

# *Advanced Communication Services*

## **GNS3 Intro**

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- 1 Objectives
- 2 The Network Simulator
- 3 A simple example

- 4 GNS3 important files
- 5 CISCO IOS basic commands



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# Objectives

- Learn about installing, configuring and using GNS3 (Graphical Network Simulator)
- Design real case test scenarios, learning by example



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# The Network Simulator

## Graphical Network Simulator, GNS3

- Allows to create complex network with GUI
- Emulates CISCO IOS using *dynamips*
- Multiplatform, opensource and allowing VirtualBox and Wireshark integration
- Current version 2.2
- More at [www.gns3.com](http://www.gns3.com)



# The Network Simulator

## Installation

- 1 Read instructions for Linux distros (binaries and source) at [GNS3 Install instructions](#)
- 2 [Click here](#) for instructions and download
- 3 Install **dynamips** emulator from binaries according to your distro
- 4 Get [dynamips source code](#) if binaries don't exist for your distro or fixes required on Fedora 26 ([Read this](#))



# The Network Simulator

## Configuration

- 1 Run GNS3 on localhost
- 2 Go to Edit > Preferences > Server. Check if **ubridge** exists on your system. Otherwise, [download source code](#), compile it and install
- 3 Go to Edit > Preferences > Dynamips and check if path is correct
- 4 Go to Edit > Preferences > General. Set paths for Projects and Images
- 5 Download and extract CISCO 7200 image to \$GNS3/Images from [CISCO 7200 image](#)
- 6 [CISCO 7200 image in local server](#)

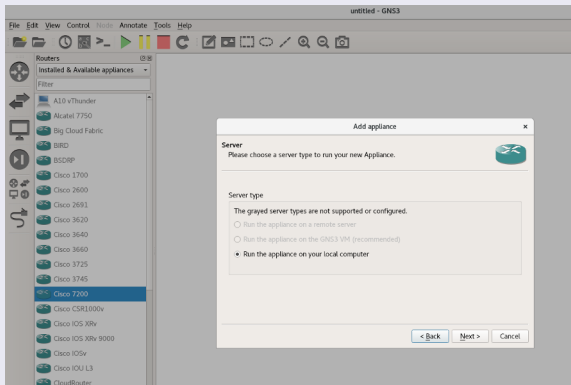




# The Network Simulator

## Configuration

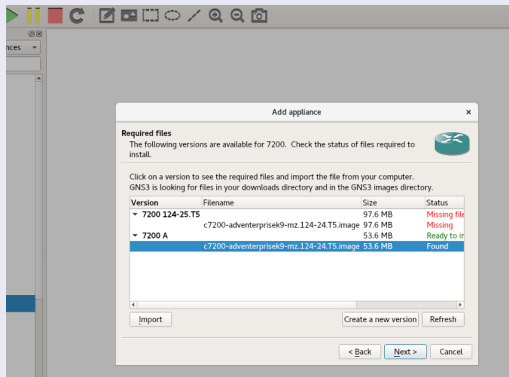
- From installed & available appliances, drag and drop Cisco 7200 in a new project canvas



# The Network Simulator

## Configuration

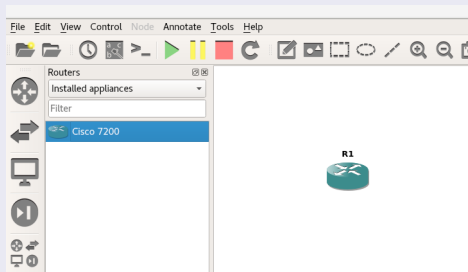
- 8 Create a new version and import the new downloaded image



# The Network Simulator

## Configuration

- 9 Now, the new router is available in Installed Appliances



# The Network Simulator

## Configuration

- 10 If required, as root, include user into wireshark group

```
% usermod -a -G wireshark cesar
```



