**Problem Statement**

During the vSphere design discovery process, information is collected on the business and technical goals of the virtualization project. This information must be analyzed in order to determine the vSphere design factors.

The vSphere design factors that must be determined are as follows:

* Requirements
* Constraints
* Assumptions
* Risks

Determining the requirements, making and proving assumptions, determining constraints, and identifying risks forms the conceptual design and provides the foundation to build on for the logical design. Business and technical design factors that are identified as part of the conceptual design will be mapped to the resources that are necessary to satisfy them during the logical design process.

This project is envisioned as creation of a new Data Center for the University Computer Center. All information is provided through interviews with employees at various Faculties, providing their current and future needs, goals and vision. Collected information is given in the form of technical data, current equipment and musings gathered during interviews. Your task is to create and present the design that will be used for creating of technical documentation, installation and implementation of the Data Center. For the purposes of this project, your budget is not limited, but you will receive better grade if you use smaller budget for providing necessary goals.

In your budget you should calculate the costs of providing new server equipment, storage, networking, and VMware licensing. You should provide sufficient equipment and licenses for all stated goals.

You should start your work given following information:

* Currently, there are 100 physical servers, servicing 10 Faculties. You should presume that each Faculty is using the same number of servers.
* You should work with the fact that each Faculty is increasing their need in computing resources by 10% each year.
* The solution must support growth over the next 7 years.
* Application uptime and accessibility is not so important. Preserving of data is the most important aspect of your planning.
* Consolidate physical servers to reduce hardware costs associated with the maintenance and deployment of new application servers.
* At least 80% of the servers used at each Faculty are application servers, and it is prerogative to keep all virtualized application servers belonging to a Faculty on host(s) that are not used by any other Faculty. The other 20% servers can be shared between Faculties. Shared servers include DNS, File Servers, FTP Servers, etc.
* Every Faculty should use their own network (VLAN) for applications. You should also provide at least one network for each of following: host management, vMotion, and shared servers. Design network according to this requirement.
* No more than half of application servers belonging to a Faculty, should be affected by a hardware failure.
* There should be a 24-hour maintenance window each six months for application and hardware maintenance. Hardware maintenance is currently a challenge. Since hardware and application maintenance cannot be performed at the same time, the maintenance window does not typically provide the time that's required to perform both application and hardware maintenance.
* Application servers run CentOS 8 as the operating system.
* Each application server is configured with 16 GB of memory. The peak usage of a single application server is approximately 75 percent or approximately 12 GB.
* Each application server is configured with two 6-core 2.2 GHz processors. The peak usage of a single application server is approximately 10 percent of the total processing power, or approximately 2.6 GHz.
* Each application server is configured with 200 GB of disk space. Peak disk capacity usage of a single application server is approximately 35 percent of the total disk space, or 70 GB. Peak disk performance of a single application server is 60 IOPS with an IO profile of 80 percent read and 20 percent write.
* Currently, the stakeholders are using HP DL380 servers. Faculty Computer Center is open to new hardware vendors and it is your duty to provide most resources while using smallest budget.
* Currently, there is no shared storage. The current system and infrastructure administrators are unfamiliar with the shared storage concepts and protocols. If you choose to use certain storage connection technology, you should also provide means of connecting all servers and storages (switches), while also providing redundancy (use at least two ports/interfaces on each server, use storage with at least two storage controllers). Total bandwidth connecting server(s) to the storage(s) should be at least 12 Gbps. If you use IP network, do not use existing switches for storage traffic (you should design and implement new switches).
* Cisco switches providing 1Gbps per port are used for network connectivity. You should provide network connection redundancy for each server in the Virtualized Data Center. The number of interfaces/ports per server is left for you to decide.
* Currently, each physical server contains a dual gigabit network interface card. Peak network usage is 100 Mbps.
* The management team expects the implementation to be completed before the third quarter of the year.

If your design includes more Features provided by VMware, your effort will be valued more. Plagiarism will not be rewarded, we will split your points equally between all similar designs.

For help and reference, you can use following resources:

<https://www.fujitsu.com/global/products/computing/servers/primergy/>

<https://webconfigurator.ts.fujitsu.com/webarchitect/configuration/catalog>

<https://h22174.www2.hpe.com/SimplifiedConfig/Welcome>

<https://www.serverwarehouse.co.uk/>

<https://www.dell.com/en-us/work/shop/dell-poweredge-servers/sc/servers>

<https://www.servermind.de/en/configurator/for-dell-servers/>

<https://cloud.ibm.com/gen1/infrastructure/provision/bm?packageId=1105&itemId=14124>

<https://www.router-switch.com/Price-huawei-servers_c358>

<https://store-eu.vmware.com/>

<https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/product/vmware-product-guide.pdf>