Networking and Data Communication

Networking H/618/5219
AC 4.1: Design a network to meet specified requirements.

Data Communication T/618/5211
AC 3.1: Create direct network communication between two users.
AC 3.2: Set up interconnection devices for direct communication.esign a network to meet specified requirements.

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Scenario

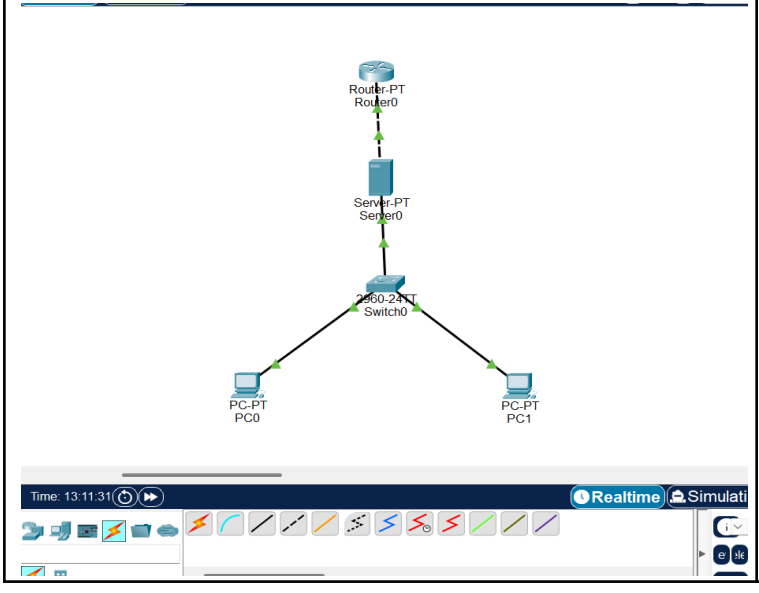
VividBrush Creations is a small sales and marketing agency based in Yorkshire and you have been employed and appointed their IT Administrator. As their IT Administrator, it is your responsibility to develop a network to allow them to meet their security requirements to protect sensitive data, maintain a robust defence against potential cyber threats and allow for the functionality they require.

Requirements of the network design must consider the following:

- VividBrush Creations has 4 departments, Finance, HR, Sales and Marketing.
- All employees can access all the files/data stored on their single shared server, and data transfer happens freely.
- Employees will need to be able to communicate via email.
- Employees rely heavily on the network infrastructure for daily operations.
- Employees have never been issued with guidance on how to store files securely, or how to create a strong password to initially access the network.
- Employees can work from the Yorkshire office, or from home, where they dial in using remote access software to obtain the files they need.
- Recently, an employee within the Sales Department received an email, unfortunately, they clicked the link within the email not aware it was a phishing scam – the phishing email should not have been able to reach the employee's inbox and been detected and quarantined prior.

Task 1) *Using Cisco Packet Tracer design a suitable network to meet the specified requirements (Networking 4.1, Data Communications 3.1, 3.2).*
Task 2) *Complete this document to show the purpose and characteristics of devices and technologies used (4.1).*

Task 1) Using Cisco Packet Tracer design a suitable network to meet the specified requirements (Networking 4.1, Data Communications 3.1, 3.2).



Annotation(s):

This is a shot of my network map

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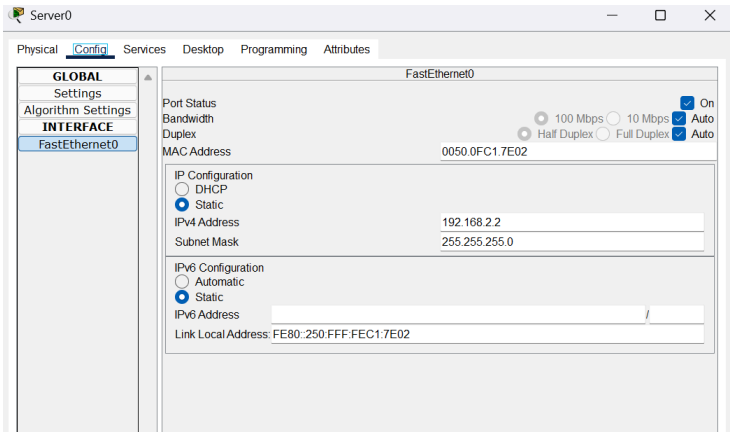
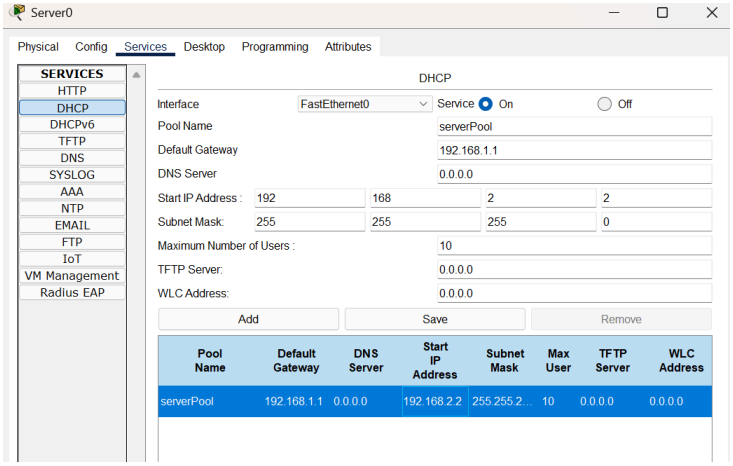
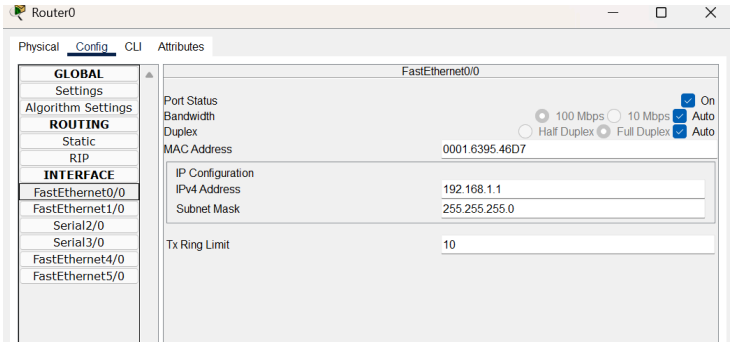
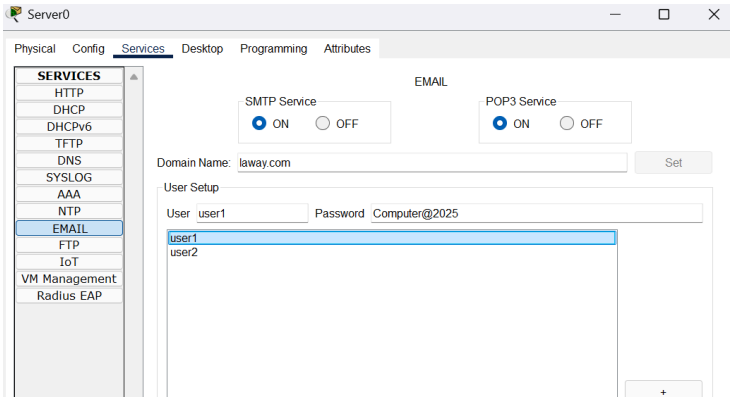
Screenshot showing interconnection devices such as switches, routers, bridges, wireless access points, mobile base stations.	**Annotation(s):**
	Firstly, I set up the IP configuration for FastEthernet 0 of Server0. I switched on the port status by checking ON, then filled in 192.168.2.2 for IPv4 Address after which Subnet Mask was filled automatically.
	Still on Server0, I configured the DHCP by clicking on Services and selecting DHCP. This procedure will automatically generate IP for connected devices. The generated IPs will be set to be within the range of Server0 IPv4. I switched the service on and filled in the default gateway 192.168.1.1. Updated the Start IP address with Subnet Mask updating automatically. I also reduced the maximum number of users to 10 and then clicked save.
	Then I set up the IP configuration for FastEthernet 0/0 of Router0. I switched on the port status by checking ON, then filled in 192.168.1.1 for IPv4 Address after which Subnet Mask was filled automatically.
	I configured the email service on the server by going on to Services, selected Email, then set my domain name to ‘’laway.com’’ and added the two PCs with a complex password.