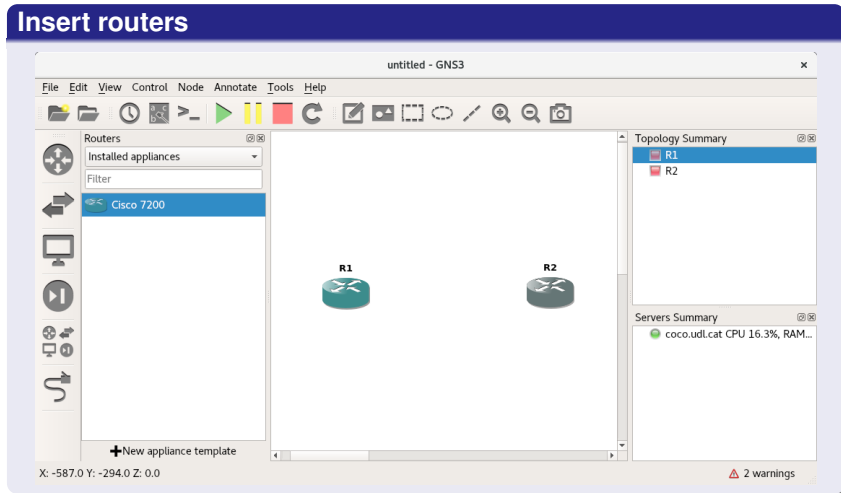
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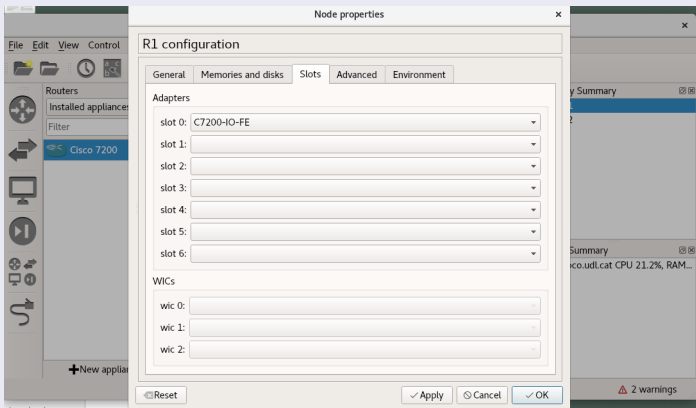
# A simple example

