Project Report for Computer Networks 18CSC302J

Network Design for Shopping Complex

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ABSTRACT AND INTRODUCTION: -

Computer networks have a significant impact on the working of an organization. Shopping Complexes nowadays depend on the proper functioning and analysis of their networks for payment, billing/invoices, communication, helpdesk services, checking availability of items etc. An efficient network is essential to facilitate the systematic and cost-efficient transfer of information in an organization in the form of messages, files, and resources. The project provides insights into various concepts such as topology design, IP address configuration, and how to send information in the form of packets to the wireless networks of different areas of a shopping complex.

The aim of this project is to design the topology of the shopping complex network using the software Cisco Packet Tracer with the implementation of wireless networking systems. This network consists of the following devices:

1) Router (Generic)

2) Switches (Generic)

3) Wireless Router

4) Tablets

5) Smartphones

6) Copper straight through cable

7) Serial DTE cable

MOTIVATION: -

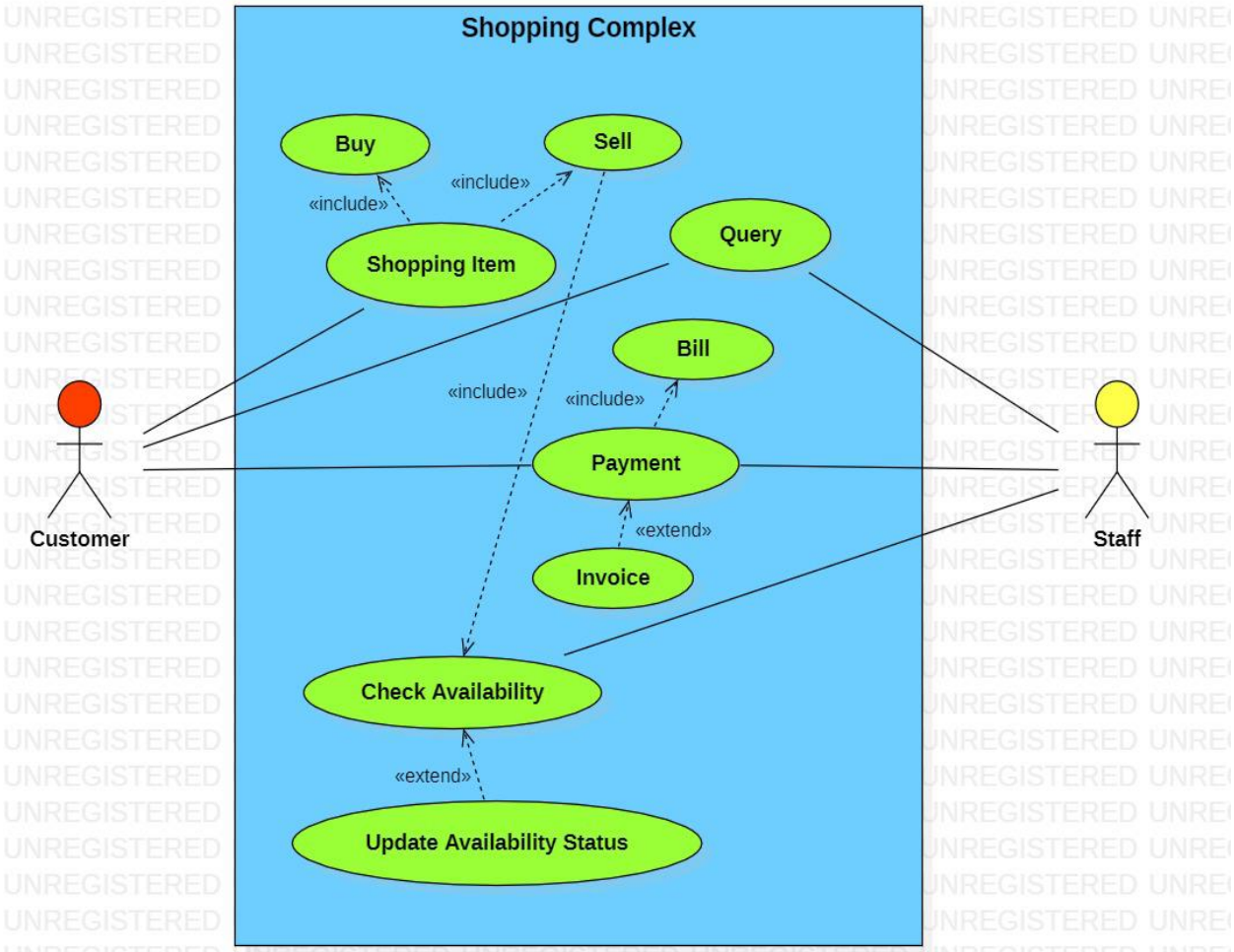
With an increase in the development of technology the entire world is moving towards the digital era. Hence the shops should adapt to digital means of networking as well and become a “digital complex”. Going wireless plays an important role in this digitalization. The wireless network makes the connection easy with a reduction in the use of wires or cables. A wired connection makes it difficult to keep track of all the devices and to manage the cable connection, which is not only chaotic but also challenging to handle. Complex networking via wireless connection becomes an important part of shopping and provides the main way for buyers and sellers to access the market. As smartphones and intelligent terminals are widely used, demand for access to information anytime and anywhere has become more and more urgent, but traditional cable networks cannot meet this requirement. Then wireless network construction becomes necessary and essential. This is an important mark of the modern shopping stores as a supplement of a cable network. With the development of network and communication technology, cable networks in a shopping complex bring much convenience for communication and shopping process. But for mobility and flexibility, it has obvious shortcomings. A wireless network can overcome these drawbacks and has been applied to the complex.