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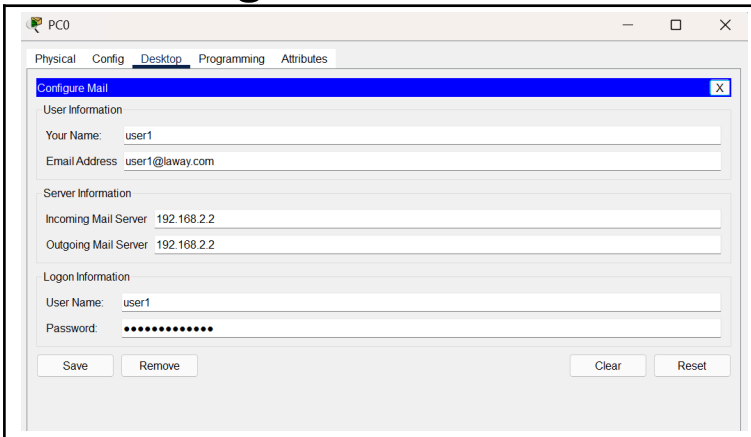
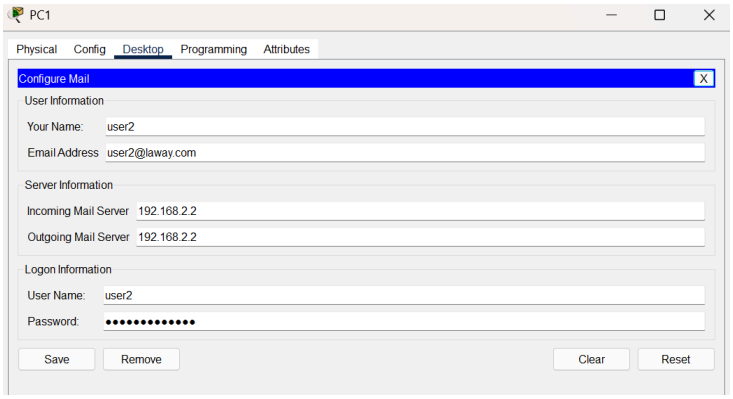
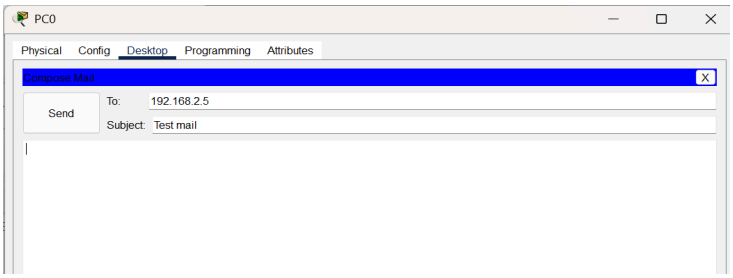


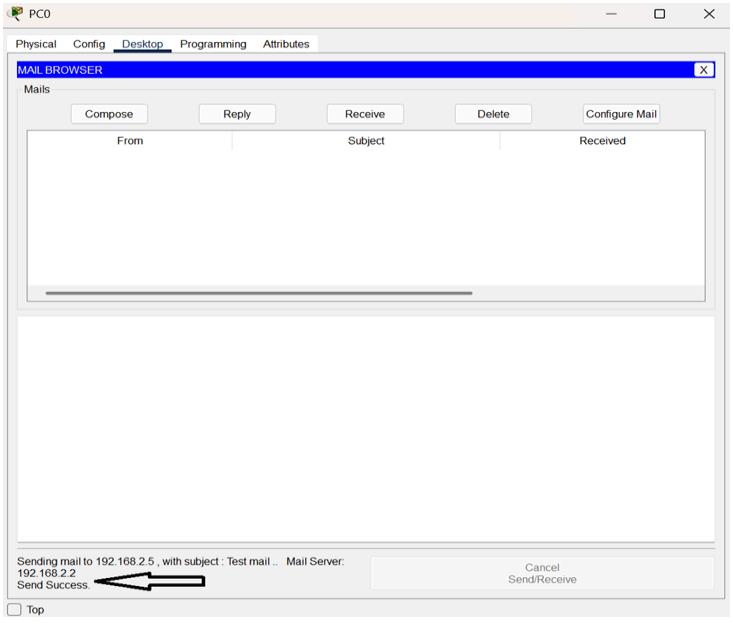
This shows how PC0 was configured for email access.



This shows how PC1 was configured for email access.

Screenshot showing direct network communication between two users.



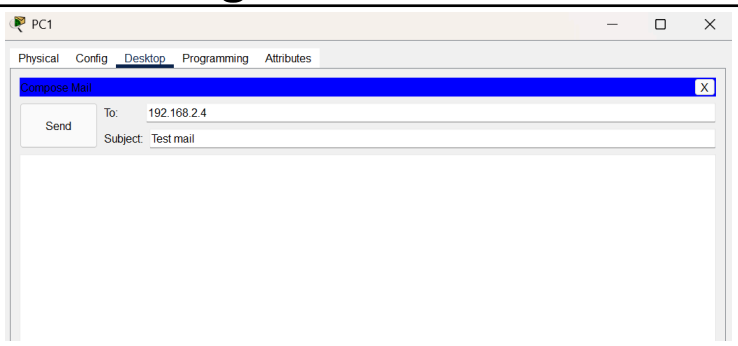


Annotation(s):

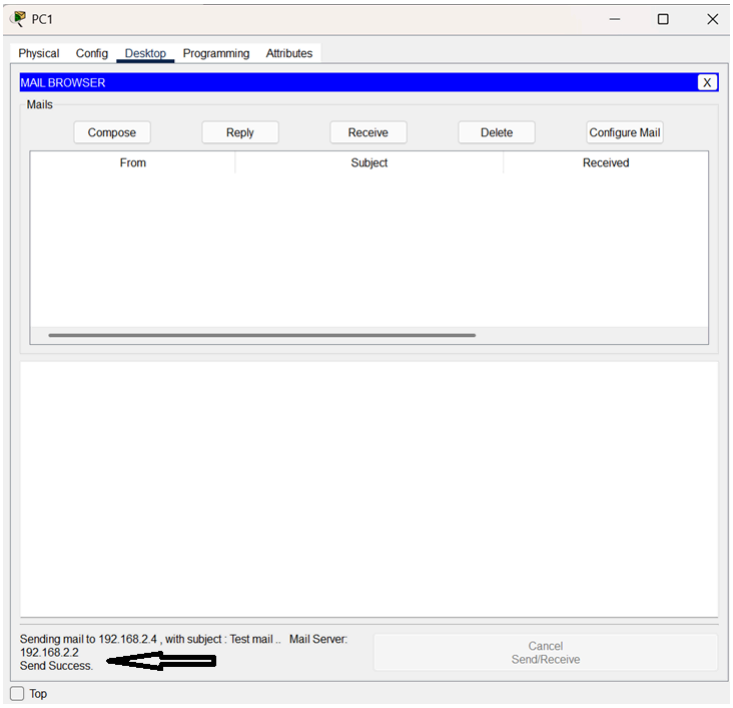
This is a show showing the recipient as PC1 and email subject ‘Test mail’.