## Insert routers



# A simple example

## Configure slots and interfaces

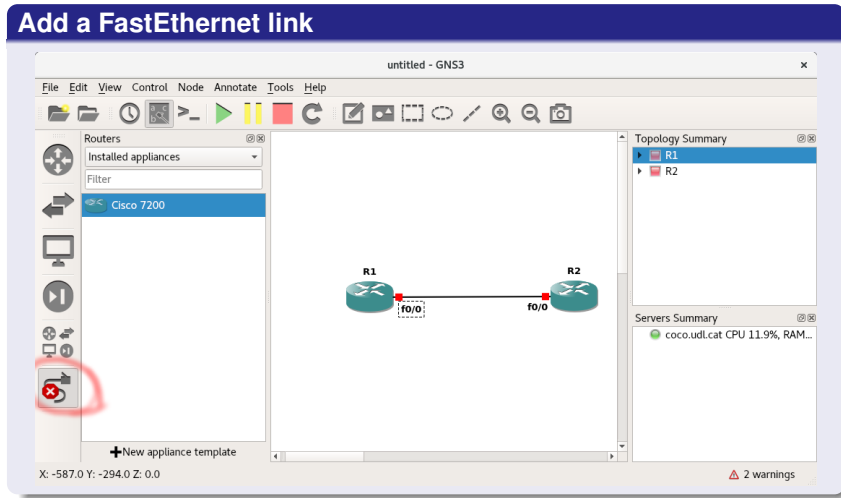


Right click on router. Select configure. Choose slot/0 and 1 port FastEthernet



# A simple example

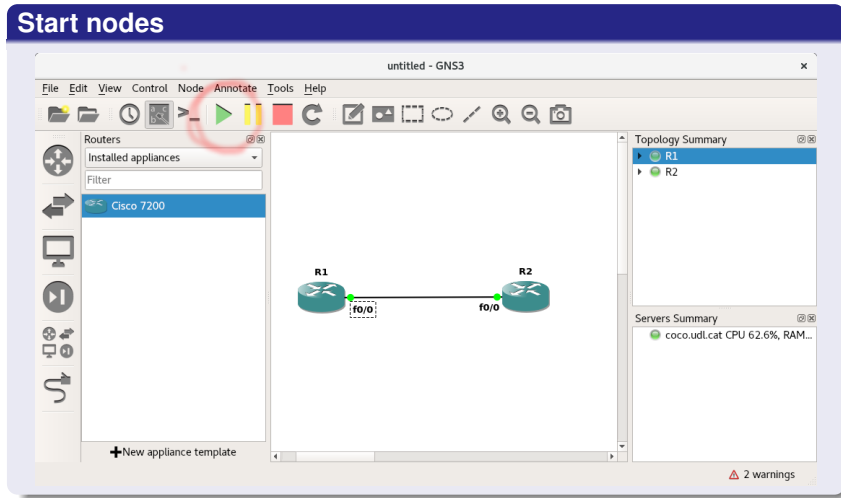
## Add a FastEthernet link





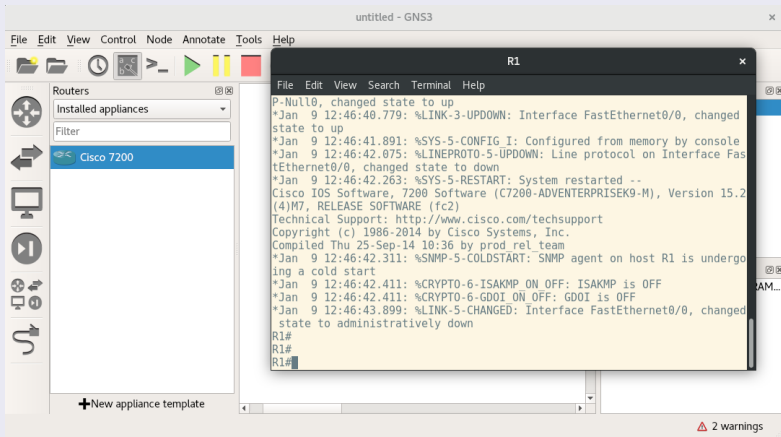
# A simple example

## Start nodes



# A simple example

## Open console for router configuration



Right click on router. Select console



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# GNS3 important files

## Topology

- Saved at  
`$GNS3/Projects/ProjectName/ProjectName.gns3`
- Links and nodes detailed. JSON Notation



# GNS3 important files

## ProjectName.net (Link info)

```

"topology": {
  "computes": [],
  "drawings": [],
  "links": [
    {
      "filters": {},
      "link_id": "0e2bf692-5e3b-4e65-8423-b5b445fafa73",
      "nodes": [
        {
          "adapter_number": 0,
          "label": {
            "rotation": 0,
            "style": "font-family: TypeWriter;font-size: 10.0;font-weight: bold;fill: #000000;fi",
            "text": "f0/0",
            "x": 72,
            "y": 26
          },
          "node_id": "6feld4bf-758c-4340-8d6e-fedfbab48763",
          "port_number": 0
        },
        {
          "adapter_number": 0,
          "label": {
            "rotation": 0,
            "style": "font-family: TypeWriter;font-size: 10.0;font-weight: bold;fill: #000000;fi",
            "text": "f0/0",
            "x": -6,
            "y": 17
          },
          "node_id": "e6ebfc40-e454-43e3-98b1-6a378f57deef",
          "port_number": 0
        }
      ],
      "suspend": false
    }
  ]
}

```



# GNS3 important files

## ProjectName.net (Node info)

```
"nodes": [
  {
    "compute_id": "local",
    "console": 5000,
    "console_type": "telnet",
    "first_port_name": null,
    "height": 45,
    "label": {
      "rotation": 0,
      "style": "font-family: TypeWriter;font-size: 10.0;font-weight: bold;fill: #000000;fill-opacity: 0.5",
      "text": "R1",
      "x": 19,
      "y": -25
    },
    "name": "R1",
    "node_id": "6feld4bf-758c-4340-8d6e-fedfbab48763",
    "node_type": "dynamips",
    "port_name_format": "Ethernet{0}",
    "port_segment_size": 0,
    "properties": {
      "auto_delete_disks": true,
      "aux": null,
      "clock_divisor": 4,
      "disk0": 0,
      "disk1": 0,
      "dynamips_id": 1,
      "exec_area": 64,
      "idlemax": 500,
      "idlepc": "0x606df838",
      "idlesleep": 30,
      "image": "c7200-adventerprisek9-mz.124-24.T5.image",
      "image_md5sum": "1fe8d7d82cb8261a7487d543f172b985",
      "iomem": 5,
      "mac_addr": "ca01.1805.0000",
```



# GNS3 important files

## Router Configurations

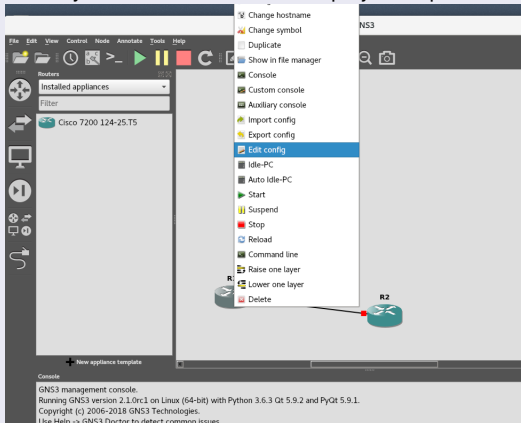
- Saved at  
\$GNS3/Projects/ProjectName/project-files/  
/dynamips/NodeID/configs/iX\_startup-config.cfg
  - Where **NodeID** corresponds to `node_id` as in topology file
  - and **X** is the assigned number by GNS3



# GNS3 important files

## Router Configurations

- Configuration may be edited from GUI when project stopped





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# CISCO IOS basic commands

- Cisco IOS Configuration Fundamentals Configuration Guide, Release 15.OS
- IP Addressing Configuration Guide Library, Cisco IOS Release 15M&T
- Self-completion commands (tab) and help (?)

## Interfaces and saving configuration

```
R1# config terminal
R1(config)# interface FastEthernet 0/0
R1(config-if)# ip address 10.0.0.1 255.255.255.0
R1(config-if)# no shutdown
R1(config-if)# exit
R1(config)# exit
R1# copy running-config startup-config

R1# ping 10.0.0.1
```

