**Part 2**

Overview and Discussion

Group 3

Ryan J. Skelly, Kambal Vaidya, James Msaddi

10/12/2021

The three most important factors when buying servers for the company are…

1. Accessibility/Fault Tolerance: For Data Centers and the devices in them, being able to be accessible at all times is of the utmost importance. If the Data center does not have the correct power management infrastructure set up, then failure could decrease monetary value gained, and increase volatility between devices(Failure of components, MoBos frying, storage devices being unusable). Also, fault tolerance storage devices and formats allow data loss to be at a minimum, which is the best for customer satisfaction. If data is lost, customers will be angry and need reparations for the value that the data was(which is subjective to the customer).
2. Storage: For a database, setting storage is one of the most important factors because it has to hold the data properly. For a corporate level server, a lot of storage is needed as well. It is important to have because it stores all the data that the company uses. The type of storage also impacts the importance because some types of storage can decrease read, write times which are very important when working with servers.
3. Memory - For the use cases listed, simulations and office productivity applications for the company can tend to be RAM hogs. Therefore, having well-performing memory(DDR4-DDR5) and having a formidable capacity(bare minimum 4Gb) is one of the most important factors. Also, this system is part of the order processing and fulfillment infrastructure of the corporation, slow performance or downtime of the system mean orders don’t get processed, customers don’t receive their products, and the company doesn’t make money therefore memory is very important for preventing slow performance or downtime of systems.

The least important factors when buying servers for the company are...

1. Display Details - The display details in hardware specifications were more for the laptops as there is an actual display while servers do not need a display this hardware specification is the least important factor.
2. Graphics Details - Graphical details are the absolute least important for this specific usage case due to most storage servers operating solely based on a CLI, and SQL servers being operated through text input/calls. There is no reason for Images/Videos to be held on the server, and graphics-intensive programs won't need to be run on it.

Manufacturers investigated:

1. **Dell**
2. **Cisco**
3. **Lenovo**

Manufacturers ruled out:

1. Asus
2. HPE

Our team investigated Asus and HPE as manufacturers and decided not to use these are our manufactures. The Asus server seems to be more of a mining rig rather than a server that would be used for this company. Since the budget is important for buying servers the main reason the HPE was ruled out was for the heavy price of about $10,000.

| **Make** | **Model** | **Processor Type** | **Processor Speed** |
| --- | --- | --- | --- |
| Dell | PowerEdge R250 Rack Server | Intel® Pentium G6405T | 3.5GHz, 4M Cache, 2C/4T, No Turbo (35W), 2666 MT/s |
| Cisco | Cisco C220 M4 Rack Server | Intel Xeon E5-2630 v3 | 2.40 GHz |
| Lenovo | ThinkSystem SR570 Rack Server | 2 second-generation Intel® Xeon® Platinum processor | 150W, up to 26 cores per CPU |

| **Memory** | **Storage Type** | **Storage Amount** | **Networking Details** |
| --- | --- | --- | --- |
| 8GB UDIMM, 3200MT/s, ECC | Hard Drive | 2TB Hard Drive SATA 6Gbps 7.2K 512n 3.5in Cabled | On-Board Broadcom 5720 Dual Port 1Gb LOM |
| 64 GB | HDD SATA, Expandable | Up to 8 front-accessible, hot-swappable, 2.5-inch HDD or SSD or up to four 3.5-inch drives. | Dual 1-Gbps Intel i350 Ethernet ports. |
| 1TB of 2933MHz TruDDR4 in 16 slots, Intel® Optane™ DC Persistent Memory | SAS/SATA HDD | 48TB (3.5" SAS/SATA HDD); 30.72TB (3.5" SATA SSD); 24TB (2.5" SAS/SATA HDD); 76.8TB (2.5" SSD); 30.72TB (2.5" NVMe); 1x or 2x M.2 | 2 GbE ports standard; LOM interface standard; optional ML2, PCIe |

| **Graphics Details** | **Display Details** | **Ports** | **Warranty Details** |
| --- | --- | --- | --- |
| none | none | USB 3.0 Card, 8X DVD-ROM, USB, External, Keyboard and Optical Mouse | None |
| none(Up to 8 MB) | none | x1 USB 2.0, x1 Ethernet, x1 Serial port | 3-year money-back warranty |
| none | none | 2x GbE standard; 1x GbE dedicated management standard | 1- and 3-year customer-replaceable unit and onsite service, next business day 9x5 |

