

FRANCISCO JOSÉ DE CALDAS DISTRICT UNIVERSITY



UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS
Acreditación Institucional de Alta Calidad

PROFESSOR:

Carlos Andrés Sierra Virgüez

Gabriela Martínez Eslava

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UBI
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SYSTEMS ENGINEERING - FACULTY OF ENGINEERING
COMPUTING NETWORKING I

WORKSHOP I

Bogotá C.D.

2024

I. OBJECTIVE

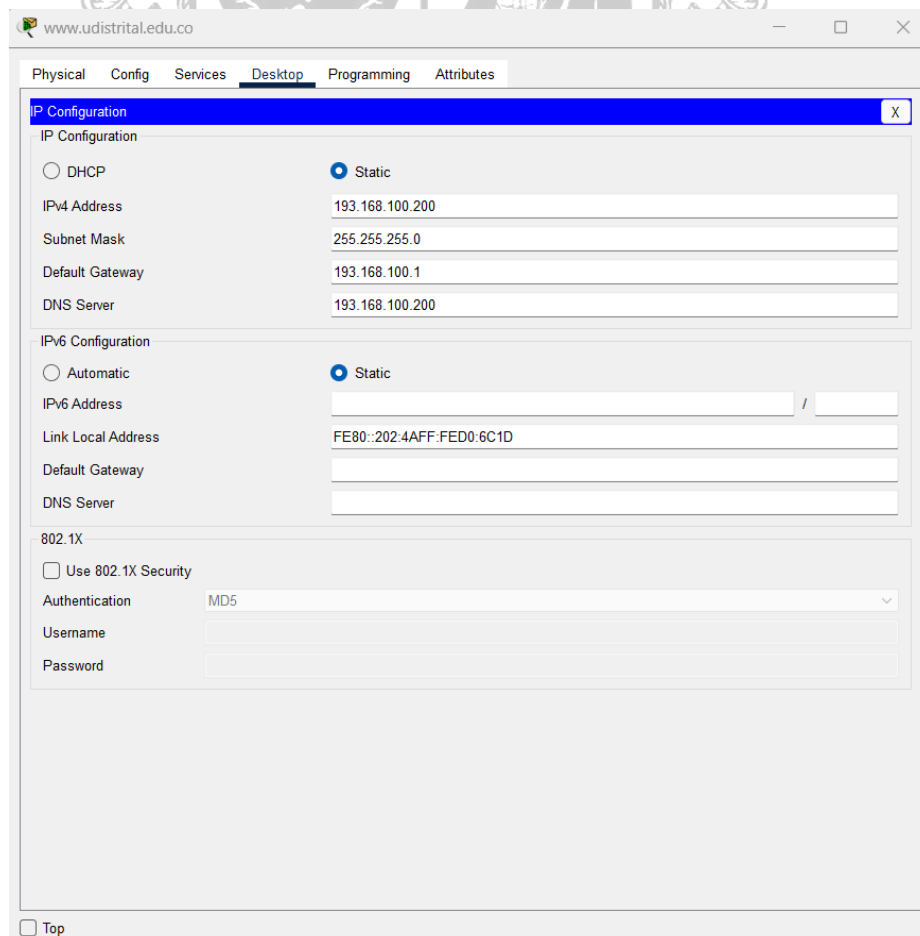
The aim of this workshop is to implement a network infrastructure using Cisco Packet Trace applied to a functional network for the Universidad Distrital Francisco José de Caldas, which includes configuring a web server with a static public IP, DNS, DHCP services, and testing access from client devices. The final deliverables will include a network design file, a custom HTML webpage, and a detailed report of the technical configurations and tests performed.