Although, the sent and received messages did not show under ‘’From, Subject, and Received’’ but you can confirm the emails are successfully sent by following the black arrow (bottom left). Same thing applies to PC1.

This shot shows that the email PC0 sent to PC1 was a success.



This is a show showing the recipient as PC0 and email subject ‘Test mail’.



Although, the sent and received messages did not show under ‘’From, Subject, and Received’’ but you can confirm the emails are successfully sent by following the black arrow (bottom left).

This shot shows that the email PC1 sent to PC0 was a success.

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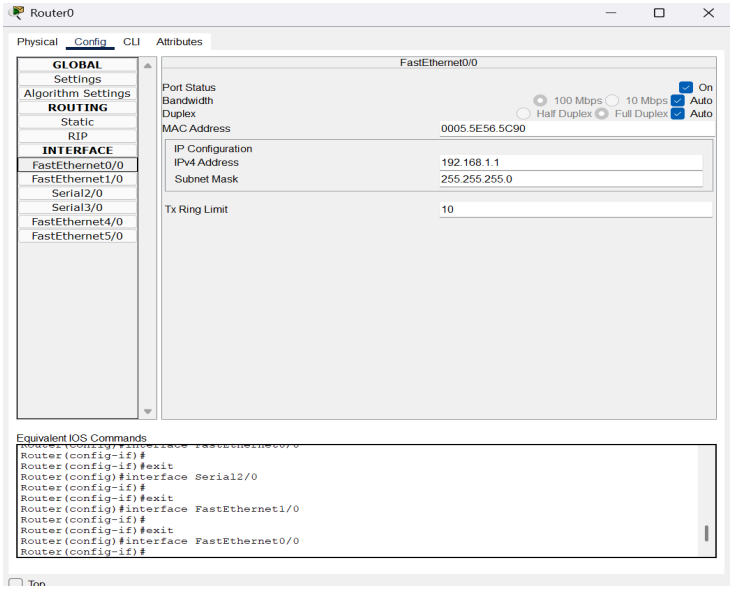
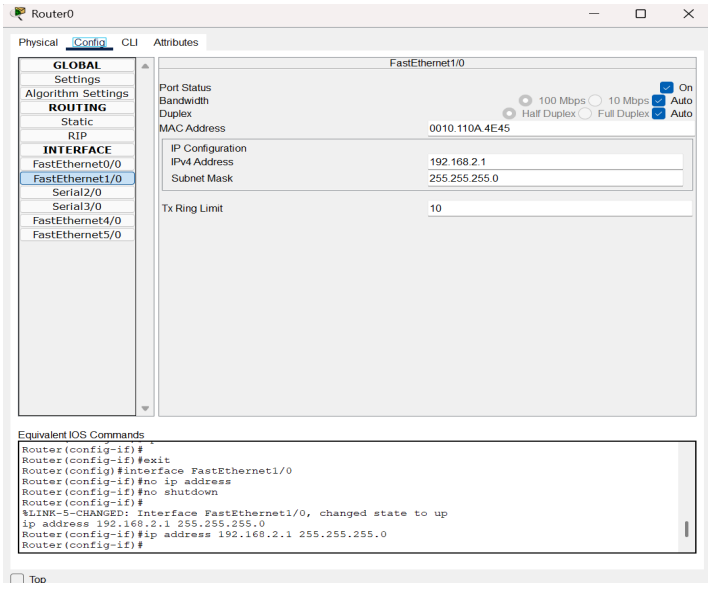
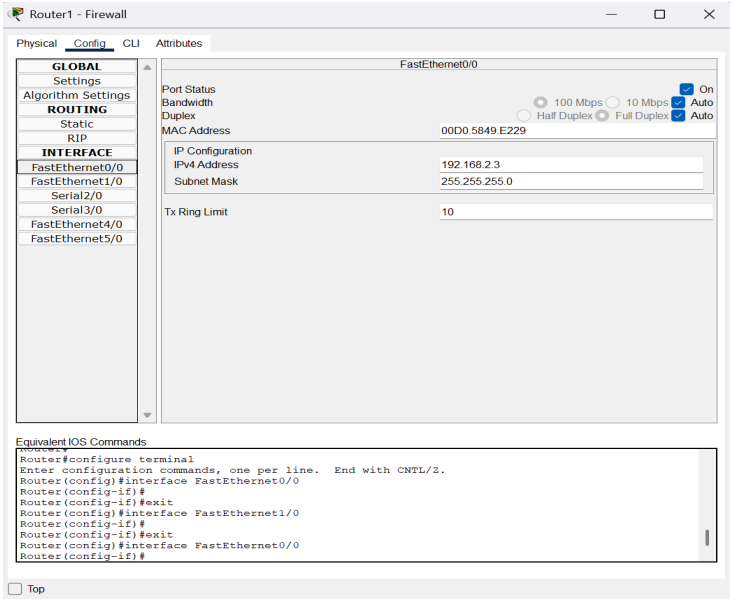
Task 2) Complete this document to show the purpose and characteristics of devices and technologies used (4.1).

What is the purpose of the devices and technologies used?

Screenshot(s):







Annotation(s):

To highlight the purpose of the devices and technology used, it is necessary to follow the step by step process illustrated by the screenshots and explanations of how they meet the requirements of VividBrush Creations

I started with the IP configuration for FastEthernet 0/0 of Router0. I switched on the port status by checking ON, then filled in 192.168.1.1 for IPv4 Address after which Subnet Mask was filled automatically.

Still on Router0, I also configured the FastEthernet 1/0. I switched on the port status by checking ON, then filled in 192.168.2.1 for IPv4 Address after which Subnet Mask was filled automatically.

I repeated the same process for Router1. Configured FastEthernet 0/0. I switched on the port status by checking ON, then filled in 192.168.2.3 for IPv4 Address after which Subnet Mask was filled automatically. This allows connection with Router0 as it's in the same IP range of Router's FastEthernet 1/0 '192.168.2.1'.

