INDIVIDUAL ASSIGNMENT

TECHNOLOGY PARK MALAYSIA

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DATA CENTER INFRASTRICTURE

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1. Introduction

In this report, I am required to cover 2 types of technical goals, which are availability and scalability of a data Centre, covering the type of servers used in a data center as well as 2 TIA 942 standards area of a data center.

2. Technical Goals

2.1. Availability

Availability as a technical goal in a network, otherwise called network uptime, can be defined as a proportion of how well a network regardless of whether a Local Area Network or a wide area network can react to the connectivity, reaction and connectivity requests put on it. (F5, Inc, 2021)

Availability is an extremely important part to be considered in catastrophe planning, yet it additionally fundamentally affects regular day to day existence and work. For associations, network personal time or laziness likens to business vacation, at extensive expense for associations through shortcoming, lost deals, absence of basic information for choices, and other unsafe impacts. (F5, Inc, 2021)

Organization accessibility is determined by separating the uptime by the complete time in any period. The objective is 100% accessibility, albeit one more ordinarily referred to objective is known as "five nines," or 99.999% accessibility. That is what could be compared to a couple of moments of vacation in a year. (F5, Inc, 2021)

2.2. Scalability

Scalability as a technical goal in a network can be defined as the capacity of a network to adjust to any given development or change. This can likewise mean adjusting to scaling down, yet individuals normally mean the capacity to perform well when the association adds clients, locations, administrations, or different requests that require more from the organization. (vincent, 2016)

3. Hardware devices

3.1. Blade Servers

A blade server now and then alluded to as a high-thickness server, is a conservative gadget containing a PC used to oversee and disseminate information in an assortment of PCs and

frameworks, this whole thing is referred to as a network . Its job is to go about as a channel between PCs, projects, applications, and frameworks. (Fitzgibbons, 2019)

As a rule, a blade server comprises of a body called a chassis, or box-like construction, lodging different meager, secluded electronic circuit sheets which are known as blade or server blade. They are called blades because of their super slim shape. Every one of those blades contains a solitary server, frequently committed to a solitary application. The data inside blade servers are put away on a memory card or other memory gadget. (Fitzgibbons, 2019)

Furthermore, the singular blade contains processors, memory, incorporated network regulators, a discretionary Fiber Channel HBA(host bus adaptor), and other I/O ports. These are utilized to interface server edges to other server sharp edge units inside the framework or to associate individual edges to control sources. (Fitzgibbons, 2019)

As example of good blade servers, we can consider DELL M630, DELL M830, Lenovo Flex system x440, Lenovo x240MS, UCS B200M4, UCS B420M4,etc.

Figure 1 : Lenovo x440 front-right (Lenovo, 2021)

Pros	Cons
• Energy efficient : chassis or body supplies capacity to numerous blade servers, rather than powering and cooling different servers in discrete racks. These abatements burning through on energy. • Processing Power: Blade servers give high processing power albeit occupying restricted space.	• Upfront costs: Over time, working costs are reasonable because of smoothed out administration interfaces and lower energy utilization. Starting expenses of capital, organization, and setup, be that as it may, can be high. • Energy costs: blade servers with high thickness require progressed

• Multi-Purpose: web services , Leading OS and hypervisors ,software, databases, and different processes and applications at the company level can be hosted. • Availability: blade server environment is rearranged by incorporated checking, maintaining ,monitoring ,and supporting , load adjusting, and grouped failover. Hot trading likewise works on the accessibility of frameworks.	environment control. To keep up with blade server effectiveness, warming or heating , cooling, and ventilation are completely required costs.

3.2. Rack Servers

Figure 2 : Lenovo x3650 M5 (Lenovo, 2021)

They are servers that can be introduced straightforwardly into standard 19-inch racks. Regularly, such servers are to some degree like the size of the switch, so the rack server is really an item under mechanical normalization, and its appearance is planned by a uniform norm, With the bound together utilization of the cabinet to meet the endeavor server-intensive organization needs. The fundamental job of the rack server is to save space on the grounds that beyond what one server can be introduced in a cabinet, which not exclusively can occupy less room, but at the same time is not difficult to oversee. The stature of a typical cabinet is 42U (1U = 1.75 inches), the rack server is 19 inches in width, and most rack servers are 1U-4U high. (Fiberland Technology Co.,LTD, 2017)

The upside of rack servers is that they are little in space and simple to oversee, but since of interior space requirements, adaptability is more restricted, for instance, 1U workers are generally simply 1 to 2 PCI expansion slots. Furthermore, the cooling execution is likewise a need to focus on the issue, notwithstanding the requirement for cabinets and other gears, so this server is utilized for countless servers for enormous endeavors to use, there are many organizations utilizing this sort of server, however the server conveyed to Dedicated server hosting to host, particularly the current site of numerous servers are utilized thusly. (Fiberland Technology Co.,LTD, 2017)

As example of good blade servers, we can consider UCS C220 M4, HP DL360 Gen9, HP DL160 Gen9, DELL R630, Lenovo x3550 M5

Pros	Cons
• Self-contained: As an independent or networked machine and each rack server has all that needed to run, its own source of power, CPU, and memory. This considers serious computing operations to be executed by rack servers. • Efficiency: Rack-mounted servers and other computing gadgets make limited server farm space utilized amazingly viably. With extra memory, stockpiling, and processors, rack servers can be broadened without any problem. Furthermore, if managers have pooled or bunched the server information for excess, it is simple to hot-swap rack servers. • Cost-viable: smaller arrangements at a cheaper cost the management and energy productivity.	• Power use: Densely populated racks are required additional cooling units, which builds the energy cost. Altogether, enormous quantities of rack server would expand energy needs. • Maintenance: Dense racks are required for really investigating and management time.