II. WORKSHOP

The steps for carrying out the workshop will be described below:

1. SETTING UP SERVER CONFIGURATION

first step is getting “Server-TP” from end devices, it is necessary setting up the data of the server: *IPv4, Subnet Mask, Default Gateway and DNS Server.*



The screenshot shows the 'IP Configuration' window in Cisco Packet Tracer. The window has tabs for Physical, Config, Services, Desktop, Programming, and Attributes. The 'Config' tab is selected, and the 'IP Configuration' sub-tab is active. The window is divided into two main sections: IP Configuration and IPv6 Configuration. In the IP Configuration section, the 'Static' radio button is selected. The fields are filled with: IPv4 Address: 193.168.100.200, Subnet Mask: 255.255.255.0, Default Gateway: 193.168.100.1, and DNS Server: 193.168.100.200. In the IPv6 Configuration section, the 'Static' radio button is also selected. The fields are: IPv6 Address: (empty), Link Local Address: FE80::202:4AFF:FED0:6C1D, Default Gateway: (empty), and DNS Server: (empty). Below these sections is the '802.1X' section, which includes a checkbox for 'Use 802.1X Security' (unchecked), a dropdown for 'Authentication' (set to MD5), and fields for 'Username' and 'Password' (both empty). A 'Top' button is located at the bottom left of the window.

Subsequently, in the HTTP services section, we delete the default files and import the website that should be displayed at www.udistrital.edu.co.

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

HTTP

HTTP ☒ On ☐ Off

HTTPS ☒ On ☐ Off

File Manager

File Name	Actions
1 FT.jpg	(delete)
2 UD.jpg	(delete)
3 index.HTML	(edit) (delete)
4 style.css	(edit) (delete)

Then, proceed to create the UDPool with the corresponding data.

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP**
- DHCPv6
- TFTP
- DNS
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- NTP
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- Radius EAP

DHCP

Interface: FastEthernet0 Service ☒ On ☐ Off

Pool Name: UDPool

Default Gateway: 193.168.100.200

DNS Server: 193.168.100.200

Start IP Address: 193 168 100 1

Subnet Mask: 255 255 255 0

Maximum Number of Users: 50

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
UDPool	193.168.1...	193.168.1...	193.168.1...	255.255.2...	50	0.0.0.0	0.0.0.0
serverPool	0.0.0.0	0.0.0.0	193.168.1...	255.255.2...	512	0.0.0.0	0.0.0.0



Then, DNS configuration needs to be carried out by using the *name* and *address* of the service.

The screenshot shows the 'Services' tab in the configuration window. The 'DNS' service is selected in the left sidebar. The main area shows the 'DNS Service' is turned 'On'. Under 'Resource Records', a record is configured with 'Name' as 'www.udistrital.edu.co', 'Type' as 'A Record', and 'Address' as '193.168.100.200'. A table below lists the configured records.

No.	Name	Type	Detail
0	www.udistrital.edu.co	A Record	193.168.100.200

2. CONNECTING THE SERVER TO THE CLOUD

To connect the server to the cloud, a Cloud-PT (it is going to be called “Internet”) device will be used. First, the cable from Coaxial7 to Ethernet 6 must be connected.

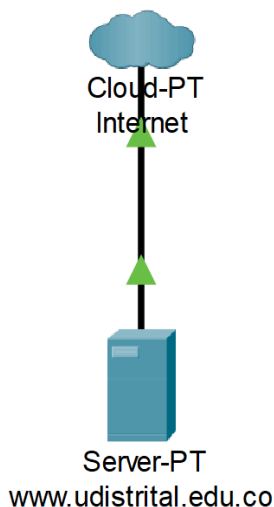
The screenshot shows the 'Internet' device configuration window. The 'Config' tab is active. In the 'Ethernet6' section, the 'Cable' option is selected, indicated by a red arrow. The 'Provider Network' is also visible.



