'Connections' → '192.168.56.1:3080' → 'Projects' → 'mini_project' → 'Device Linking'. In the top right corner, there are '+ New Link' and 'Refresh' buttons. The 'Current Topology' section displays a network diagram with devices PC1, R1, R2, R3, R4, and ESW1 connected in a hierarchical structure. Below the topology, the 'Links' section contains a table listing all existing connections between devices.

Device A	Device A Port	Device B	Device B Port	Link Type	Options
R1	f0/0	ESW1	f0/0	ethernet	
R2	f0/0	ESW1	f0/1	ethernet	
ESW1	f0/5	R3	f0/0	ethernet	
PC1	e0	R1	f0/1	ethernet	
R2	2/0	R4	0/0	ethernet	

Copyright © GNS3 Web Admin 2022

Device Configuration:

Routers:

A simple interface enables the user to:

- Get Running Configuration.

The screenshot shows the GNS3 Web Admin interface. The breadcrumb navigation is: Connections → 192.168.56.1:3080 → Projects → mini_project → Devices → R1 → View. The device status is 'started'. The console address is 192.168.56.101:5001 and the console type is telnet. Below the status bars are buttons for 'Get Running Config', 'Get Startup Config', 'Get IP Routes', and 'Copy Running to Startup Config'. There are also buttons for 'Configure Interfaces IP Address' and 'Configure Static Route'. A 'Ping Address' section has an input field for 'IP Address' and a 'Ping' button. The 'Running Configuration' section is expanded, showing the following configuration:

```
building configuration...

Current configuration : 1139 bytes
!
upgrade fpd auto
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R1
!
boot-start-marker
boot-end-marker
!
logging message-counter syslog
!
no aaa new-model
ip source-route
no ip icmp rate-limit unreachable
ip cef
!
!
```

- Get Startup Configuration.

The screenshot shows the GNS3 Web Admin interface with the same breadcrumb navigation and device status as the previous screenshot. The 'Startup Configuration' section is expanded, showing the following configuration:

```
Using 408 out of 52232 bytes!
!
!
!
!
!
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R1
!
ip cef
no ip domain-lookup
no ip icmp rate-limit unreachable
ip tcp synwait 5
no cdp log mismatch duplex
!
!
line con 0
exec-timeout 0 0
logging synchronous
privilege level 15
no login
line aux 0
exec-timeout 0 0
```

- Get IP Routes.

The screenshot shows the GNS3 Web Admin interface. The breadcrumb navigation is: Connections → 192.168.56.1:3080 → Projects → mini_project → Devices → R1 → View. The user is logged in as 'admin'. The main heading is 'Device: R1 - Router'. Below this, there are four status boxes: PROJECT NAME (mini_project), DEVICE STATUS (started), CONSOLE (192.168.56.101:5001), and CONSOLE TYPE (telnet). There are buttons for 'Get Running Config', 'Get Startup Config', 'Get IP Routes' (which is active), and 'Copy Running to Startup Config'. To the right are buttons for 'Configure Interfaces IP Address' and 'Configure Static Route'. Below these is a 'Ping Address' section with an input field for 'IP Address' and a 'Ping' button. The 'IP Routes' section is expanded, showing a list of codes (C - connected, S - static, R - RIP, M - mobile, B - BGP, etc.) and a gateway of last resort is not set. The interface also shows a copyright notice for GNS3 Web Admin 2022.

- Copy the startup configuration from running.
- Configure each interface's IP address.

The screenshot shows the GNS3 Web Admin interface for configuring IP addresses on device interfaces. The breadcrumb navigation is: Connections → 192.168.56.1:3080 → Projects → mini_project → Devices → R1 → Configure Interfaces IP Address. The user is logged in as 'admin'. The main heading is 'Device Interfaces IP Address'. Below this is a 'Configure IP Addresses' section. It contains four columns for different interfaces: FastEthernet0/0, FastEthernet0/1, GigabitEthernet1/0, and GigabitEthernet2/0. Each column has input fields for 'IP Address' and 'Mac Address'. There is a 'Create' button at the bottom left. The interface also shows a copyright notice for GNS3 Web Admin 2022.

- Configure Static Routes.

The screenshot shows the GNS3 Web Admin interface. The breadcrumb trail is: Connections → 192.168.56.1:3080 → Projects → mini_projet → Devices → R1 → Configure Static Route. The page title is "Device Interfaces IP Address". The main form is titled "Configure IP Addresses" and contains the following fields:

- Action: A dropdown menu with "Add" selected.
- Network IP Address: A text input field with "IP Address" as a placeholder.
- Mask: A text input field with "Mask" as a placeholder.
- Default Gateway: A text input field with "Default Gateway" as a placeholder.

There is a "Configure" button at the bottom of the form. The footer shows "Copyright © GNS3 Web Admin 2022".

- Ping other devices in the network.

