Computer Networks- Project Report

Project Title: Safer Company Network creation

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Abstract

The primary objective of this project is to enhance network security, safeguarding sensitive data, and facilitating robust communication within a Wide Area Network (WAN) environment. Recognizing the complexity of organizational networks, which typically comprise multiple departments, our aim is to ensure their segregation to optimize productivity. This project encompasses measures to prevent unauthorized access, implementing robust authentication mechanisms for authorized users and hosts.

Providing security innetwork to secure your private data and make a reliable and excellent communication in a WAN connection. As we know that a company network or basically known as an organization network has many departments, so we desire that these
departments should be separate for their good output. Then this project also includes this feature. This type of network avoids the unauthorized access it authenticate the authorized users or hosts. Implementation of logical network topology has been done in the project.

We have implemented a logical network topology to structure the network effectively. Moreover, the network architecture prioritizes security without compromising ease of comprehension. Its straightforward implementation streamlines troubleshooting processes. By employing the Routing Information Protocol (RIP), capable of supporting up to 15 hop counts, the network's scalability can be effortlessly extended by integrating additional routers.

Problem Description

The objective of this project is to establish a secure WAN network for company communication, aiming to eliminate data redundancy from the ground up, thereby ensuring smooth network operations.

Essentially, CISCO Packet Tracer labs are designed based on specific scenarios, customizable to meet the requirements of any customer. A network associate tailors the suitable company network based on these scenarios.

Here are several compelling features that make this project appealing to both upcoming and established companies:

- Enhanced Security: Our company network prioritizes security, safeguarding private data and facilitating reliable communication in WAN connections. This reduces organizational reliance on outdated storage mediums like floppy disks.

- Simplified Network Structure: Our network design emphasizes simplicity, employing a minimal number of end devices for easy comprehension.

- Easy Troubleshooting: The network's straightforward design facilitates efficient troubleshooting, minimizing downtime and operational disruptions.

- Scalability: With RIP implementation, router slot ranges can be extended up to the 15th hop count, ensuring adaptability to growing network demands. However, it's worth noting that the 16th hop remains unreachable.

- Structured Networking: Our project employs a segmented approach to networking, assigning separate class IP addresses to PCs and laptops within each area. This organization enhances network efficiency and management.

Implementation

Implemented Entities with their corresponding attributes:

1. Router Banashankari
It contains the network under Banashankari region.
    - Switches
    - Wireless router
    - Banashankari server (further connected to cloud Airtel Internet)
    - End devices like: PC and Laptop (having different class IP addresses)
2. Router Mysore Road
It contains the network under Mysore Road region.
    - Switch
    - End device like: PC (having a different class IP address)
3. Router HSR
It contains the network under HSR region.
    - Switch
    - HSR server (further connected to Cloud Idea Internet)
    - End device like: PC

4. Router Koramangala
It contains the network under Koramangala region.

- Switch
- Wireless router
- End devices like: PC and Laptop (having different class IP addresses)

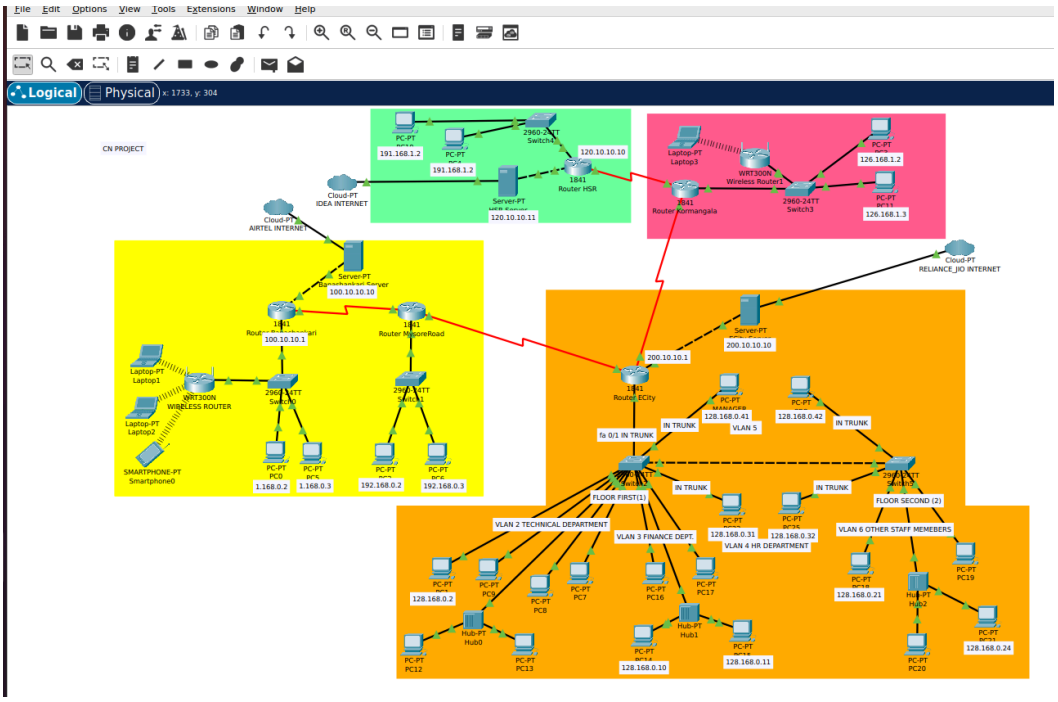
5. Router ECity
It contains the network under ECity region. The headquarters of the company is assumed to be here.