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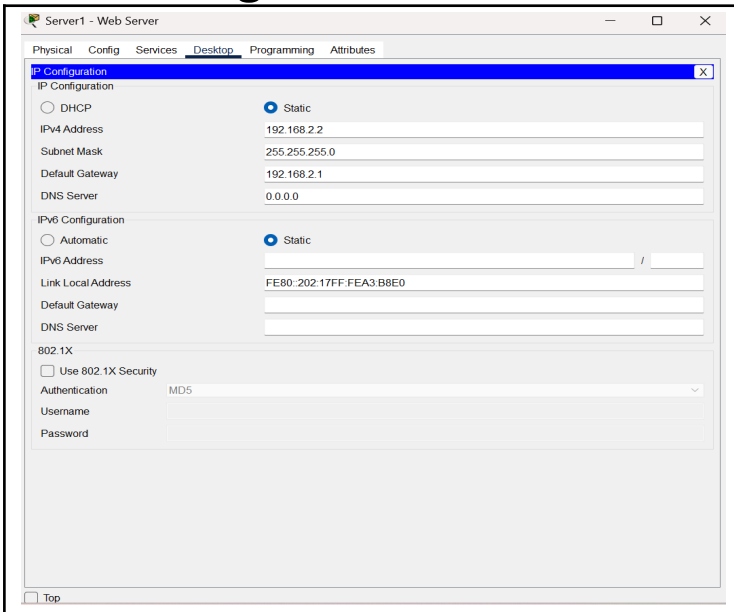
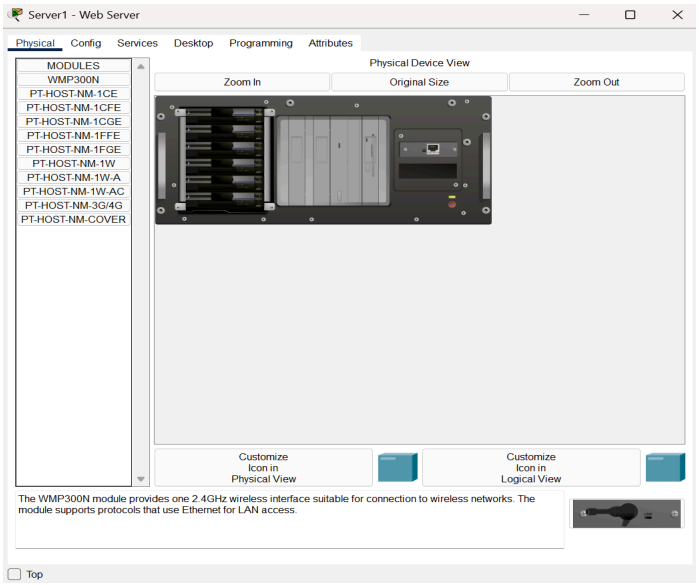
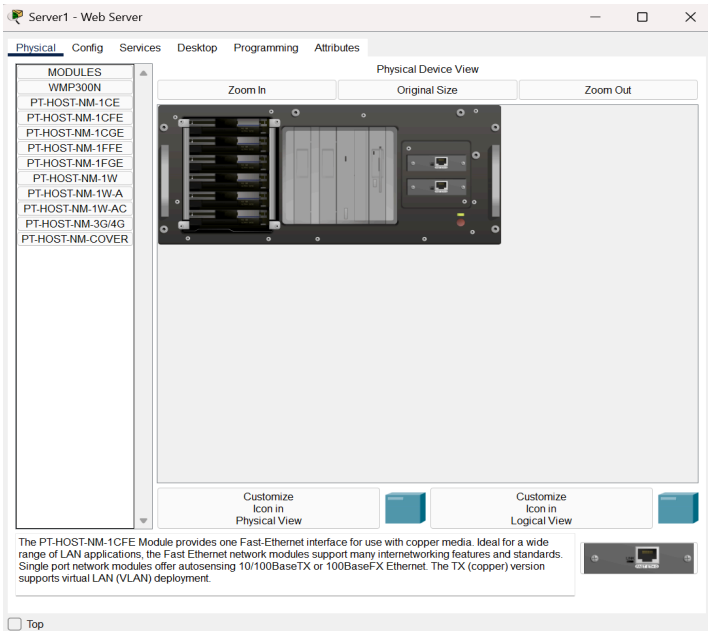


Then I configured Server1 (Web Server) IP address by clicking on IP configuration on the desktop and filled in 192.168.2.2 for IPv4 Address after which Subnet Mask was filled automatically. I also updated the Default Gateway with 192.168.2.1.

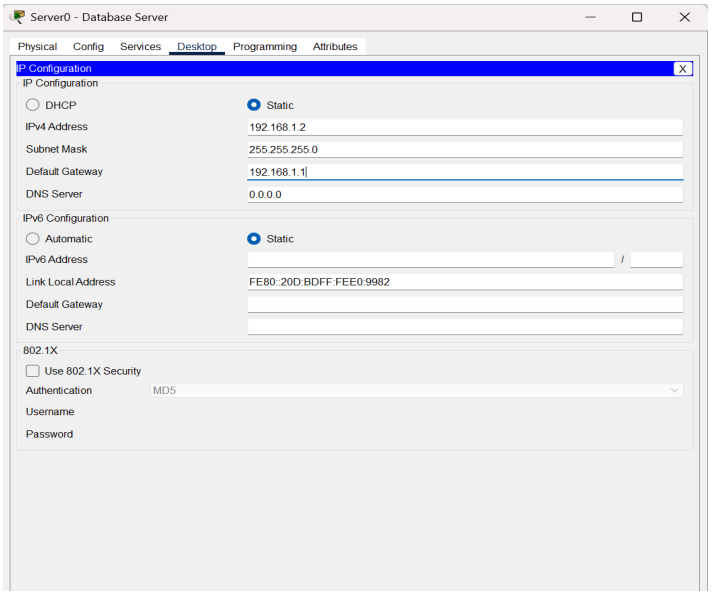
Note: Web Server's IP is in the same IP range with both Router1's FastEthernet 0/0 and Router0's FastEthernet 1/0.



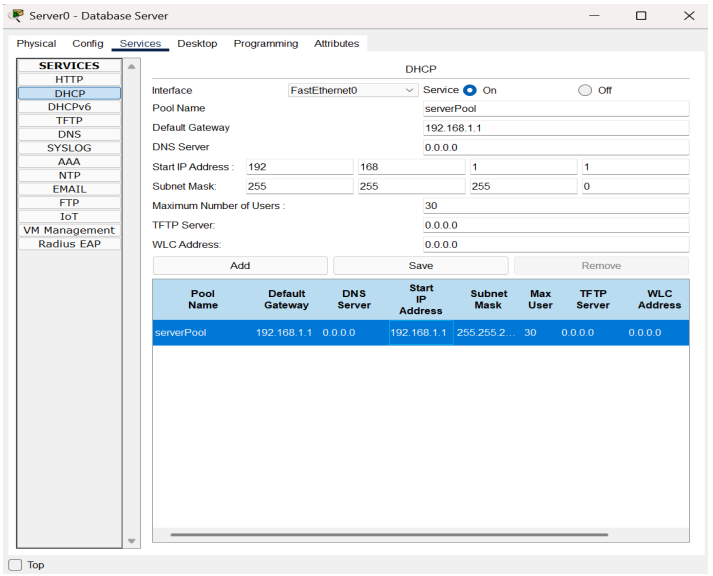
At first, only one port was available on Server1 and it is already used to connect to Router1. I added another port to Server1 so it can connect to Router0. In this shot it clearly shows one port.



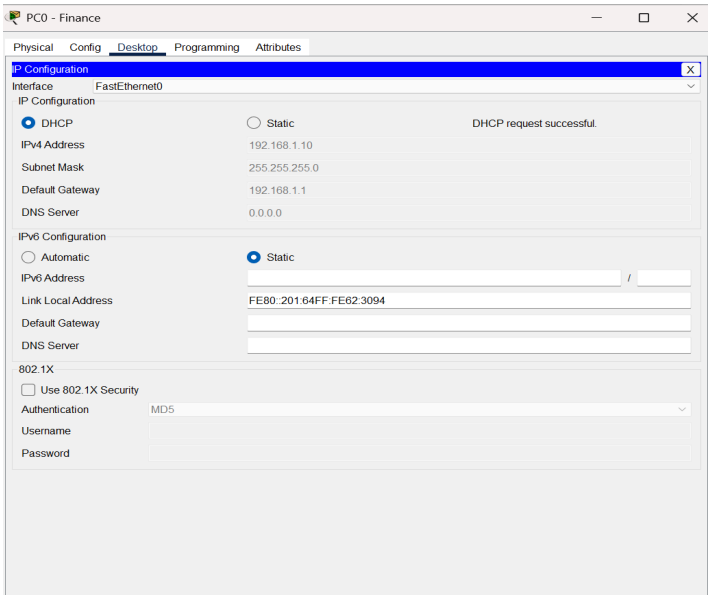
To add a new port, I switched it off first, dragged and dropped PT-HOST-NM-1CFE from the list to below the single port. I then switched Server1 back on. As shown in the shot, we now have 2 ports.