The screenshot shows the GNS3 Web Admin interface. The breadcrumb trail is: Connections → 192.168.56.1:3080 → Projects → mini_projet → Devices → R1 → View. The page title is "Device: R1 - Router". The page contains several status boxes and buttons:

- PROJECT NAME: mini_projet
- DEVICE STATUS: started
- CONSOLE: 192.168.56.101:5001
- CONSOLE TYPE: telnet

Buttons include: Get Running Config, Get Startup Config, Get IP Routes, Copy Running to Startup Config, Configure Interfaces IP Address, and Configure Static Route.

The "Ping Address" section shows a text input with "192.168.1.10" and a "Ping" button. Below this, a console window displays the following output:

```
Pinging 192.168.1.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.10, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 8/9/12 ms
```

The footer shows "Copyright © GNS3 Web Admin 2022".

Switches:

Using this interface, the user is able to:

- Get Running Configuration.

The screenshot displays the GNS3 Web Admin interface. The top navigation bar shows the path: Connections → 192.168.56.1:3080 → Projects → mini_projet → Devices → ESW1 → View. The left sidebar contains links for Dashboard and Device Linking. The main content area is titled "Device: ESW1 - Switch". It features several status boxes: PROJECT NAME (mini_projet), DEVICE STATUS (started), CONSOLE (192.168.56.101:5002), and CONSOLE TYPE (telnet). Below these are buttons for "Get Running Config", "Get Startup Config", "Get Vlan", and "Copy Running to Startup Config". There are also buttons for "Create Vlan" and "Configure Ports Access Mode". A "Ping Address" section includes an input field for the IP address and a "Ping" button. The "Running Configuration" section is expanded, showing the following configuration text:

```
Building configuration...

Current configuration : 1893 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
no service dhcp
!
hostname ESW1
!
boot-start-marker
boot-end-marker
!
!
no aaa new-model
memory-size iomem 15
no ip routing
no ip icmp rate-limit unreachable
!
!
no ip cef
no ip domain lookup
```

- Page 10 of 10

GNS3 WEB ADMIN

[admin](#)

[Home](#) →
 [Connections](#) →
 [192.168.56.1:3080](#) →
 [Projects](#) →
 [mini_project](#) →
 [Devices](#) →
 [ESW1](#) →
 [View](#)

Dashboard
Device Linking

[<](#)

Device: ESW1 - Switch

PROJECT NAME

mini_project

DEVICE STATUS

started

CONSOLE

192.168.56.101:5002

CONSOLE TYPE

telnet

[Get Running Config](#)
[Get Startup Config](#)
[Get Vlans](#)
[Copy Running to Startup Config](#)

[Create VLAN](#)
[Configure Ports Access Mode](#)

Ping Address

[Ping](#)

Startup Configuration

```
Using 3324 out of 52232 bytes!
!
!
!
!
!
!
!
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
no service dhcp
!
hostname ESW1
!
ip cef
no ip routing
no ip domain-lookup
no ip icmp rate-limit unreachable
ip tcp synwait 5
no cdp log mismatch duplex
vtp file nvram:vlan.dat
```

GNSS WEB ADMIN

Dashboard
Device Linking

Connections
192.168.56.1:3080
Projects
mini_project
Devices
ESW1
View

admin

Device: ESW1 - Switch

PROJECT NAME

mini_project

DEVICE STATUS

started

CONSOLE

192.168.56.101:5002

CONSOLE TYPE

telnet

Get Running Config

Get Startup Config

Get Vlans

Copy Running to Startup Config

Create Vlan

Configure Ports Access Mode

Ping Address

IP Address

Ping

Vlans

VLAN Name	Status	Ports
1 default	active	Fa0/0, Fa0/1, Fa0/2, Fa0/3, Fa0/4, Fa0/5, Fa0/6, Fa0/7, Fa0/8, Fa0/9, Fa0/10, Fa0/11, Fa0/12, Fa0/13, Fa0/14, Fa0/15
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

VLAN	Type	SAID	MTU	Parent	RingNo	BridgNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	-	1002	1003
1002	fddi	101002	1500	-	-	-	-	-	1	1003
1003	tr	101003	1500	1005	0	-	-	srdb	1	1002
1004	fdnet	101004	1500	-	-	1	1bm	-	0	0
1005	trnet	101005	1500	-	-	1	1bm	-	0	0

Copyright © GNSS Web Admin 2022

- Copy the startup configuration from running.
- Create Vlan.

GNS3 WEB ADMIN

Connections → 192.168.56.1:3080 → Projects → mini_project → Devices → ESW1 → Create Vlan

admin

Device Vlan

New Vlan

Vlan Number

Vlan Number

Create

Copyright © GNS3 Web Admin 2022

- Setup Switchport mode for each interface.