To connect www.udistrital.edu.co to Internet was used copper straight-through, the reasons were:

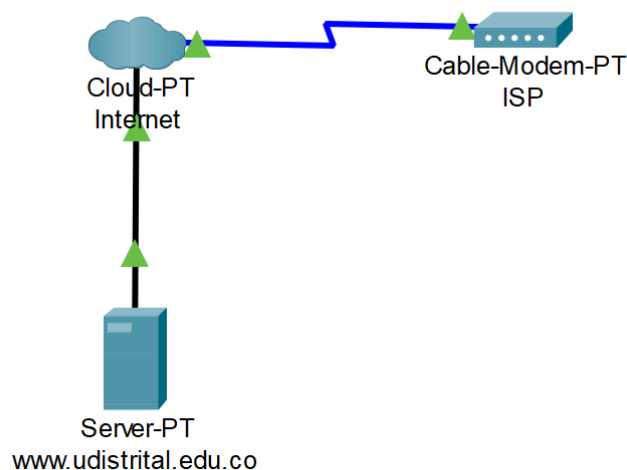
(1) **Stable physical connection:** For an on-premise server, it is important to have a reliable connection where interference and data loss are minimized.

(2) **Relatively low costs:** Copper cable remains a more affordable option compared to other technologies like fiber optics, especially for short distances.



3. CONNECTING *CABLE-MODEM-PT* TO INTERNET

it is necessary to connect a Cable-Modem-PT to the Internet. To do this, it was used the Cable-Modem-PT labeled as ISP, connecting it from Port0 to Coaxial7 of the internet.

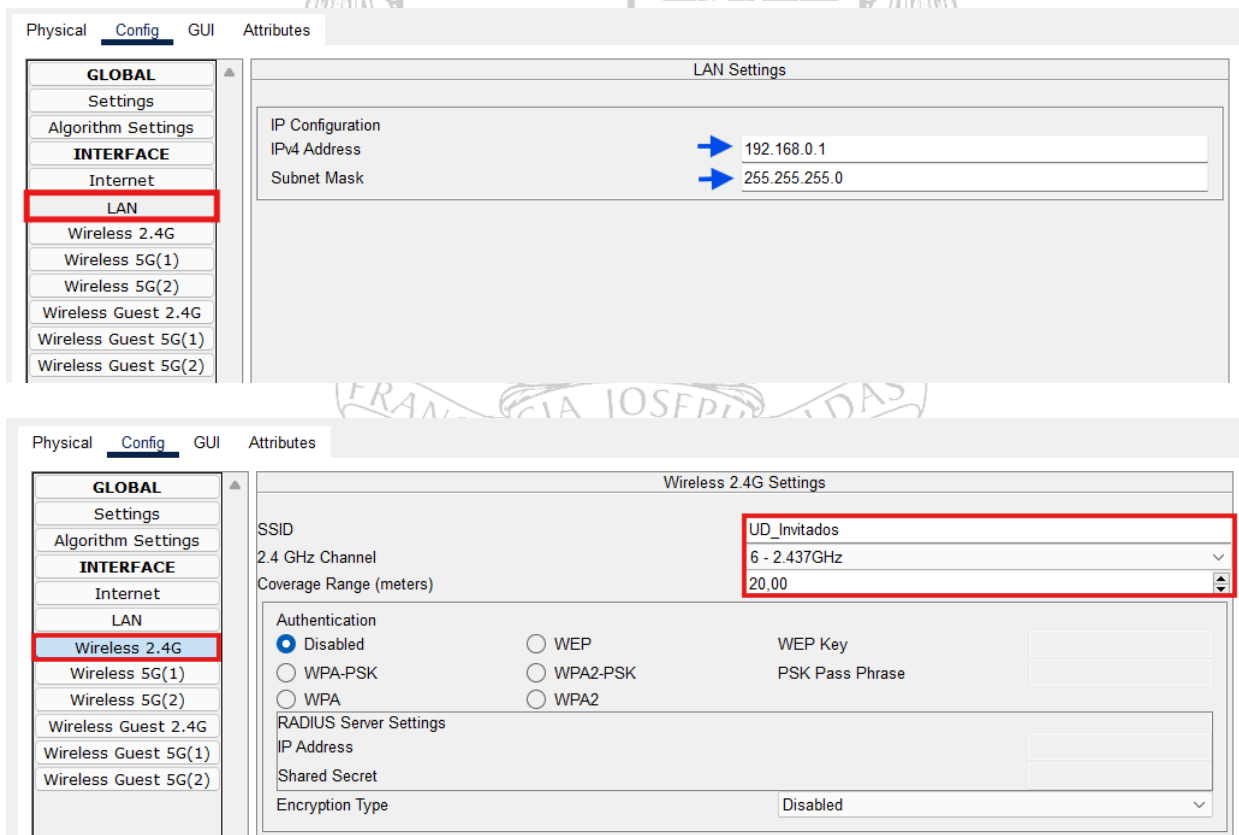


coaxial wire was used to connect these two devices for the following reasons:

- (1) **Stable physical connection:** Coaxial cables are designed to shield the signal from electromagnetic interference, making the connection more reliable.
- (2) **High bandwidth capacity:** Coaxial cables can handle a relatively high bandwidth, which makes them suitable for internet connections
- (3) **Cost-effective:** Coaxial cables are relatively inexpensive to install and maintain than others, like optic fiber, which makes them a good choice for this type of connection.

4. CONNECTING THE HOME-ROUTER

To verify any student or worker have access to the university website it is necessary to reach out to the ISP and request internet service at home. The ISP provided us *Home-Router* along with the following settings:



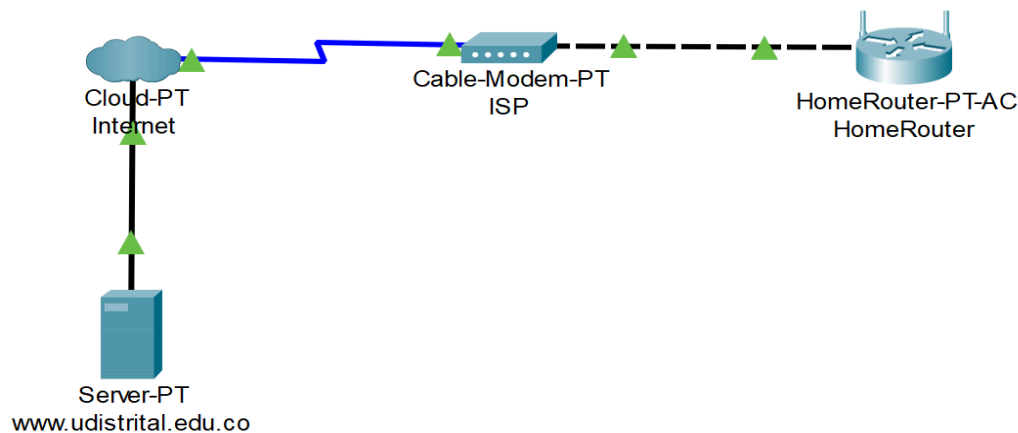
The image displays two screenshots of a home router's configuration interface, likely a MikroTik WinBox or similar. The top screenshot shows the 'LAN Settings' page. The 'IP Configuration' is set to 'Static', with the 'IPv4 Address' set to 192.168.0.1 and the 'Subnet Mask' set to 255.255.255.0. The bottom screenshot shows the 'Wireless 2.4G Settings' page. The 'SSID' is set to 'UD_Invitados', the '2.4 GHz Channel' is set to '6 - 2.437GHz', and the 'Coverage Range (meters)' is set to '20.00'. The 'Authentication' is set to 'Disabled'. The 'WPA-PSK' and 'WPA2-PSK' options are also visible, but not selected. The 'RADIUS Server Settings' section is also visible, with 'IP Address' and 'Shared Secret' fields.

then, *Home-Router* must be connected to the *Cable-Modem*. For that purpose was used twisted pair cable, for these reasons:

(1)**Reliable data transmission:** Twisted pair cables (in this case, we may consider CAT 6e), provide a stable and reliable connection with minimal data loss.

