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## Introduction

GlobalTech Solutions, located in Melbourne, is a renowned company in semiconductor industry. It is known for advanced wireless technologies like wi-fi and Bluetooth and serving wide range of modern devices. This project proposes the network design including the floor plan, design model, network diagram, site map, inventory list. It is a cost-efficient network plan under an allocated budget of \$250k which includes the cost of installation and configuration as well as the cost of project management.

It contains 76 computers, 8 printers, 6 switches, 3 routers and 4 server rack installed in the technical rooms. The network is implements using the devices mentioned above with the help of copper crossover and copper straight cables. The network is designed with the help of Cisco's three layer hierarchical approach.

## Objective

The objective of this project is to plan, design and implement a robust Ethernet LAN which projected 15 percent growth in the operation and workforce over the next 5 years. This project will help in ensuring flawless connectivity in the 4 sectors of the company: Research and Development, Sales and Marketing, Administration and Customer Service. The design will Adhere to CISCO's three-layer hierarchical design model.

## List of assumptions

- One of the assumptions is that the manager is included the number of employs given.

- Other assumptions is that there will be space of expansion for the future. Therefore, switches are connection through Ethernet and there are several ports left which can be used in the future.

### Design requirements

The design requirements for designing a Ethernet LAN for the two buildings of GlobalTech Solutions.

1. FastEthernet fiber optic link (100Base-FX). Default gateway is 192.168.40.39.
2. The network operates on class B network: 189.A1.1A.0/24 where A is the last digit of a group member's ID. For example if the last digit of a group member is 4 then the network is 189.41.14.0/24
3. The devices used in the project are:
  - Cisco ISR router 1100 series
  - Cisco S4410-24TF-P switch
  - The networks and connectors

### Design Model

Our network model follows the cisco's three- layer hierarchical model. The three layers include the core, distribution, and access layer.

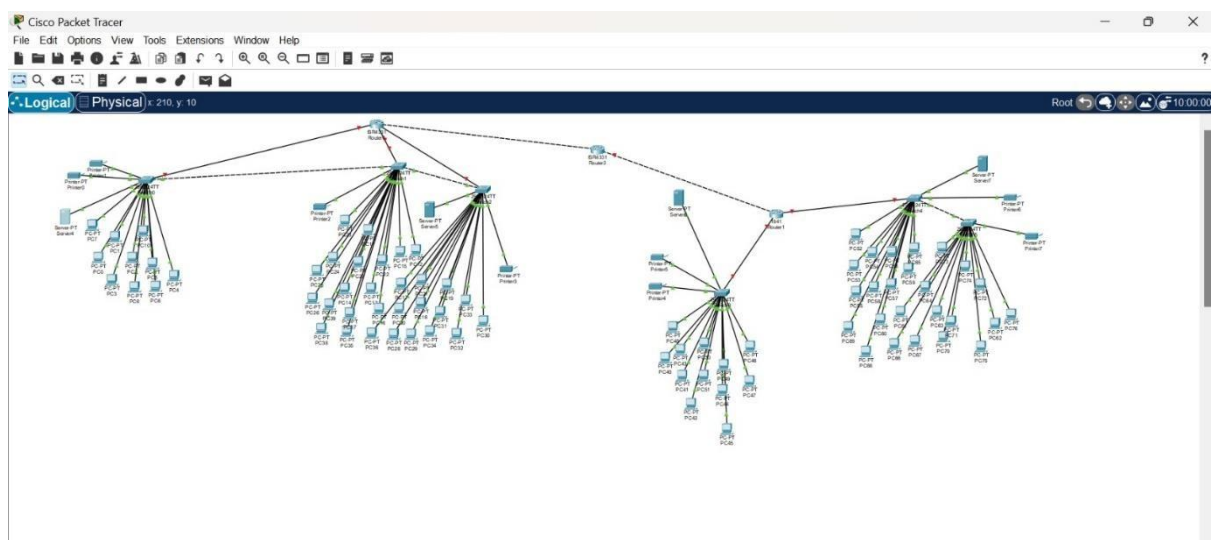
The first layer is the core layer. This layer is responsible for quickly and efficiently working of the switches. This will be the backbone of our project in which the central switch located in network equipment

room will allow the network connection with the routers, computers and other switches.

