Case Study

A fictitious case study about a non-existent company. Any reference to companies or persons living or deceased is purely coincidental.

The Scenario

JenCo Cosmetics is a company that manufactures and sells its cosmetics online. Costs for IT have been increasing and IT has struggled to meet the business's expectations. As a result, JenCo is failing to deliver the infrastructure and development environments to meet both internal and external customer demands. Due to high licensing costs and continual demand for traditional bare metal servers to host 3 tier applications, IT's budget is continually being exceeded due to delays and the inability to scale on-demand.

Recently, the CEO made some significant decisions regarding these challenges and has vowed to implement them in order to stay competitive in this highly competitive and dynamic market. As a result of these changes, a new CIO was hired to create and run a full technology transformation initiative.

The Organization

JenCo (2000 employees) is structured into only two lines of business, manufacturing and distribution. In distribution there's online and traditional. Only the online distribution line of business being transformed but, the other lines of business would take advantage of any transformation eventually. Most of the IT need is in online distribution. In online distribution there are 4 departments: Application development, Infrastructure, Security and the CIO's office.

Applications builds and deploys applications. They also test and operate the applications as well. They currently use Zabbix for monitoring and alerting with an ELK backend to collect and analyze logs. They are currently using waterfall methodology but are having their own transformation into Agile and DevOps. All applications run on Centos Linux.

The infrastructure team provides the current infrastructure resources to develop, test and run applications. Within this team there are 3 separate engineering groups, compute, storage and networking. The engineering teams provide level 2 support and receive handoffs from the application group's operators. Additional support is provided by the current infrastructure manager's vendor (we'll call it, WNware).

Security is responsible for all IT security. The define and enforce security policy, provide guidance to other teams on secure design and implementation that meet internal as well as industry security guidelines. They also perform security audits and reviews. They are also

responsible for an enterprise Active Directory installation that provides authentication to all systems.

The CIO's office is where the Project Management Office (PMO) team is located. This team prioritizes application development and oversees development projects. It is responsible for doing typical waterfall tasks like requirements gathering and resource assignments for projects. The PMO is beginning to experiment with Agile and DevOps but is relatively new to concepts like CI/CD and Agile methodologies.

The IT workforce is comprised of 75% full time employees and 25% contractors. There is no one in the company with OpenStack skills, however there are a handful of certified Linux administrators, storage admins, and network engineers.

Infrastructure and Applications

All of the infrastructure for JenCo runs in a single datacenter that they own. It has plenty of rack space, power, cooling, bandwidth and staff.

Also for the purpose of this lab, a contractor was sent into JenCo prior to this study and determined that there is no reason why any workload at JenCo could not migrate into an OpenStack cloud. The applications to be migrated fall into these 3 categories(existing/target quantities):

Type	QTY E/T	Min CPU	Min Memory	Min Storage	IOPS
Web VM(Apache)	100/200	4 vCPU	16GB	100GB	<= 500
App VM(Tomcat)	50/100	8 vCPU	32GB	200GB	500-1000
DB VM (MariaDB)	20/30	16vCPU	128GB	400GB	> 1000

Network needs are consistent with the expected levels associated with these workloads and will not need any non-standard network hardware architecture to support. For the purposes of this lab we will assume the servers have enough network interfaces for all of the standard OpenStack networks needed and in sufficient quantities for failover and bonding. The network is a top-of-rack design with two TOR switches at the top of each rack.

They currently use a standard 3rd party vendor for compute, network and storage, for the purposes of this lab, we'll assume that any basic configurations are supported and there will be no need for non-standard hardware or custom drivers. They currently have trunked VLANs piped into the switches and would like to handle routing not only the infrastructure networks but the tenant networks externally through existing VLANs.

Storage is currently appliance based and connected via FC into WNware hosts. Although, these storage appliances can be attached via iSCSI and can support high IOPS applications that need > 1000 IOPS (assume they are flash arrays.) While they have great performance, they are limited

in capacity (10TB) and there is no budget to expand the storage appliance cluster. Each current compute server has only 2 x 100GB disks mirrored internally for the OS.

However, during the interviews with application developers, the contractor noted that many staff were not excited to be leaving WNware and moving into OpenStack. Since no one knew OpenStack and they had very few Linux administrators, they felt like they were about to all be replaced.

Your challenge is to fill in the following sheet with some hypothetical answers based on the case study and come up with some additional questions for any information that may be missing.

Component	Configuration
Number of regions/DCs	
Block Storage backend	
Ephemeral storage	
Object storage	
Other storage	
Guest OSes	
Hypervisor	
Networking	
Authentication	
Monitoring	
Logging	
Self service	
Metering	
Workloads	

Document the existing environment:

Business Drivers/Objectives:

Term	Definition

Technical Drivers/Objectives:

Term	Definition

Technical Architecture:

Component	Configuration
Number of regions/DCs	
Block Storage backend	
Ephemeral storage	
Object storage	
Other storage	
Guest OSes	
Hypervisor	
Networking	
Authentication	
Monitoring	
Logging	
Self service	
Metering	
Workloads	

OpenStack Architecture

Project	Function	Objective
Keystone	Authentication	Provide AAA to OpenStack

JenCo OpenStack Control Plane Hardware Example

3	**Chassis**	Packard Belt PB-500 Chassis with up to 4, 2.5" Hard Drives, 2 PCIe Slots
2	**CPU**	Intel® Xeon® Gold 5118 12C 24T 3.20Ghz
16	**Memory**	256GB
1	**RAID Configuration**	RAID 10 - PERC H730
8	**Hard Drives**	600GB 10K SAS 12Gbps
1	**Network**	2 x 1Gb, 2 x Intel X520 10Gb SFP+
1	**Additional Network**	Intel X520 Dual Port 10Gb NIC DA/SFP+

JenCo OpenStack Compute Plane Hardware Example

	Chassis	Packard Belt PB-500 Chassis with up to 4, 2.5" Hard Drives, 2 PCIe Slots
2	**CPU**	Intel® Xeon® Gold 5118 12C 24T 3.20Ghz
	Memory	16GB X
1	**RAID Configuration**	RAID 10 - PERC H730
2	**Hard Drives**	600GB 10K SAS 12Gbps
1	**Network**	2 x 1Gb, 2 x Intel X520 10Gb SFP+
1	**Additional Network**	Intel X520 Dual Port 10Gb NIC DA/SFP+

Storage Recommendation:

What are the options for storage? What do you recommend? Why?

Network Recommendation:

What should the network recommendation be? Are there any design principles that would change the OpenStack architecture from the standard? Why?