Yotsuba Network Design Brief

360CT - Advanced Network Management and Design

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Contents

1. Introduction

This is to get references to appear (Heikkinen & Hamalainen, 2020)

2. Requirements and Assumptions

2.1 Expansion

An assumed rate of expansion of 10-20 new employees annually is being used for this project. This expansion will be spread over all departments acquiring 1-2 new employees annually.

2.2 Network Speeds and Bandwidth

Research showed that private internet for the greater Tokyo region had available speeds in the range of 10Mbps to 1Gbps. It is assumed that enterprise internet speeds will be within a similar range and that the Yotsuba Group will be purchasing at the top range. Therefor a 10Gbps connection will be used for the designs.

2.3 IP Address Block

As the Yotsuba Group is a rapidly expanding company, it is assumed that they have purchased their own Class B IP block. This block is IP RANGE and will be used for all designs.

2.4 Employee breakdown

As no information on individual department employee count was provided it has been assumed based on departmental needs.

- Research and Technology - 50 employees
- Financial Planning - 20 employees
- Sales - 34 employees
- Material and Design - 50 employees
- Personnel - 20 employees
- Planning and Manufacturing - 60 employees
- Legal and Accounting - 10 employees
- Marketing - 20 employees

- IT - 20 employees
- Department Head and Assistants - 16 (8+8) employees

2.5 Extra Devices

3. Physical Network Design

3.1 Devices

3.1.1 CCTV

3.1.2 Wireless Access Points

3.1.3 Switches

3.1.4 Routers

3.1.5

3.2 Wiring

3.2.1 Fibre

3.2.1.1 Multimode Fiber - OM4

Could be used in and between core/access due to high data transfer rates (10Gbps) over a distance of 550m.
While the distance of 550m is overkill for a 7 story building, the allowance for higher distances at higher speeds (100m at 100Gbps) will be good for futurproofing our solution.
Use case would be from server room to server cupboard.
OM4 would be used due to the cost/benifit compared to OM5 which would be overkill for our setup.

Type	Distance for a 10Gbps connection	Cost per meter
OM1	33m	
OM2	82m	
OM3	300m	
OM4	550m	
OM5	550m	

3.2.2 Copper - CAT6a

Allows us to utilise 10Gbps over 100m. Use case would be from workstations to server cupboard.