The second layer is the distribution. This layer separated access layer with the core layer. This included the routers used in our project. This layer is responsible for IP addressing which is the process of assigning unique IP addresses. In other words, IP addressing hierarchy is managed at this layer. This layer is also responsible for implementing network policies and providing network services such as NAT, QOS, firewall protection.

The third and last layer is the access layer which is closest to the user as it is where they attach to a network. This layer consists of the switches in the office areas. In this layer we'll consist of total 76 computer one of each employ. We'll use copper cross over cables for communication within the computers and switches and copper straight cables to connect the routers.

## Network Diagram



This is a network diagram for the Global Tech Solutions. In the access layer star topology is used as all the PC are connected to a central node which is a switch. There are 76 PC connected. There are total 6

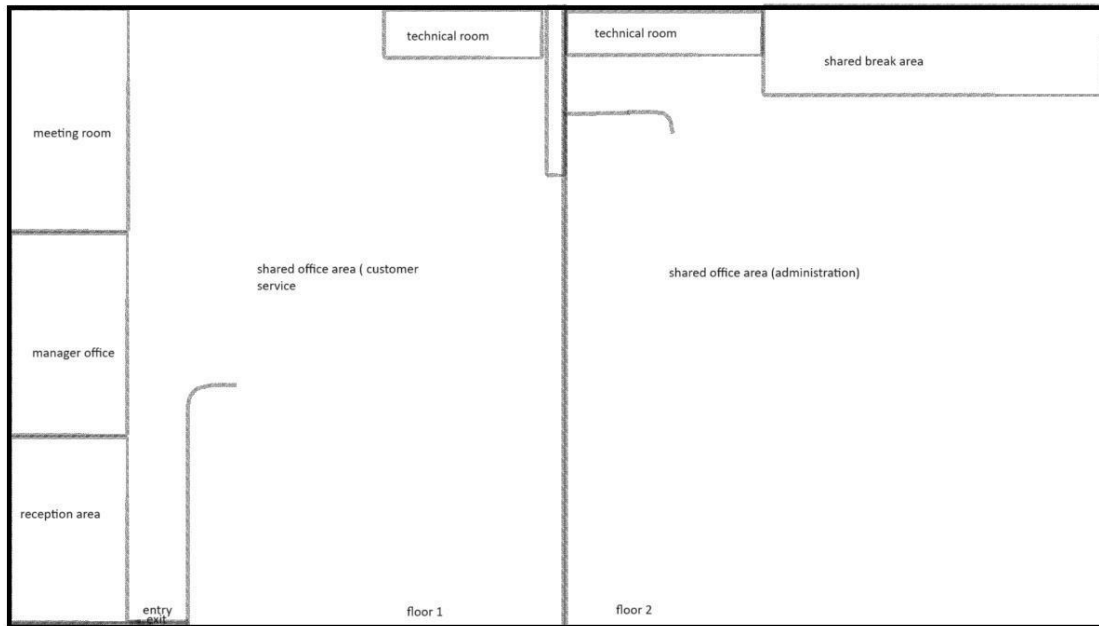
switches used in the network. There are total 3 routers connected with the switches and making connection with it. There are 4 servers interlinked with each other. CISCO cable crossover wire are used to connect the same devices such as routers with routers and switches with switches and cable straight wire are used to connect different devices such as computer with switches and switches with routers

## *Site Map*

This is a site map of building 1. It hosts the administration and customer service department.

At ground level. Near the main there is reception area with size 5\*5.

It includes chairs, visting area. Then there is manager office with size 6\*4. It is next to the reception area. It includes desks and storage cabinets. Upon this there is meeting room with size 7\*4. It consists of chairs, table ,projector, white board. On the right of it there is a technical room as it contains the switches and networking devices of the floor. On the central area there is customer service department with size 5\*7. It has chairs and desks for 9 employees with wired Ethernet connections. On the second floor there is additional technical room. There is also a shared break room with size 3\*6. The central area is adminstration office with size 5\*7.