Then I proceeded to Server0 (Database Server) IP configuration by clicking IP configuration on the desktop and filled in 192.168.1.2 for IPv4 Address after which Subnet Mask was filled automatically. I also updated the Default Gateway with 192.168.1.1.



Still on the Database Server, I configured the DHCP by clicking on Services and selecting DHCP. This procedure will automatically generate IP for connected devices. The generated IPs will be within the range of the 'Start IP Address'. E.g 192.168.1.1, 192.168.1.11, 192.168.1.12, 192.168.1.13. I switched the service on and filled in the default gateway 192.168.1.1. Updated the Start IP address with Subnet Mask updating automatically. I also reduced the maximum number of users to 30 and then clicked save.



I configured the finance department's PC by clicking IP configuration on the desktop and clicked DHCP which automatically generates IPv4 (as stated above which applies to other connected PCs), Subnet Mask, and Default Gateway.

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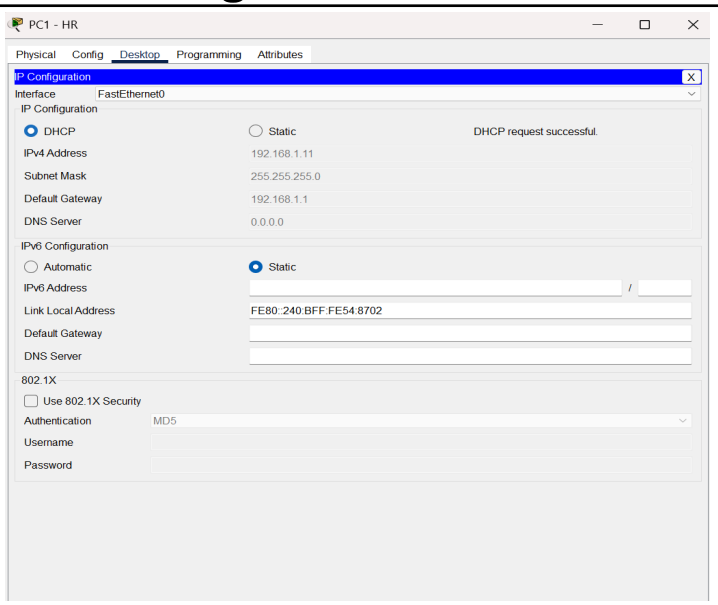
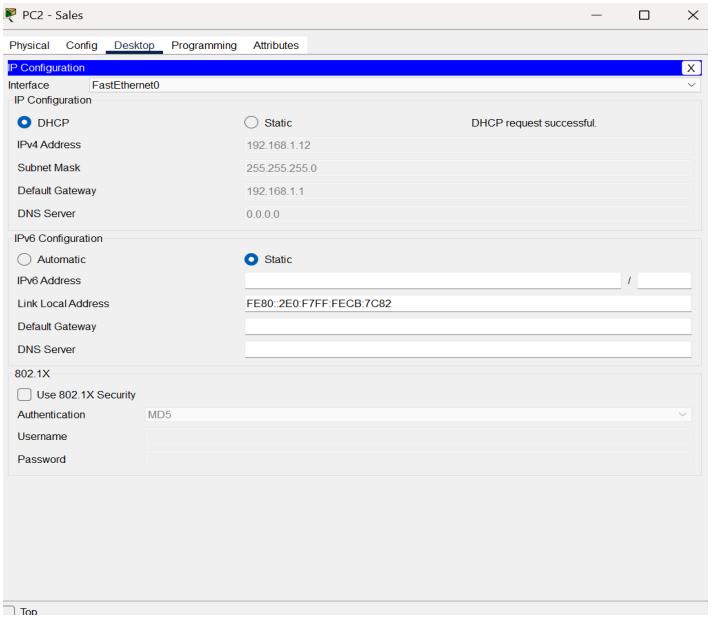
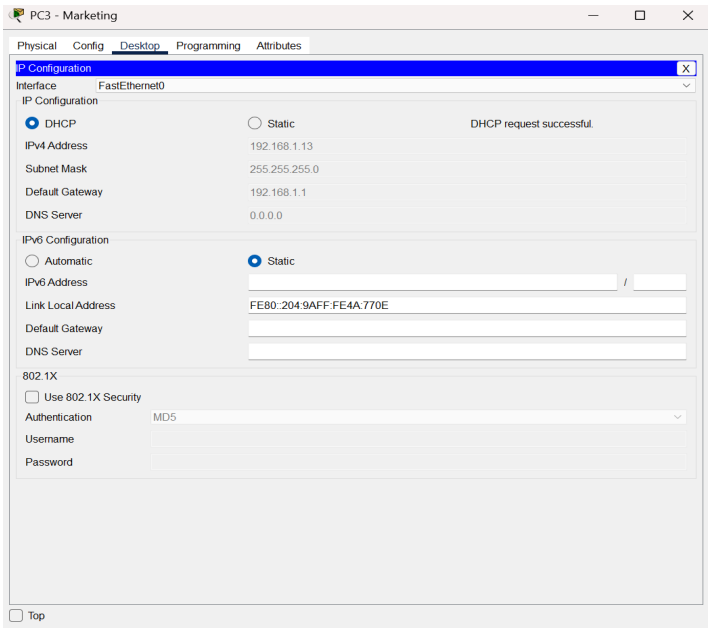


I configured the HR department's PC by clicking IP configuration on the desktop and clicked DHCP which automatically generates IPv4, Subnet Mask, and Default Gateway.



I configured the Sales department's PC by clicking IP configuration on the desktop and clicked DHCP which automatically generates IPv4, Subnet Mask, and Default Gateway.



I configured the Marketing department's PC by clicking IP configuration on the desktop and clicked DHCP which automatically generates IPv4, Subnet Mask, and Default Gateway.

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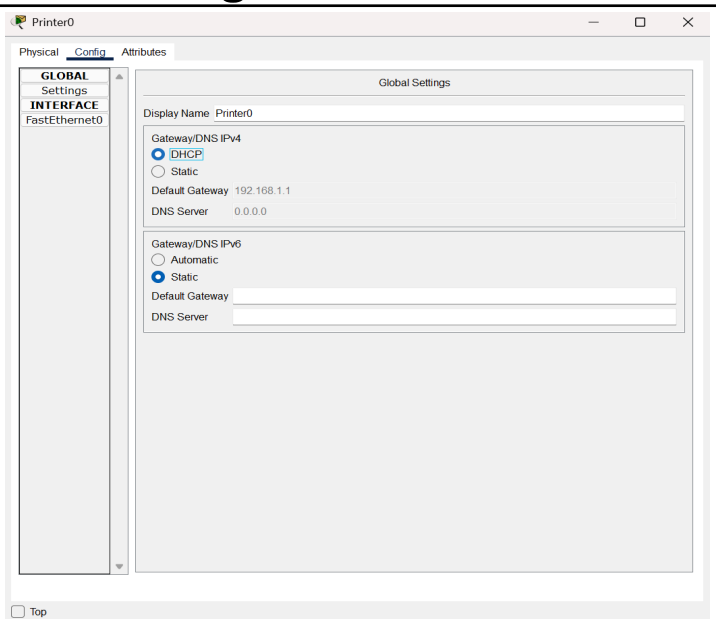
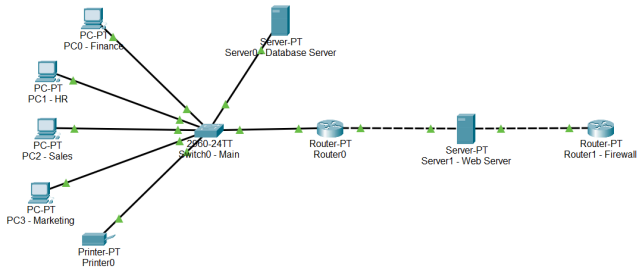


I configured the printer by clicking DHCP which automatically generates the Default Gateway.