3.3 Device Placement

3.3.1 Ground Floor

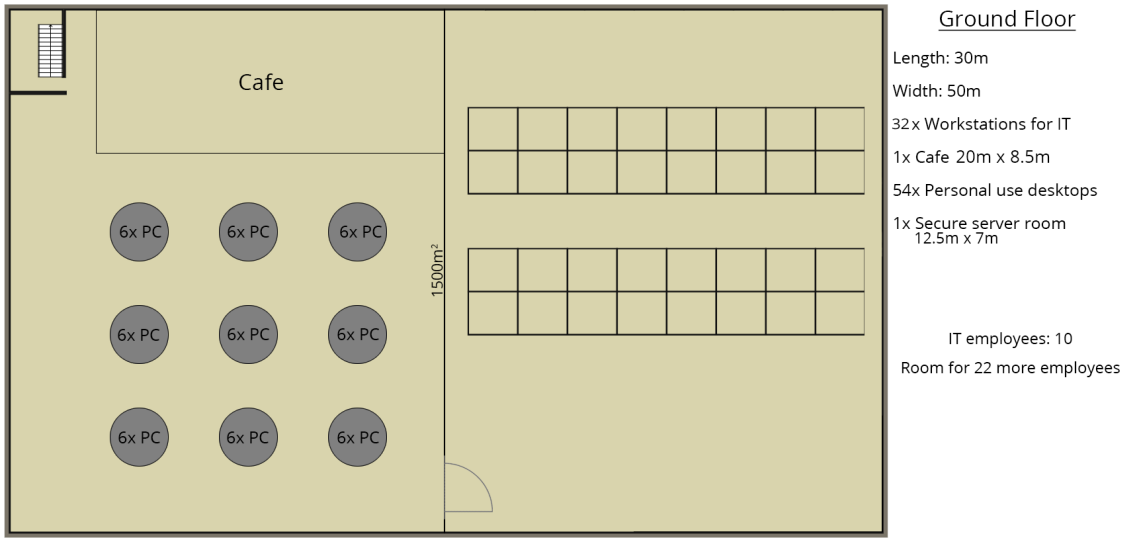

Figure 3.1: *Ground floor floor plan*

3.3.2 1st Floor

MAKE NEW 1ST FLOOR

3.3.3 2nd Floor

MAKE NEW 2ND FLOOR

3.3.4 3rd Floor

3.3.5 4th Floor

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3.3.6 5th Floor

This is text

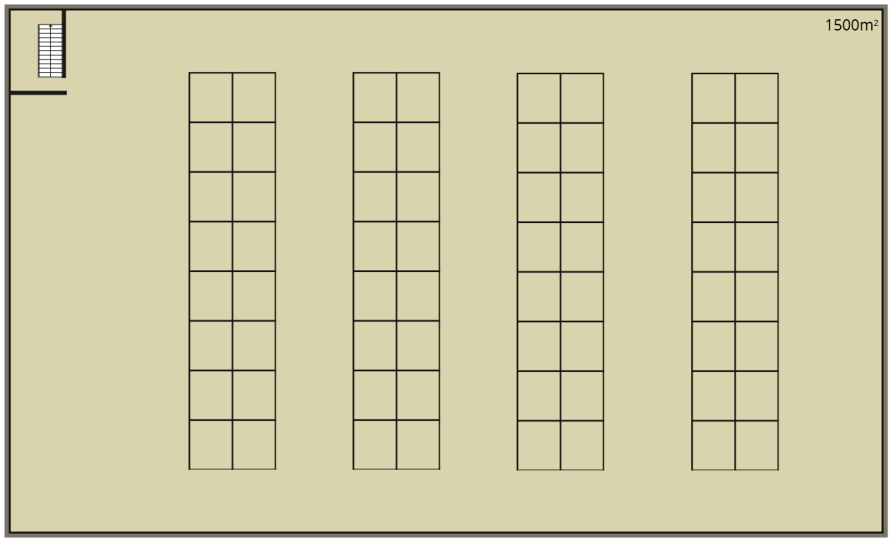