This is site map of second building. It consists of mainly the sales marketing and research development department. There is a shared research and development area with size 5\*6 on the central part of the building. On the entry level there is reception where visiting area and chairs are kept with size 4\*4. Next to it is a manager office and meeting area with size 4\*3. There is a technical room kept where all the connectivity is maintained of the floor. On the central part there is a shared sales and marketing area with size 5\*7. It contains chairs and conference tables. On top of it there is a break room and technical room next to it. All the sitting availability with chairs and tables are there.

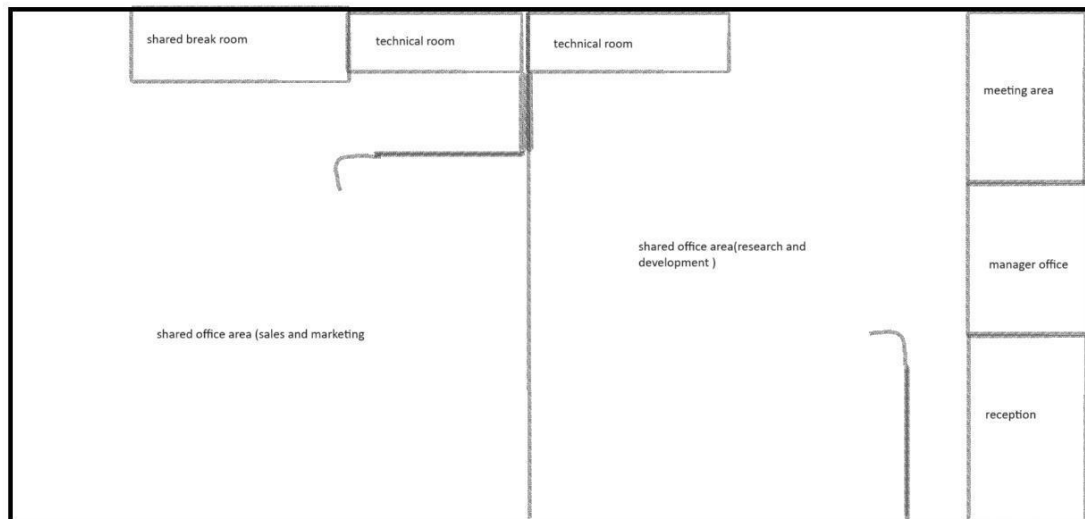


Figure 1

## Inventory List

| Network Devices | Specification  | Qty | Cost    |
|-----------------|--|-----|---------|
| PC              | 27" Full HD (1920 x 1080) IPS display<br><br>Intel core i5-13420H 8 core processor (3.4 - 4.6GHz)<br><br>512GB SSD storage<br><br>16GB RAM<br><br>Intel UHD Graphics<br><br>1 x HDMI port<br><br>2 x USB 2.0 ports | 76  | \$98724 |

|         |  |   |           |
|---------|--|---|-----------|
|         | <p>2 x USB 3.2 ports</p> <p>Webcam</p> <p>Bluetooth v5.1</p> <p>Wi-Fi 6 (802.11ax)</p> <p>Wireless mouse &amp; keyboard</p> <p>Windows 11 Home OS</p>  |   |           |
| Printer | <ul style="list-style-type: none"> <li>Professional-quality prints at speeds of 21 ISO ppm (black) and 11 ISO ppm (colour)</li> <li>Large 250-sheet capacity</li> <li>Intuitive 2.7" colour touchscreen LCD</li> <li>Professional-quality prints at speeds of 21 ISO ppm (black) and 11 ISO ppm (colour)</li> <li>Large 250-sheet capacity</li> <li>Intuitive 2.7" colour touchscreen LCD</li> </ul> | 8 | \$1272    |
| Routers | <p>SKU # AC69821   Model # C1111-8P</p> <p>  Brand <a href="#">Cisco</a></p>   |   | \$4907.85 |