PROJECT STATEMENT: -

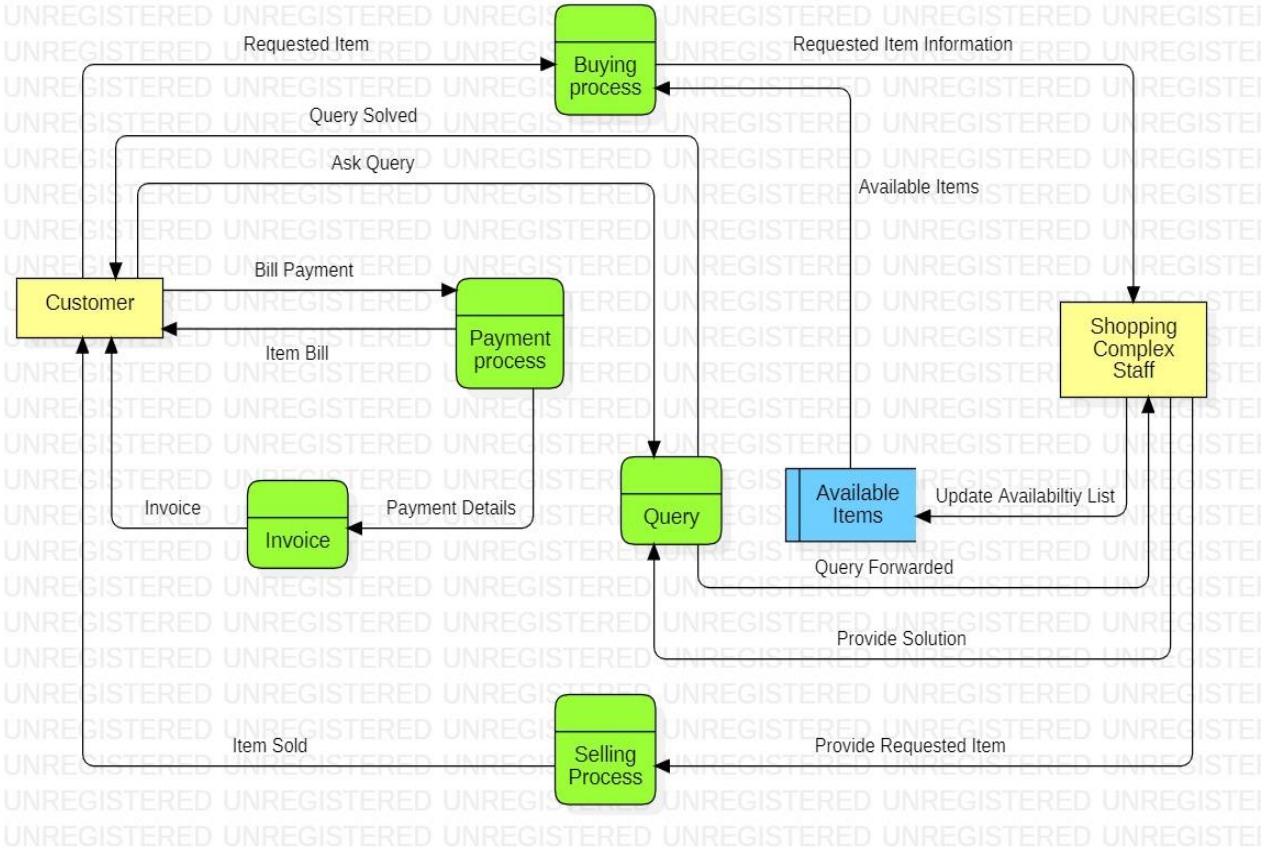
In this mini project, we defined a simulation of a shopping complex network based on wired and wireless networking. The network is divided into five parts i.e., the five floors, Helpdesk, Groceries, Kids, Men's and Women’s wear respectively. The major aim of this project is to show the network connectivity that is used in shops to make the network efficient. The complex network provides different services such as shopping facilities, payment facilities, billing/invoice, checking availability of an item and a helpdesk for additional queries, so it needs wireless networking for smooth processing.