Figure 3.2: *3rd floor floor plan*

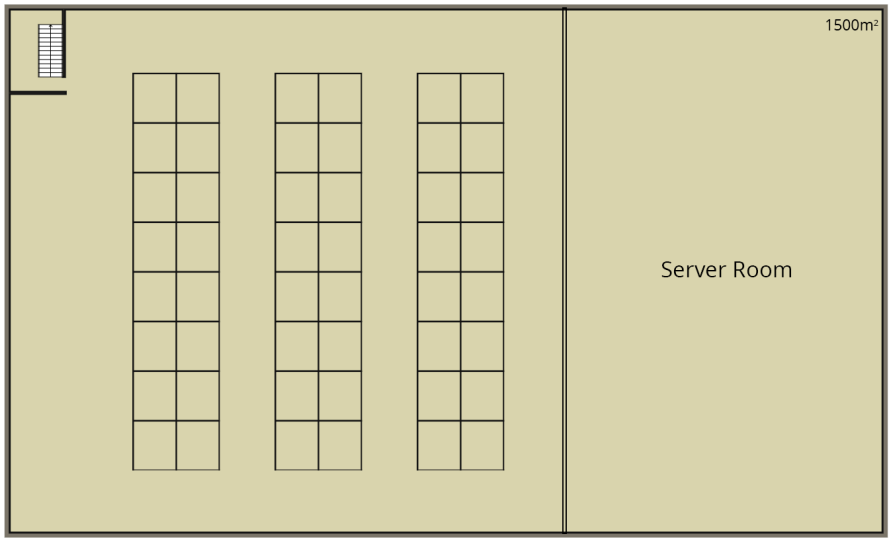


Figure 3.3: *4th floor floor plan*

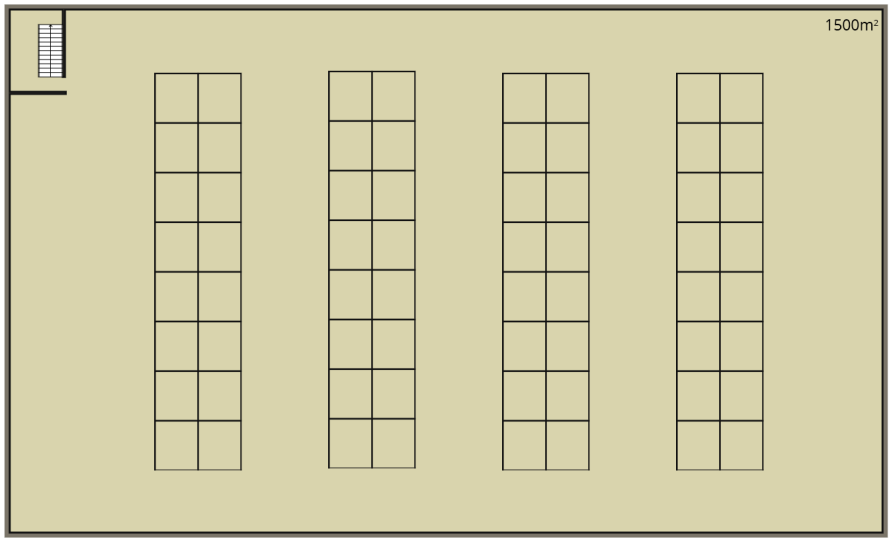
3.3.7 6th Floor

This is text

3.3.8 7th Floor

MAKE NEW TOP FLOOR

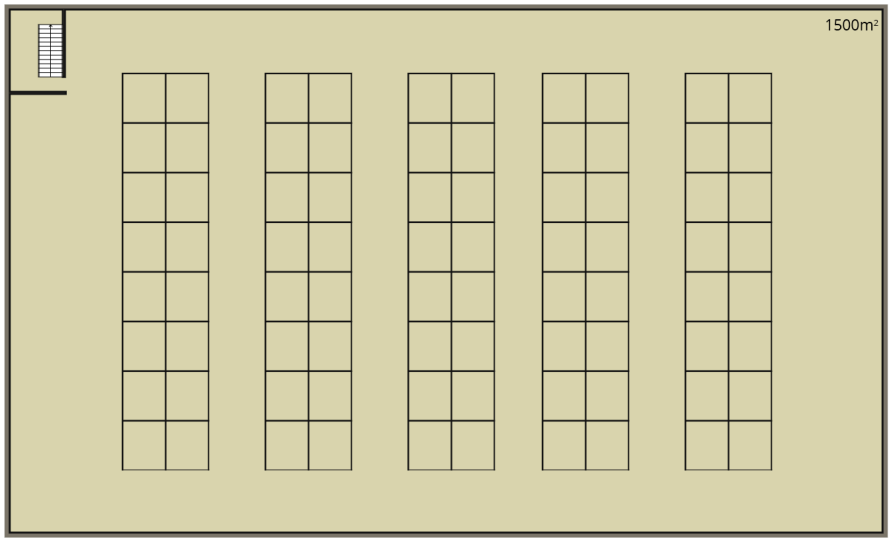
3.3.9 Server Room



Floor 5

Research and Technology
Workstations: 64
No. of personnel: 50
Room for expansion: 14