| **Additional Notes** | **Price** | **URL** |
| --- | --- | --- |
| C21 Software RAID 0 for S150 Embedded SATA | $1,157 | <https://www.dell.com/en-us/work/shop/pdr/poweredge-r250/pe_r250_15318_vi_vp?selectionState=eyJPQyI6InBlX3IyNTBfMTUzMThfdmlfdnAiLCJNb2RzIjpbeyJJZCI6MTYzMCwiT3B0cyI6W3siSWQiOiJHSEVBR044In1dfV0sIlRpIjoiIiwiRGkiOiIifQ%3D%3D&cartItemId=> |
| RAID capable, No OS installed but supports WinServer, RHEL, ESXi, CentOS, SLES, and many others | $5,779.64 | <https://www.compsource.com/buy/UCSSPLC220M4S1/Cisco-91/?src=F> |
| HW RAID 0, 1, 5 standard,Lenovo ThinkShield, locking bezel; locking top cover; TPM 2.1 standard,Microsoft, SUSE, Red Hat, OS support, | $1,673.59 | <https://www.lenovo.com/us/en/p/data-center/servers/racks/thinksystem-sr570/77xx7srsr57> |

**Discussion on Options**

The first option we chose was the Dell PowerEdge R250 Rack Server. This server exceeds our requirements for what we thought would be an effective server for this company. The three most important factors needed are Accessibility/fault tolerance, Storage, and Memory. Accessibility/fault tolerance was one of the most important factors when buying the servers and this server comes with C21 Software RAID 0 for S150 Embedded SATA and S150 for Software RAID this would allow for fault tolerance and RAID is very important when it comes to servers. Storage is very important when it comes to servers because its main purpose is to store data and if this company is thinking of expanding to more the 50G of data having a server like this Dell server that has 2TB Hard Drive SATA 6Gbps 7.2K 512n 3.5in Cabled storage is very important in running operations right now and in the future. Memory is very important because it allows the server device to package and send the data it needs quickly and efficiently and with 8GB UDIMM, 3200MT/s, ECC memory, and expandable memory this server is more than enough to run for this company. The main difference between this Dell server and the other servers provided is the price as the price is a big factor for the company with the dell server being only about $1,000 about $4,000 cheaper than the next cheapest server. As long as price, reliability is very important as Dell as a manufacturer has proven its servers are reliable time and time again.

For our second option, we chose the Cisco C220 M4 Rack Server, for many different reasons. The first being its price, although the server is on the expensive side, for the cost it provides many extra benefits that the other options don’t. The second being its storage capability, it can hold both 2.5” and 3.5” drives that are hot-swappable for easy replacement of dead/faulty drives. It also has support for harddrives and solid state drives so the choice is at the discretion of the company. This allows it to interface seamlessly with RAID and in the event, the Hard drives fail. As stated before the server is RAID capable and can allow for all forms of the raid to work natively. The third reason we chose this device was for its incredible 64 Gbs of memory which allows the device to package and send the data it needs quickly and efficiently, for SQL transmissions this will provide the customer with low wait times, which is crucial for financial transactions because if the customer has to wait an extended period of time for things to load, they could very well click off of the eCommerce site and opt for a different seller. Speaking of sellers, the seller of the device, CompSource, is reputable and has 4.7 stars on google site ratings. They also have 24/7 customer support. Also because this device is a Cisco product, ample documentation exists making it easier for the IT staff at the company to implement the server.

The last option we decided on was the Lenovo ThinkSystem SR570 Rack Server. The first benefit for having this was the storage on the device. It comes with different options with at least 30.72 TB to 76.8 TB of storage available. This meets the requirement of at least 50 Gb to start, and it also allows a lot more room to grow as the server requires more storage. It also allows for hot-swappable HDDs or SSDs which can change the storage type to what the company wants to use. This also meets our expectations of having a large amount of storage. Another reason why this was one of the top options was because of the RAID capabilities that are incorporated with the system. It is capable with RAID 0,1,5, this provides a big level of support for the data recoverability, and uptime for the device. There are different types of RAID available for different models, one is a hardware RAID for the hot-swappable models, while there is a software RAID for the other model. This matches with our expectation of accessibility and fault-tolerance. The last important requirement is the memory. This device has a large memory capacity of 1TB of 2933 MHz TruDDR4. This is a lot of memory capacity that it has, and it has it in up to 16 different slots. This allows the transfer of the data from the servers to be fast and reliable. This also comes with a 1-3 year warranty that provides on-site service along with replaceable units on the next business day from 9-5