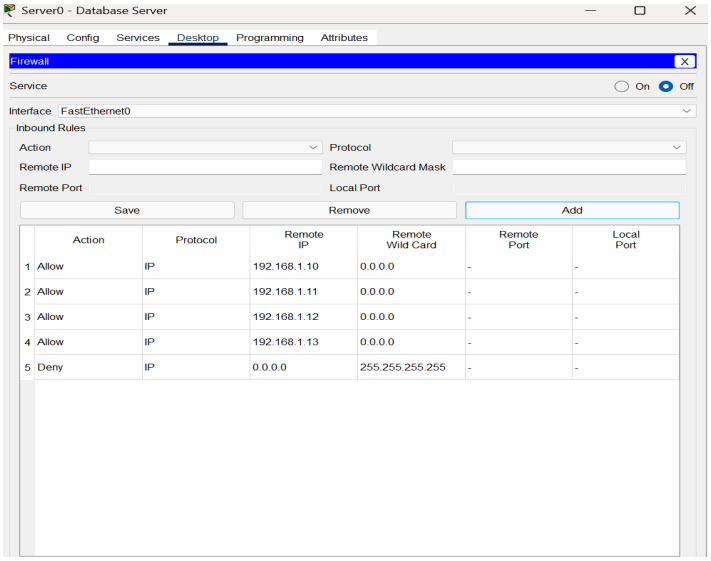


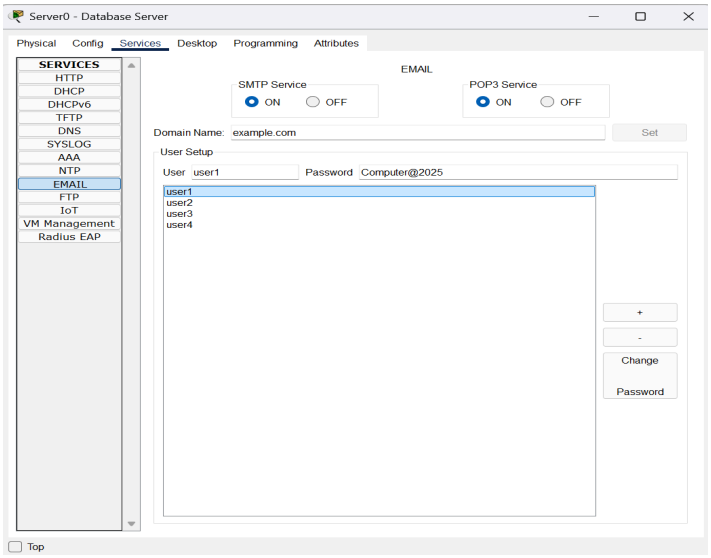
This is a shot of my network map.

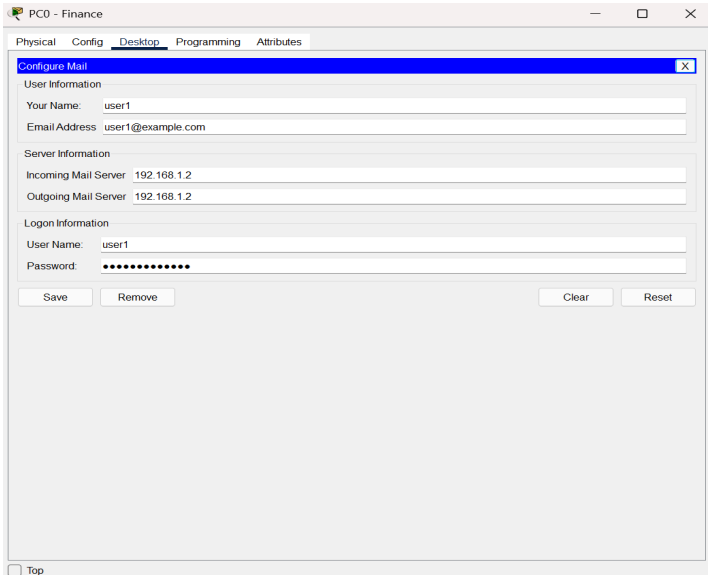
Networking and Data Communication

What are the characteristics of the devices and technologies used?

Screenshot(s):







Annotation(s):

The following screenshots and explanations highlight the characteristics of the devices and technologies used. The firewall configuration, email access set up, and ping test

This is the firewall configuration to allow access to the 4 department's PCs and deny access to any other external devices. This access allows different departments to seamlessly share and save data without having to worry about external interference.

To meet the needs of the departments on direct communication amongst each other, I configured the email service on the server by going on to Services, selected Email, then set my domain name to ''example.com'' and added the four PCs as shown in the shot from user1 to user4. The below screenshots will show how each department's PC is configured for email access and successfully sent emails to one another which further highlight some of the characteristics of the devices and technology used in this project.

This shows how the finance department's PC was configured for email access.

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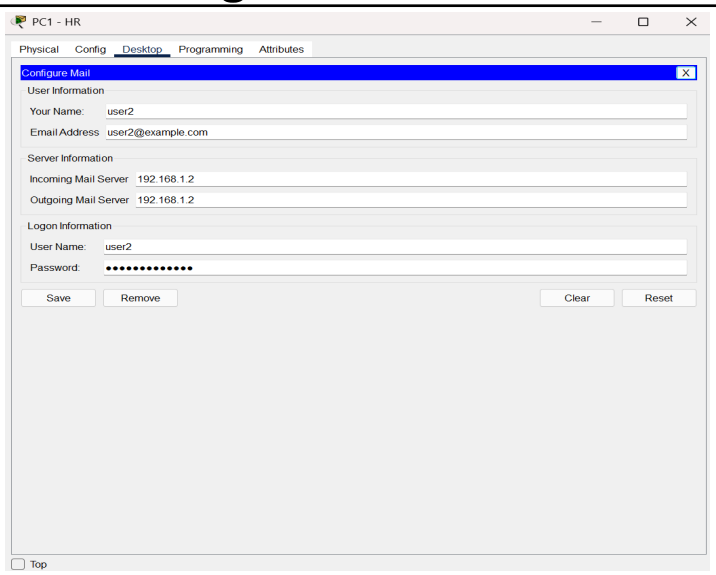
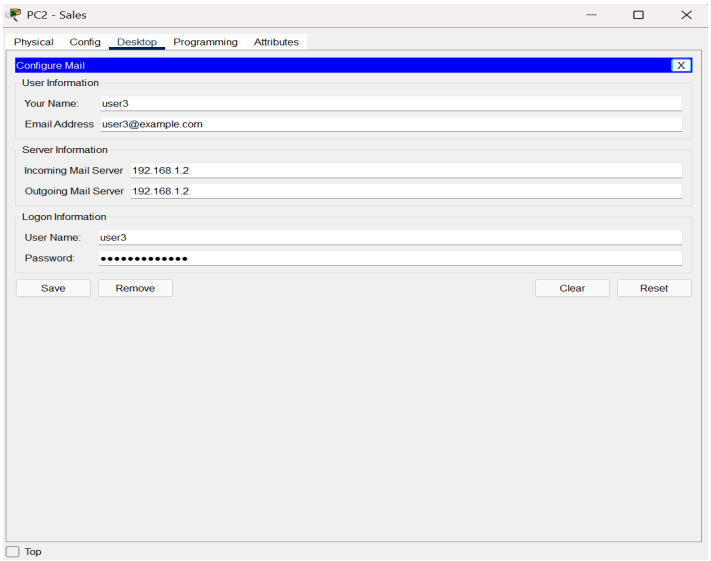
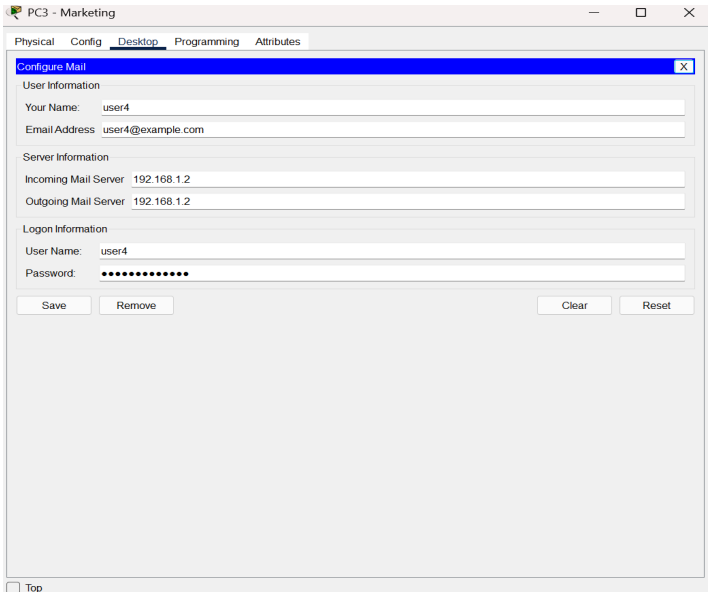