Figure 3.4: *5th floor floor plan*



Floor 6

Planning and
Manufacturing

Workstations: 80
No. of personnel: 60
Room for expansion: 20

Figure 3.5: *6th floor floor plan*

4. Logical Network Design

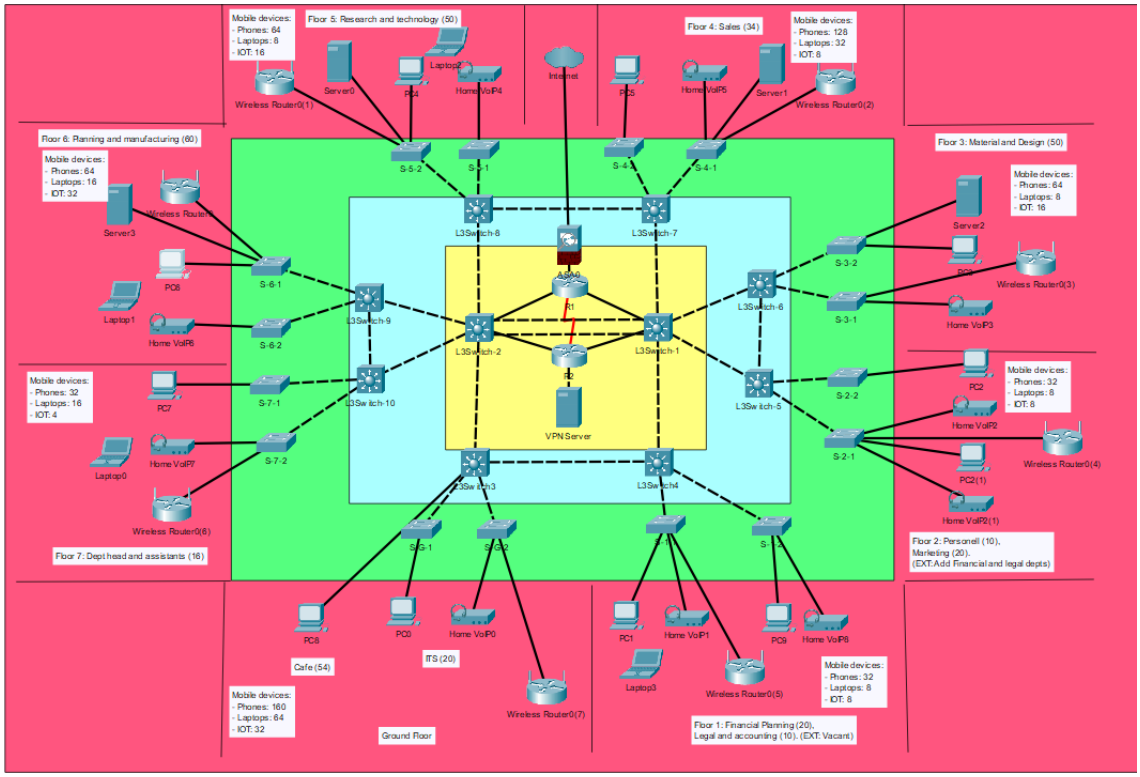


Figure 4.1: *A Network Design produced in PacketTracer.*

4.1 Justifications

5. Addressing Scheme

5.1 Scheme

5.2 Justifications

6. Network Policies

6.1 Issues

6.2 Resolutions

7. Security

7.1 Previous Security Threats

The Yotsuba Group reported a number of security incidents in the last 6 months. These have been assumed below.

7.1.1 IP Theft

The company had some intellectual property stolen from a physical attack on the servers within the company premises, the attackers were not found or apprehended as the security was not to standard. This attack was made possible by a lack of physical security measures on there network infrastructure.

7.1.2 Internal Breach

30% of attacks come from employee's within the companies, some data was accessed by departments who has access to other parts of the organisation that they should not have had. A lack of access control was the cause of this attack.

7.1.3 Identity Theft

An external attack left the customer database held by the company open and accessible to the attackers, this in turn was used to ciphon their data and initiate fraud through loan applications under customer names.

7.2 Possible Security Threats

In addition to the previous incidents, various other attacks could be possible against the group and their network. These have been outlined below.

7.2.1 Some new attack

7.3 Solutions

A list of solutions.

7.3.1 Physical Security Measures

7.3.2 Access Control

7.3.2.1 Access Control Configurations

8. Monitoring and Maintenance

8.1 Software

8.2 Justifications

9. Disaster Plan

9.1 Risks

9.2 Plan

10. Additional Problems

10.1 Renting One Floor Out

The second floor will combine four different departments to allow for space in the first floor. The new layout can be seen in figure 10.1.