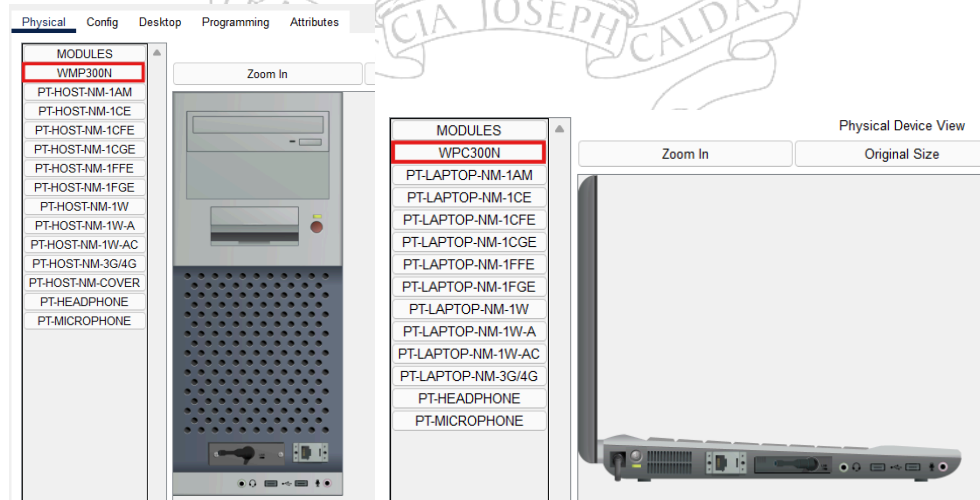
(2)**High-speed data transfer:** Twisted pair cables can support high-speed data transfers, with cables capable of handling speeds up to 10Gbps in at a distance of up to 100 meters, much **more than enough** for this case, considering that the router is configured for a distance of 20m.

(3) **Cost-effective:** Twisted pair cable covers all necessities for *ISP* and *Home-Router* Connection at low cost.



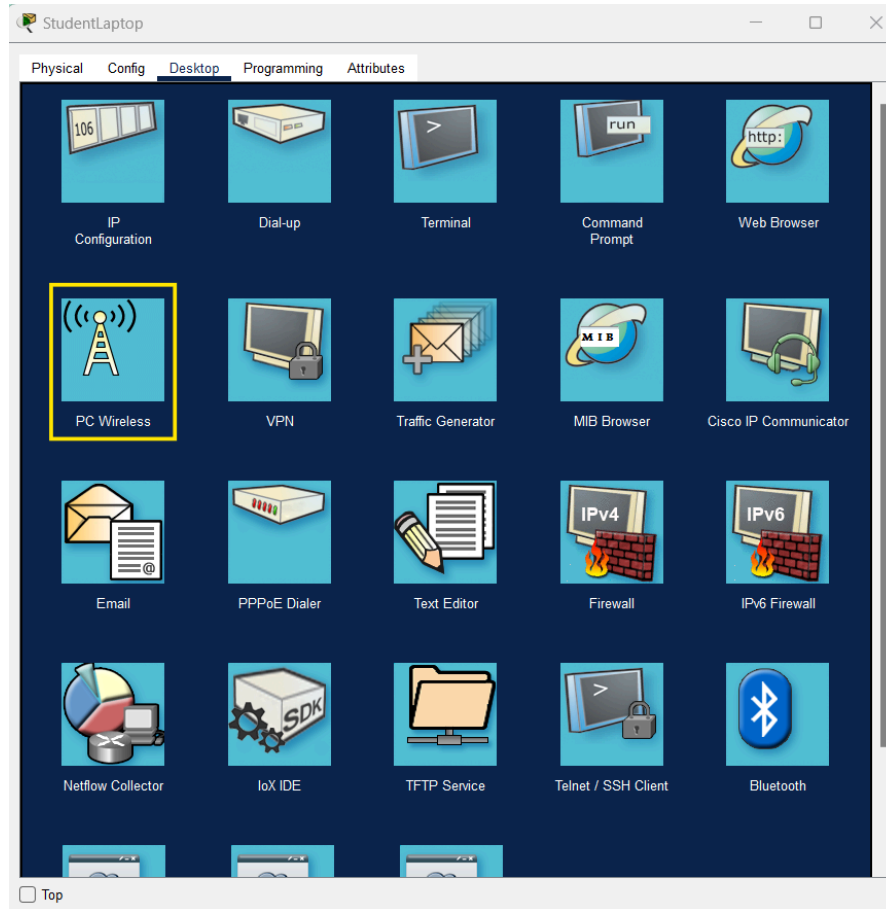
5. CONNECTING DEVICES TO THE NETWORK

Connecting the following modules to *WorkerPC* and the *StudentLaptop*:

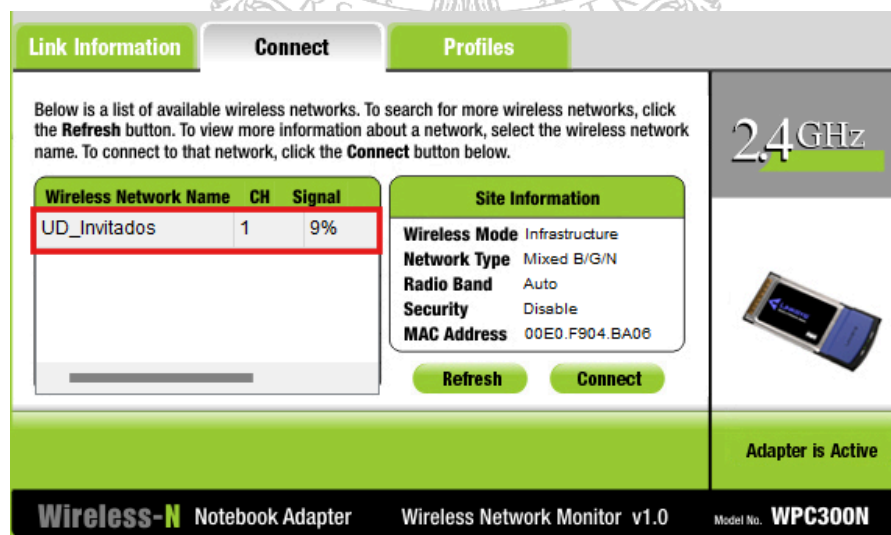




In desktop, click *PC Wireless* to connect a available network.

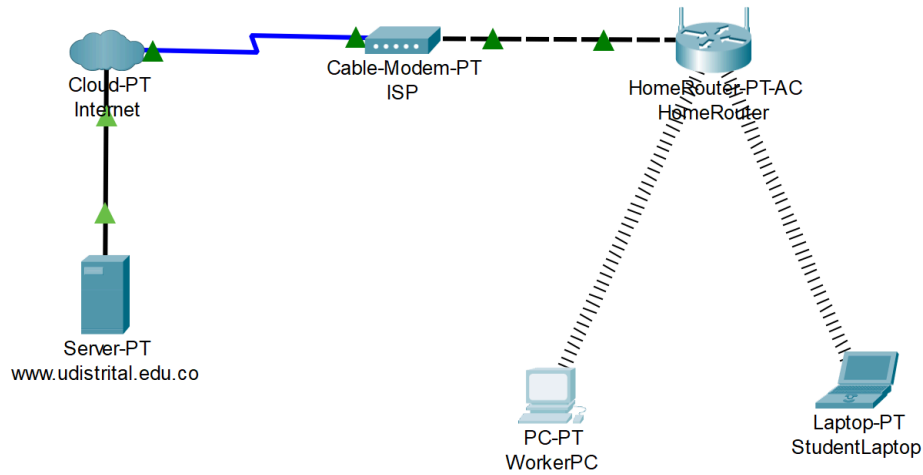


Then, we select 'UD_Invitados' Wi-Fi network





¡Devices connection is done!



To access the university website, go to *Desktop* -> *Web Browser*, and type www.udistrital.edu.co in the search bar.



Works! 😊

III. CONCLUSIONS

- It is crucial to pay special attention to the configuration of the devices, as entering an incorrect character will not only cause that device to malfunction but will also affect all connected devices: if one part of the network fails, the entire network will fail.
- It is very important to choose the correct cables to connect the devices, as this will ensure the proper functioning of the network and prevent data loss. This choice is also extremely important because it will allow for cost optimization, which is crucial in the real world.
- Networks are very interesting, and implementing this one was both fun and enriching.