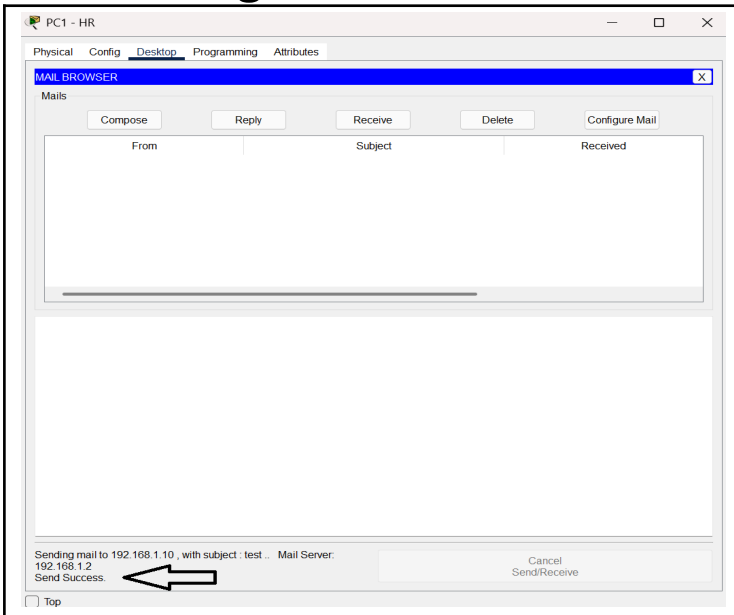
This shows how the HR department's PC was configured for email access.



This shows how the sales department's PC was configured for email access.

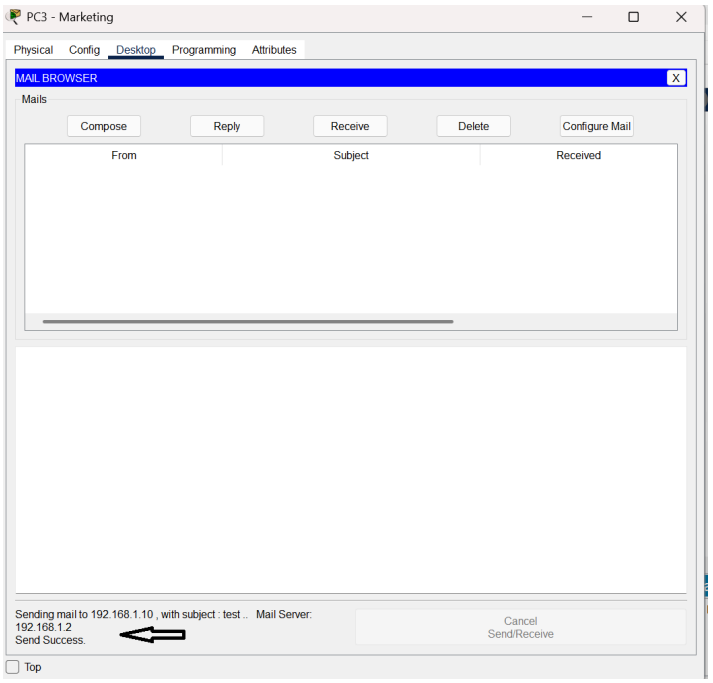


This shows how the marketing department's PC was configured for email access.

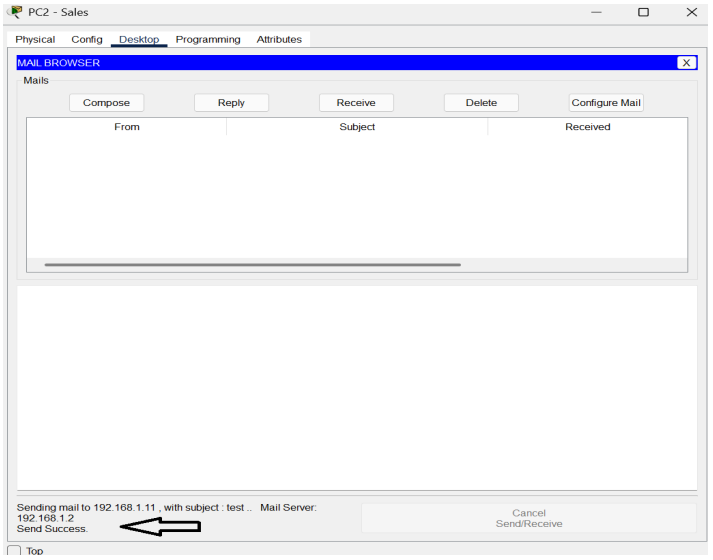


Although, the sent and received messages did not show under ''From, Subject, and Received'' but you can confirm the emails are successfully sent by following the black arrow (bottom left). Same thing applies to other departments.

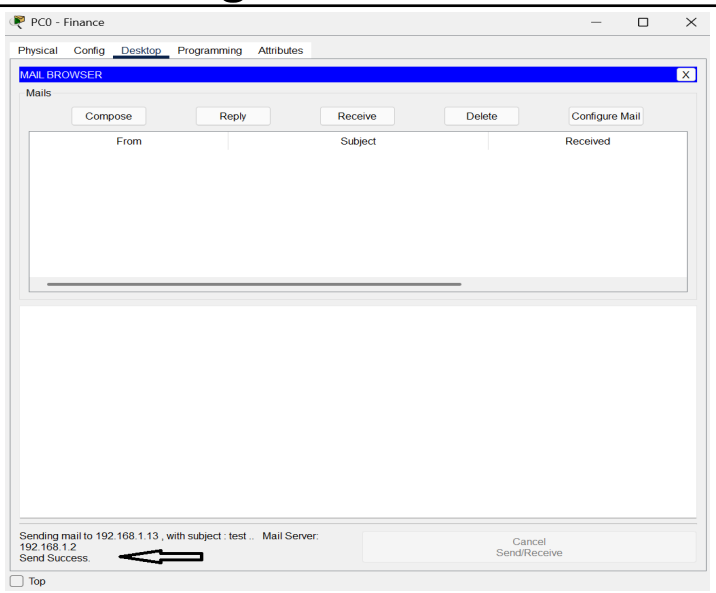
This shot shows that the email HR department sent to the Finance department was a success.