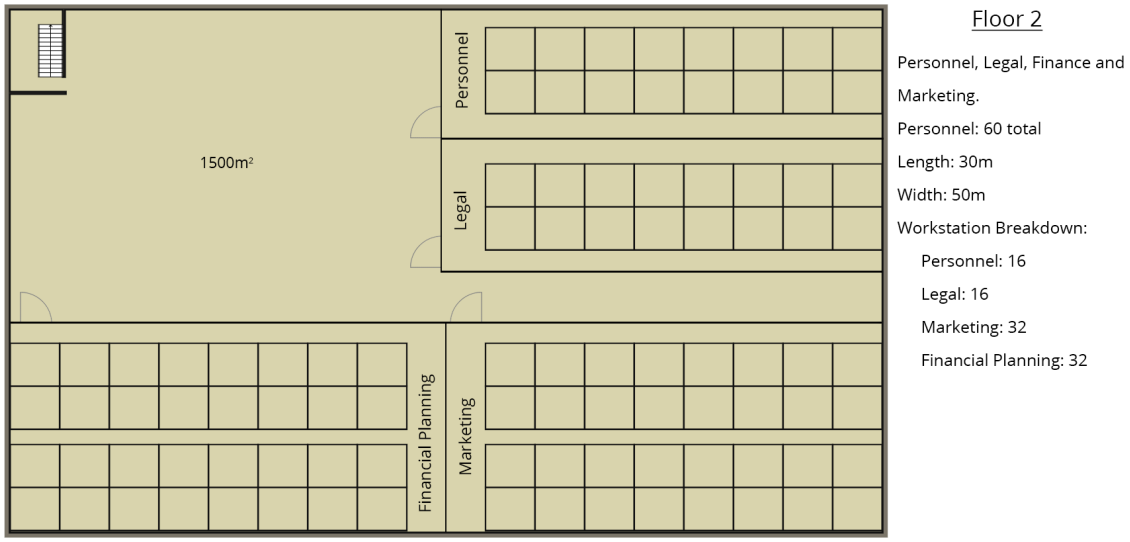


Figure 10.1: *2nd floor floor plan combining 4 different departments*

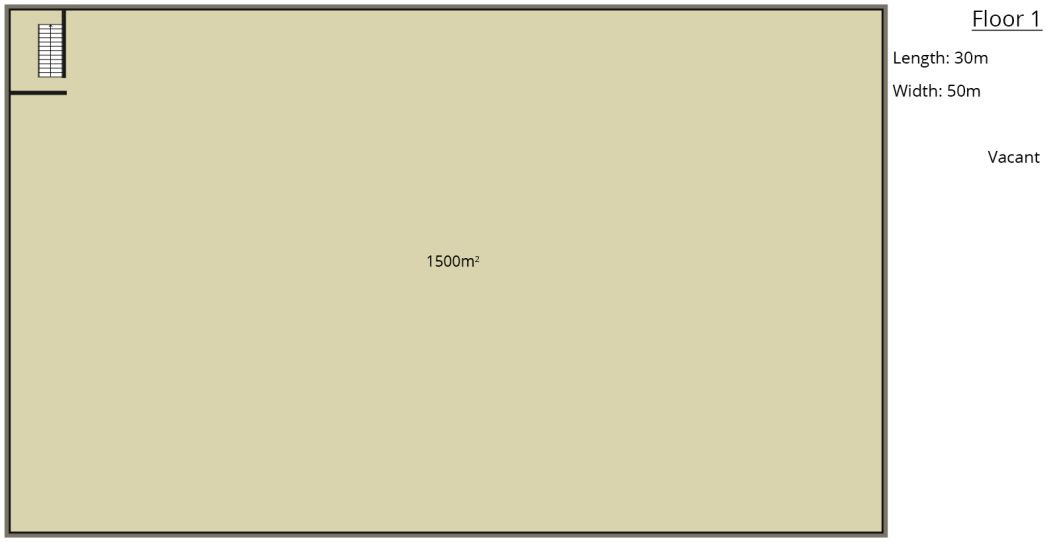


Figure 10.2: *1st floor vacant plan*

10.2 Splitting Between Two Buildings

References

Heikkinen, E., & Hamalainen, T. D. (2020). Deployment of batch processing for log file analysis. *2020 IEEE Conference on Industrial Cyberphysical Systems (ICPS)*. https://doi.org/10.1109/icps48405.2020.9274712