DESIGN ARCHITECTURE: -

Use Case Diagram



Data Flow Diagram: -



CAMPUS DIAGRAM: -

NETWORK REQUIREMENT ANALYSIS: -

1. Software and hardware requirements

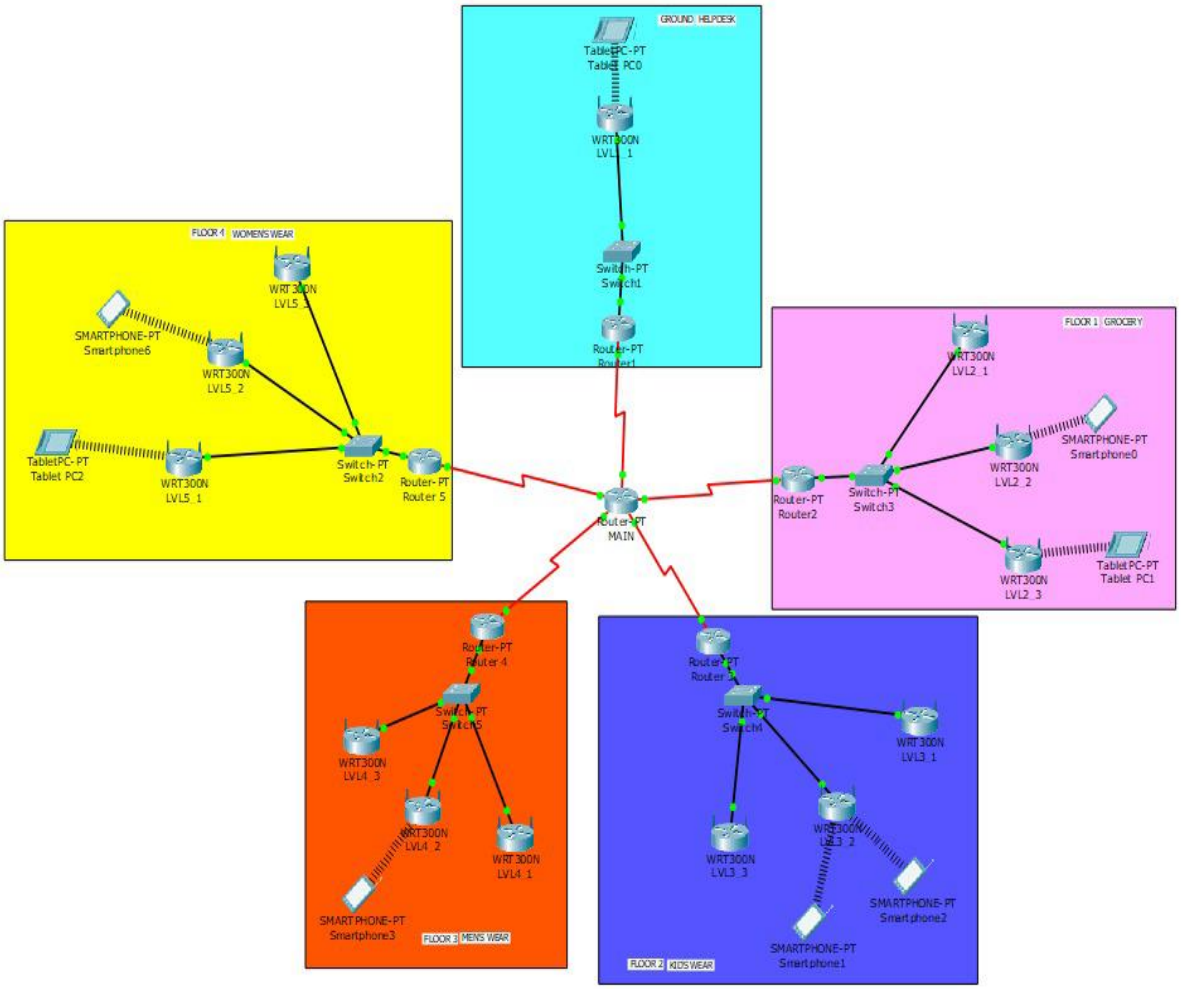
Before heading towards the implementation, we need to make sure of the following requirements.