3.3. Tower Servers

These servers will be servers in an independent body arrangement. They are produced with insignificant software or parts, so average size and endeavor clients can vigorously tweak the servers for explicit errands. For instance, tower servers typically don't accompany extra parts like very high RAM or peripherals. (Taylor, 2020)

Figure 3 : HPE ProLiant ML110 G10 4.5U Tower Server (Yot Store, 2021)

A tower server is a PC that is implicit an upstanding cabinet that remains solitary and that is intended to work as a server. The cabinet is also referred to as a tower. These servers are famous inferable from the versatility and dependability highlights since limitless servers can be added to the current organization generally due to the autonomous idea of the singular tower servers. (Taylor, 2020)

These servers support most fundamental applications like system management, record the executives, print coordinated effort, ER applications, dissemination, and framework security. There are sure benefits to utilizing tower servers. This server is powerful and basic in nature. As generally part thickness is low, more straightforward cooling is conceivable in tower servers. Conceivable harm, overheating or personal time would thus be able to be forestalled. (Taylor, 2020)

The adaptability factor is high in tower servers, and it is a lot simpler to increase the number of servers to a basic network, prompting versatile joining. Once more, the upkeep factor is less when contrasted with different plans. Simple distinguishing proof both on the physical and the

network is conceivable in tower servers as the information are typically put away in a solitary tower and not across different gadgets. (Taylor, 2020)

The cabling engaged with tower servers can be muddled, and a few servers in a solitary area could be loud because of the way that each tower may require a devoted fan. A singular screen, mouse, or console is needed for each tower server, or a console, video, and mouse (KVM) change should be accessible for overseeing gadgets utilizing a solitary arrangement of gear. Once more, in contrast with edge servers or rack servers, tower servers could be bulkier. (optcore, 2017)

As example of good blade servers, we can consider HPE ProLiant, DELL PowerEdge.

Pros	Cons
• Efficient versatility: Tower servers accompany insignificant design, so IT can tweak and update them dependent on business needs. They are more affordable to purchase than a completely stacked server. • Low cooling costs: With their low part thickness, towers are more affordable to cool than thick racks or cutting edges.	• Upgrade cost. Numerous clients purchase tower servers for customization and not really for low capital expenses. Top of the line equipment parts, and programming will raise the continuous cost impressively. • Large impression: These servers don't fit in racks and devour server farm space. They require opening the walled in area to investigate and add or redesign inner parts. • Awkward fringe the board: In various pinnacle server conditions, IT should put resources into switches or re-plug outside gadgets into each different server.

3.4. Blade server vs Tower server vs and rack-mounted server

Blade Servers have a walled in area made from a circuit board with insignificant parts. It houses various cutting edges and has power and systems administration necessities served through undercarriage while Rack servers do not have outside hard fenced in area except for housed in openings of rack structure and the tower server is more of a solitaire or a standalone in an upward structure. They ordinarily go inside negligible parts and pre-stacked application and can be customized for explicit necessities.

Regarding the power consumptions blade servers are considered to consume less power than, tower or rack, so if the hospital is looking to energy consumption as one of the biggest factors in its data center, blade server will have a point more in the decision making.

Regarding the maintenance and management blade servers are considered to give less trouble when it comes to troubleshooting and this is due to the centralization of the control of severs which is not the case for tower and rack servers.

Regarding the scalability of the network the best choice to go with will be a tower server and this is because unlike blade servers or rack servers, a tower server is highly scalable because tower servers usually do not come with maximal configuration and can easily be upgrade in a way to satisfy the needs of a business and the cost is much cheaper than blade servers as well as rack servers if they must be scaled.

Regarding the Business model blade servers are majorly used by large organizations while tower Ideal for small businesses and rack servers are ideal to be used in a relatively small business. This is why for this data center the most suitable choice is blade server.

4. TIA 942 Standards Area

4.1. Main distribution area

Placed in the second position of the space functional area of the TIA 942 data center spaces, the main distribution area also known as MDA is the area of the data center that is between the entrance room and horizontal distribution area also known as HAD, this part of the data center is used to house network communication gadgets such as routers and switches. We must also underline that the MDA may include the horizontal cross-connection as well as storage devices.

4.2. Entrance Room

The entrance room is on the first position of the space functional area of the TIA 942 data center spaces. The entrance room is used as a place to keep all the 3rd party equipment. In case the data center wants to connect to an outside network such as internet, there is a need of an internet service provider which in this example can be considered as a 3rd party equipment. It is the only part of data center that is allowed to almost everyone.

5. Conclusion

As conclusion, this report shows the availability and scalability are the most important technical goals that should be cover because the hospital will need to have their data whenever they want and should not meet issues while increasing the size of the data center. We also recommend the data center to use blade servers for its data center because it is more suitable for a company that

does not have a guarantee and it is guarantee higher availability and better performance regardless of the face that it will be expensive to install those servers.

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