GNS3 WEB ADMIN

Connections → 192.168.56.1:3080 → Projects → mini_project → Devices → ESW1 → Configure Ports Access Mode

admin

Device Vlan Mode Setup

Vlan Setup

<p>Interface <input type="checkbox"/> FastEthernet0/0</p> <p>Action: Add</p> <p>Access Mode: Open this select menu</p> <p>Vlan: Open this select menu</p>	<p>Interface <input type="checkbox"/> FastEthernet0/1</p> <p>Action: Add</p> <p>Access Mode: Open this select menu</p> <p>Vlan: Open this select menu</p>	<p>Interface <input type="checkbox"/> FastEthernet0/2</p> <p>Action: Add</p> <p>Access Mode: Open this select menu</p> <p>Vlan: Open this select menu</p>	<p>Interface <input type="checkbox"/> FastEthernet0/3</p> <p>Action: Add</p> <p>Access Mode: Open this select menu</p> <p>Vlan: Open this select menu</p>
<p>Interface <input type="checkbox"/> FastEthernet0/4</p> <p>Action: Add</p> <p>Access Mode: Open this select menu</p> <p>Vlan: Open this select menu</p>	<p>Interface <input type="checkbox"/> FastEthernet0/5</p> <p>Action: Add</p> <p>Access Mode: Open this select menu</p> <p>Vlan: Open this select menu</p>	<p>Interface <input type="checkbox"/> FastEthernet0/6</p> <p>Action: Add</p> <p>Access Mode: Open this select menu</p> <p>Vlan: Open this select menu</p>	<p>Interface <input type="checkbox"/> FastEthernet0/7</p> <p>Action: Add</p> <p>Access Mode: Open this select menu</p> <p>Vlan: Open this select menu</p>
<p>Interface <input type="checkbox"/> FastEthernet0/8</p> <p>Action: Add</p> <p>Access Mode: Open this select menu</p> <p>Vlan: Open this select menu</p>	<p>Interface <input type="checkbox"/> FastEthernet0/9</p> <p>Action: Add</p> <p>Access Mode: Open this select menu</p> <p>Vlan: Open this select menu</p>	<p>Interface <input type="checkbox"/> FastEthernet0/10</p> <p>Action: Add</p> <p>Access Mode: Open this select menu</p> <p>Vlan: Open this select menu</p>	<p>Interface <input type="checkbox"/> FastEthernet0/11</p> <p>Action: Add</p> <p>Access Mode: Open this select menu</p> <p>Vlan: Open this select menu</p>

Copyright © GNS3 Web Admin 2022

Guest (PC):

Using this interface, the user is able to:

- Show IP Address.

GNS3 WEB ADMIN

Connections → 192.168.56.1:3080 → Projects → mini_projet → Devices → PC1 → View

admin

Device: PC1 - Guest

PROJECT NAME: mini_projet

DEVICE STATUS: started

CONSOLE: 192.168.56.1:5000

CONSOLE TYPE: telnet

Show IP Address

Configure Device IP Address

Ping Address

IP Address

Ping

IP Address

```
show ip
NAME      : PC1[1]
IP/MASK   : 192.168.1.10/24
GATEWAY   : 192.168.1.1
DNS       :
MAC       : 08:5b:79:66:66:00
LPORT     : 10001
RHOST:PORT : 127.0.0.1:10002
MTU       : 1500

PC1>
```

Copyright © GNS3 Web Admin 2022

- Configure IP Address.

GNS3 WEB ADMIN

Connections → 192.168.56.1:3080 → Projects → mini_projet → Devices → PC1 → Configure IP Address

admin

Configure IP Address

Device IP Address

IP Address

IP Address

Mask

Mask

Default Gateway

Default Gateway

Configure

Copyright © GNS3 Web Admin 2022

- Ping other devices in the network.

The screenshot displays the GNS3 Web Admin interface. On the left is a blue sidebar with the title 'GNS3 WEB ADMIN' and navigation links for 'Dashboard' and 'Device Linking'. The main content area has a breadcrumb trail: 'Connections' → '192.168.56.1:3080' → 'Projects' → 'mini_projet' → 'Devices' → 'PC1' → 'View'. The user 'admin' is logged in. The page title is 'Device: PC1 - Guest'. There are four status cards: 'PROJECT NAME' (mini_projet), 'DEVICE STATUS' (started), 'CONSOLE' (192.168.56.1:5000), and 'CONSOLE TYPE' (telnet). Below these are buttons for 'Show IP Address' and 'Configure Device IP Address'. A 'Ping Address' field contains '192.168.1.1' with a 'Ping' button. A scrollable console window titled 'Pinging 192.168.1.1' shows the output of a ping command: 'ping 192.168.1.1' followed by five successful responses from 192.168.1.1 with varying times. The console ends with 'PC1>'. The footer contains 'Copyright © GNS3 Web Admin 2022' and an upward arrow icon.

GNS3 WEB ADMIN

Dashboard

Device Linking

Connections → 192.168.56.1:3080 → Projects → mini_projet → Devices → PC1 → View

admin

Device: PC1 - Guest

PROJECT NAME
mini_projet

DEVICE STATUS
started

CONSOLE
192.168.56.1:5000

CONSOLE TYPE
telnet

Show IP Address

Configure Device IP Address

Ping Address
192.168.1.1

Ping

Pinging 192.168.1.1

```
ping 192.168.1.1

84 bytes from 192.168.1.1 icmp_seq=1 ttl=255 time=38.912 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=255 time=11.364 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=255 time=16.814 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=255 time=8.863 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=255 time=17.121 ms

PC1>
```

Copyright © GNS3 Web Admin 2022