- A proper workstation (any mid-high range laptop will suffice).
- Packet Tracer by Cisco
- 8 GB RAM.
- Any 10,000+ Average CPU Mark scored processor.
- 16 GB of dedicated hard disk space.
- USB 3.0+ port

2. Components required

Device	**Quantity**
Router-PT	6
Switch-PT	5
Smartphones	5
Tablets	3
Wireless routers (WRT300N)	15

NETWORK DIAGRAM: -



Components: -

1) Router (Generic)

2) Switches (Generic)

3) Wireless Router

4) Tablets

5) Smartphones

6) Copper straight through cable

7) Serial DTE cable

NETWORK INTEGRATION METHODOLOGY: -

The most common integration process is the Application Programming Interface (API). While there are several API subcategories, including public, private, and partners, they all utilize application integration. By establishing these interconnections using common code language, systems can transmit data seamlessly throughout solutions.

Advantages: -

Flexibility - By using product code language, the API method can handle most data variations.

Smooth Operations - The links between the systems allow providers to handle individual connections without disturbing third-party software.

High Availability - As the most common integration strategy, API is available for almost every integration project.

Disadvantages: -

Supplier Dependability - Suppliers are responsible for establishing an API, making the partnering business dependent on their schedule for data access.

Code Intensive - While being code-based makes APIs more functional, programming the coding is time-intensive and can be overwhelming.

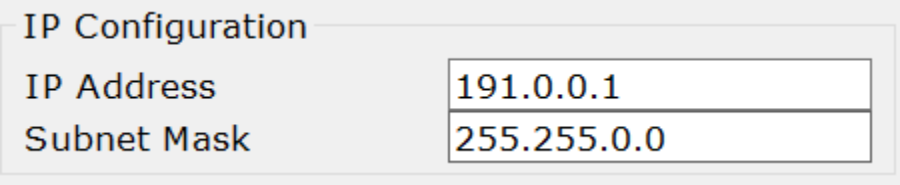
IP NETWORK DESIGN GUIDELINES: -

Configuring IP address

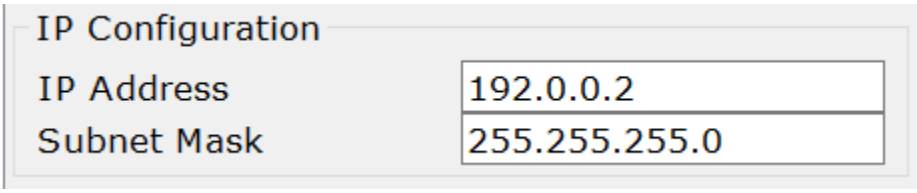
We have attached the screenshots of all the IP configuration below:

1) Main router

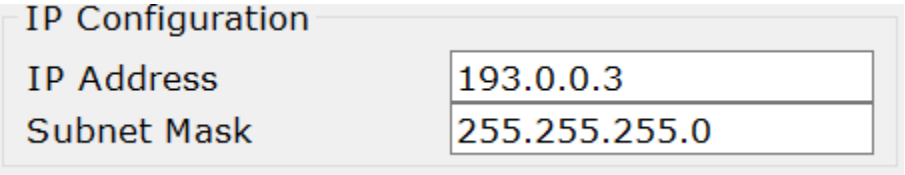
Serial 2/0



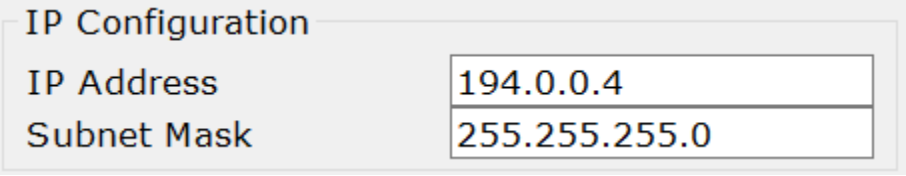
Serial 3/0



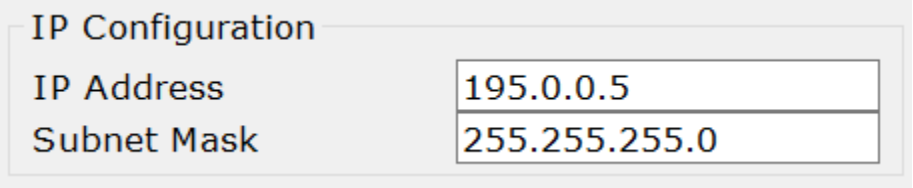
Serial 6/0



Serial 7/0

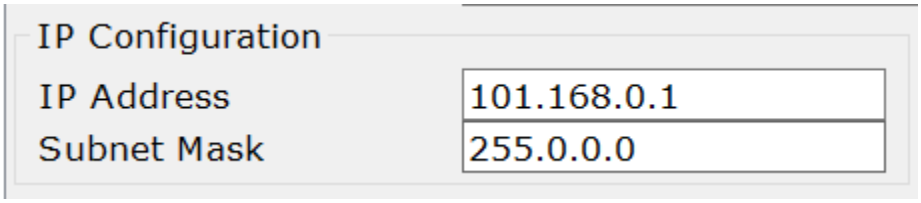


Serial 8/0

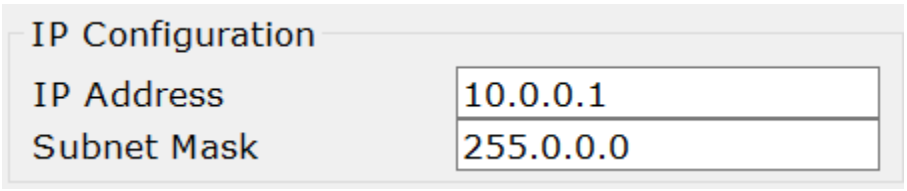


2) Ground floor

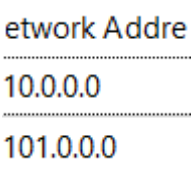
Fast Ethernet 0/0



Serial 2/0

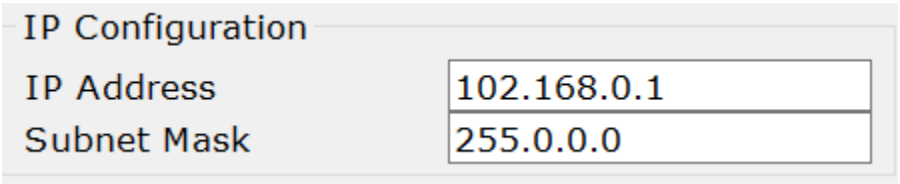


RIP

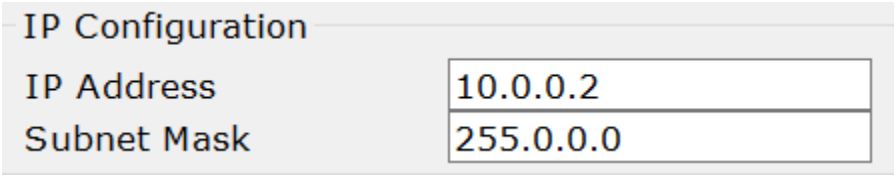


3) Floor 1

Fast Ethernet 0/0



Serial 2/0



RIP

etwork Addre
10.0.0.0
102.0.0.0

3) Floor 2

Fast Ethernet 0/0

IP Configuration

IP Address	103.168.0.1
Subnet Mask	255.0.0.0

Serial 2/0

IP Configuration

IP Address	10.0.0.3
Subnet Mask	255.0.0.0

RIP

etwork Addre
10.0.0.0
103.0.0.0

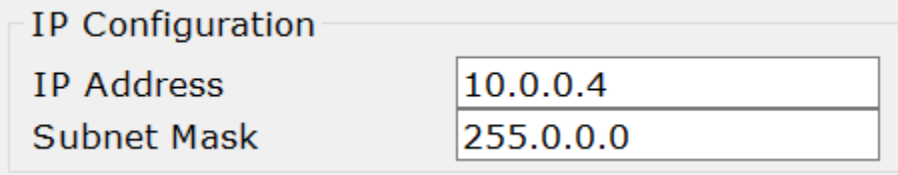
4) Floor 3

Fast Ethernet 0/0

IP Configuration

IP Address	104.168.0.1
Subnet Mask	255.0.0.0

Serial 2/0

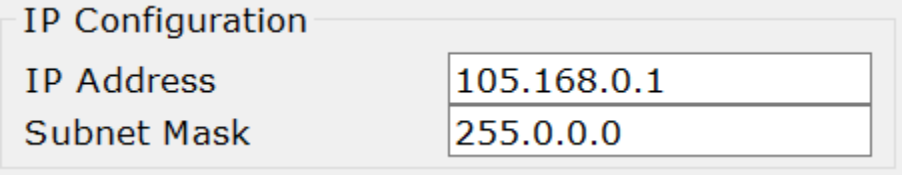


RIP

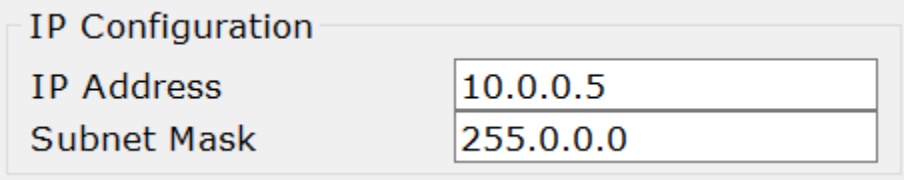
etwork Addre
10.0.0.0
104.0.0.0

5) Floor 4

Fast Ethernet 0/0



Serial 2/0



RIP

etwork Addre
10.0.0.0
105.0.0.0

<u>FEATURES AND SERVICES</u>: -

1. Performance: - Building Distribution switches should provide wire-speed performance on all ports. This feature is important because of Building Access

layer aggregation on one side and high-speed connectivity of the Campus Core module on the other side. Future expansions with additional ports or modules can result in an overloaded switch if it is not selected properly.

2. Redundancy: - Redundant Building Distribution layer switches and redundant connections to the Campus Core should be implemented. Using equal-cost redundant connections to the core supports fast convergence and avoids routing black holes. Network bandwidth and capacity should be engineered to withstand node or link failure.

3. Infrastructure services: - Building Distribution switches should not only support fast multilayer switching but should also incorporate network services such as high availability, QoS, security, and policy enforcement. Expanding and/or reconfiguring distribution layer devices must be easy and efficient. These devices must support the required management features.

BILLING OF MATERIALS: -

Device	Quantity	Cost(per piece)	Total Cost
Router	6	2829	16974
Switch	5	1800	9000
Smartphones	5	3999	19995
Tablets	3	11999	35997
Wireless routers (WRT300N)	15	3500	52200
Copper Straight Through	18	500	9000
Serial DTE	5	1570	7850

CONCLUSION: -

In this project we have successfully created Multi level shopping complex network system using Cisco Packet Tracer Where we have created a prototype model for 5 floors where all the floors are connected with one network. This will help shopping complex staffs for the communication and for creating & managing database and financial data.