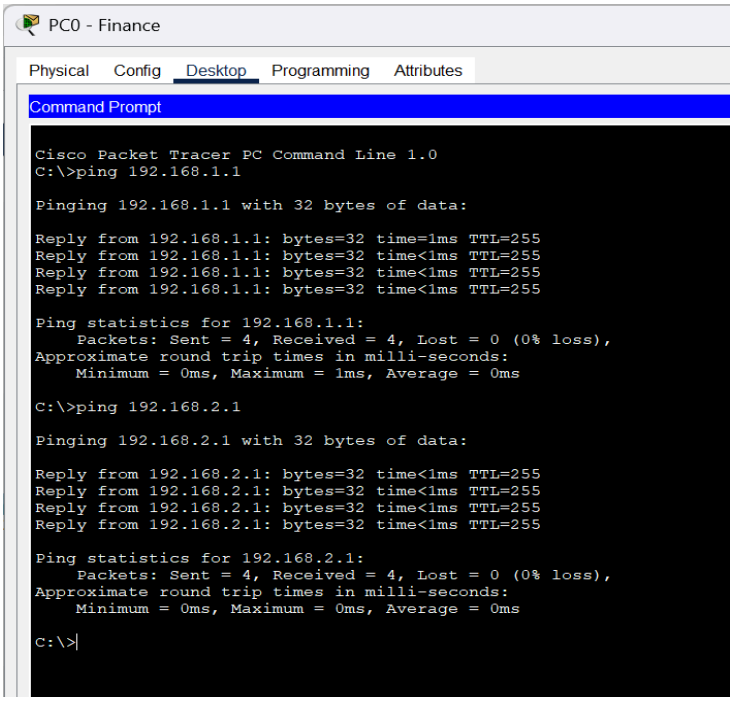
This shot shows that the email marketing department sent to the Finance department was a success.



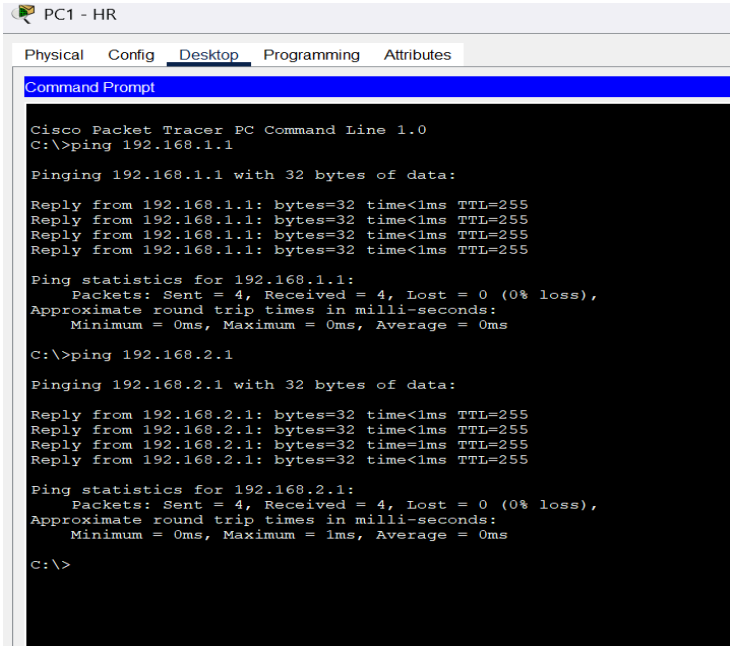
This shot shows that the email sales department sent to the HR department was a success.



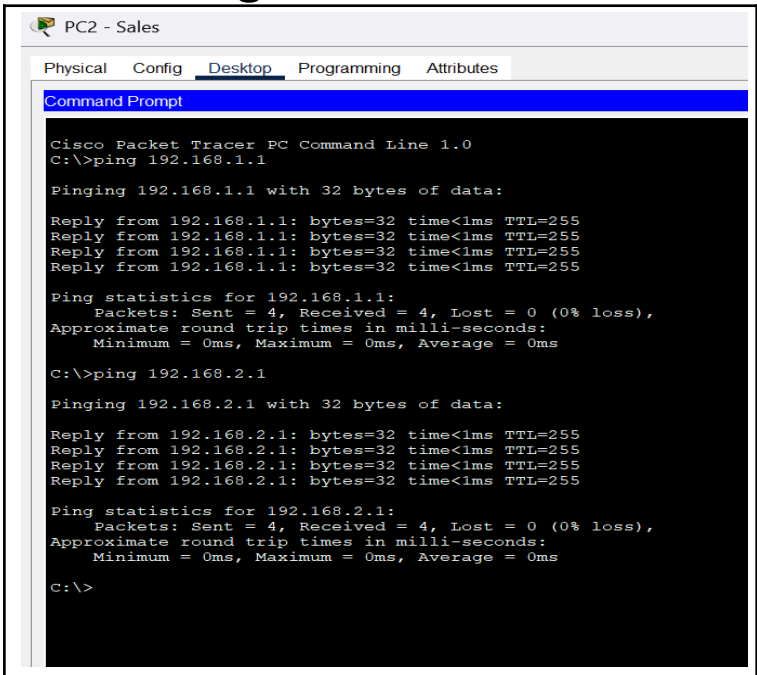
This shot shows that the email finance department sent to the marketing department was a success.



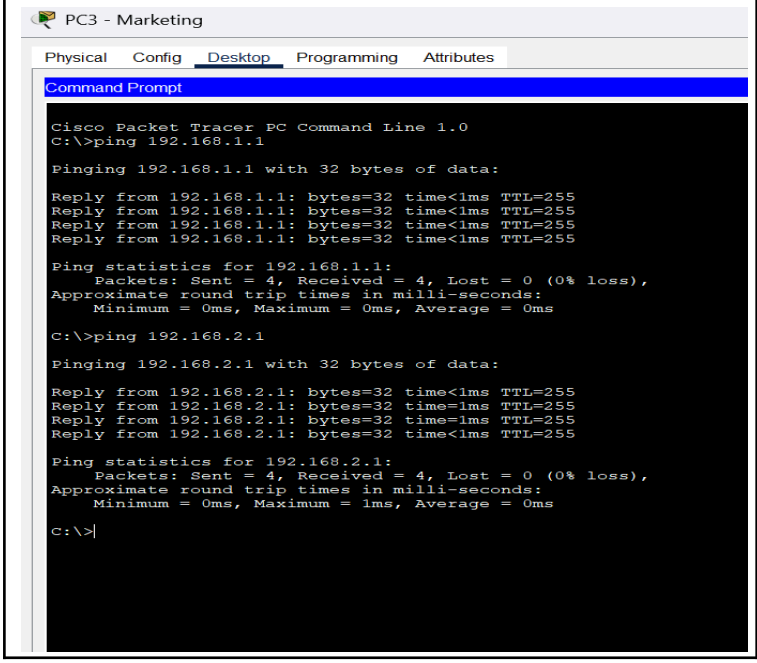
This shot shows the finance department's PC successfully pinging both the database and web server. All packets sent were received with none lost.



This shot shows the HR department's PC successfully pinging both the database and web server. All packets sent were received with none lost.



This shot shows the sales department's PC successfully pinging both the database and web server. All packets sent were received with none lost.



This shot shows the marketing department's PC successfully pinging both the database and web server. All packets sent were received with none lost.