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|  | <p>Cisco ISR 1100 8-Port Dual GE WAN Ethernet Router - 8x RJ-45 Network Ports, 1x GE SFP Port, 1x GE RJ45 Port, 1x GE Port - 1x USB Port - C1111-8P - 12 Months Limited Warranty</p> <hr/> <p><b>Manufacturer Warranty:</b> 12 Months Limited Warranty</p> <hr/> <p>· <b>Industry-leading hardware coupled with feature-rich software combine to make highperformance small-office routers. Up to 800 Mbps IMIX encrypted throughput</b></p> <hr/> <p>· <b>Latest-generation LTE uplink technologies, including dual-carrier support and carrier aggregation, with 5G support coming soon</b></p> <hr/> <p>· <b>Flexible network management solutions, ranging from local WebUI support to cloud-hosted and on-premises SD-WAN controllers</b></p> <hr/> <p>· <b>Wi-Fi 6-capable wireless connectivity embedded into a small-form-factor, fanless, all-in-one device</b></p> <hr/> <p>· <b>Advanced security features available on-box, including Enterprise Firewall with Application</b></p> |  |  |
|--|--|--|--|

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|--|---|--|--|
|  | <b>Awareness, IPS/IDS,<br/>Advanced Malware<br/>Protection, URL filtering,<br/>and Cisco Umbrella Secure<br/>Internet Gateway (SIG)</b> |  |  |
|--|---|--|--|

|  |  |  |  |
|--|--|--|--|
|  | <b>(Secure Access Service Edge<br/>[SASE])</b> |  |  |
|--|--|--|--|

# Switches

**ip 24-Port Gigabit  
Ethernet L2+ PoE+  
Switch, 24x PoE+ Ports  
@370W, with 4x 1Gb SFP  
Uplinks, Broadcom Ch**

S3410-24TF-P 24-Port managed PoE+ switch is equipped with 24x 10/100/1000BASE-T ports and 4x 1Gb SFP uplinks. 24x RJ45 ports support both IEEE 802.3af PoE and IEEE 802.3at PoE+ (up to 30W per port) for powering attached IP phones, wireless access points, or other standards-compliant PoE and PoE+ end network devices. It supports 4 Units of virtual stacking. This managed enterprise switch delivers 128 Gbps switching capacity and 96 Mpps forwarding rate. It is packed with a single power supply and a single smart fan for superior processing performance and network reliability. Secure and simple access for users and IoT with FS Airware Cloud. This access switch delivers a compact, cost-effective

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\$673

|  |  |  |  |
|--|--|--|--|
|  | solution for campus networks,<br>SMBs and enterprise networks. |  |  |
|--|--|--|--|

| Cable Type             | Description  | Approximate Length | Cost  |
|------------------------|--|--------------------|-------|
| Copper crossover cable | <p><b>3M RJ45 Cat 5E Cross Over Cable.</b></p> <p>4Cabling Cat 5E Cross Over Cable. High-Quality Cross Over Cable used to connect two devices of the same type, e.g: computer to computer (via their ethernet controller). Fully compliant to ACA regulations, which allows usage in any network connected to the Telstra network.</p> | 150                | \$450 |

|  |   |     |        |
|--|---|-----|--------|
| Copper<br>straight<br>through<br>cable | <b>Product Highlights</b><br>Exceed ANSI/TIA-568.2-D<br>Category 6 and ISO 11801<br>Class E Standards   | 180 | \$5020 |
|  | Up to 550MHz with 1G/10G-T<br>Speed, Support<br>PoE/PoE+/PoE++ (IEEE<br>802.3af/at/bt)<br>Performance Tested with<br>Fluke and Wired T568B<br>Strain Relief and a Flexible<br>Boot Simplify Moves,<br>Additions and Changes<br>Stranded Cable and RJ45<br>Modular Plugs with 50μ"<br>Gold-plated Contacts<br>Pure Bare Copper<br>Conductors with Stable<br>Transmission Performance<br>Use in Patch Panel or<br>Equipment Connections in<br>Enterprise Networks and<br>Data Center<br>Variety of Cable Colors and<br>Lengths to Meet Individual<br>Requirements and System<br>Flexibility |     |        |

Additional Resources

| Tools/Connectors | Description/Usage |
|------------------|-------------------|
|                  |                   |
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