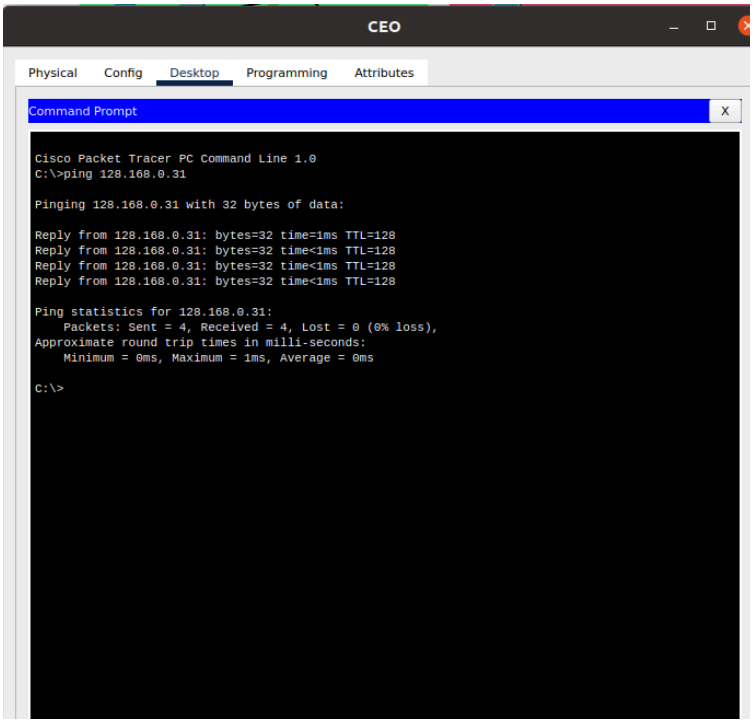
- Switches
- Hubs
- ECity server (further connected to Cloud Reliance JIO Internet)
- End devices like: PCs (having different class IP addresses)
- Technical, Finance, HR, Other members Department
- CEO and Manager PC (both are in trunk with HR members i.e. the manager and CEO are able to access information from HR members PC)

RIP Routing is used as its

Simplicity: Easy to configure and deploy.
Low Overhead: Minimal impact on bandwidth and processing power.
Ease of Management: Automates routing updates, reducing manual configuration.
Convergence: Quickly adapts to network changes.
Compatibility: Supported by a wide range of devices.
Built-in Loop Prevention: Includes mechanisms to prevent routing loops.
Scalability for Small Networks: Effective for small to medium-sized networks.
Widely Supported: Many devices and software solutions support RIP.
Ease of Troubleshooting: Simple behavior aids in troubleshooting.

Results





Conclusion

The network ensures the prevention of unauthorized access by authenticating users or hosts. The main ECity router is password protected, serving as the central hub of the organization. Subnetting is utilized to optimize IP address allocation, minimizing wastage. This network interconnects various departments such as finance, technical, HR, and other staff divisions. The central hub is linked to four satellite branches (via routers), ensuring efficient data transfer between each branch and the main office. Packet transfer can be observed in simulation mode using packet tracer. Router

implementations are tailored accurately to the scenario, leveraging RIP for its distance vector protocol, thereby facilitating fast and secure communication by determining the shortest path in the network. Additionally, the creation of VLANs (Virtual LANs) aids in logically segmenting the network, thereby enhancing security. This project successfully meets the requirements of securing private data, ensuring reliable WAN communication, and reducing organizational reliance on outdated storage mediums like floppy disks.

Appendix

Dhruthan - Implementation of VLAN’s
Vineet Goel - Planning whole network structure and end devices
Vishwatma V Bhat - Implementing Routing and Cloud connections