



Homelaber Brasil 
Homelab & Virtualização

Virtual Design Master - 2016

Challenge 1

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Executive Summary

We've had quite a journey so far during the first three seasons of Virtual Design Master. We've had to survive the zombie apocalypse and evacuate our planet. We've needed to support human life on the moon and Mars, and now, we're going back to earth.

We ended last season by giving the zombies a taste of their own medicine. Thanks to Steven, last season's Virtual Design Master, the zombie anti-virus was applied by the Zombie Assassin System. Over the last year, we've monitored the zombies closely and it seems most of them no longer exist.

It is time to take back our planet, but before we can, we need an infrastructure to support re-colonization. Does everyone remember the warehouse of 5-year-old hardware from Season 1? Unfortunately, it isn't usable any more.

Luckily our billionaire friend has been recruiting to re-build his empire, and his first order of business is datacenter hardware. Since we're starting from the ground up, you can use any type of hardware you would like, even if it doesn't exist yet. While the sky is the limit, remember to justify your hardware decisions.

Unfortunately, we are still limited by software. You can use any cloud software suite you would like that exists today, and you can assume it will run on the new hardware.

Prepare a multi-site environment for the world's new infrastructure. Your primary site is on Earth, wherever you would like it, and your secondary site is on the moon. The most critical application is the HumanityLink software suite, which consists of three front end web servers, one database, and two application servers. Performance of this software is paramount. The environment must also support 25 web servers, 5 databases, and 10 application servers.

Objectives & Goals

- Build an infrastructure to support re-colonization of the Earth.
- Design a datacenter hardware and software infrastructure to a multi-site environment in order to support the critical application HumanityLink consisted in 3 front end web servers, one database server and two application servers.
- Design a deployment plan to the HumanityLink application
- Plan and support future expansion of the application

Requirements

- Datacenter Hardware: could be any hardware
- Datacenter Software: any cloud software suite that exists today and it will run on the new hardware
- Primary site location: Earth (any location)
- Secondary site location: Moon
- Critical Applications: HumanityLink software suite - 3 front end web servers, one database server and two application servers.
- Focus on Performance
- Future expansion: The environment must also support 25 web servers, 5 database servers and 10 application servers

Solution

Prologue

The Earth as we know it no longer exists. All materials for the manufacture of a server as before, disappeared. Mines of silicon, iron and other precious metals are missing forever. During the time that the human species has been living out of our beloved planet, our scientists were exposed to an unidentified species of cosmic smoke that caused them to develop a kind of sixth sense and after years of study they discovered a new type of material. This material, according to our research, is based on an organic product fairly common and abundant in the earth. This organic product combined with a chemical process gave rise to the most extraordinary materials ever thought of or created by the human race: The **HEMPHENE**.

It is possible to build anything with **HEMPHENE**. Since electrical microcircuits to space rockets, buildings, machinery, medicine and clothing. **HEMPHENE** can also generate fuel, heat and electricity

Due to the abundance of raw material to create the **HEMPHENE** in tropical areas such as South America, the main data center will be located where there used to be the city of Salvador (Savior) in Brazil. Salvador is located in the following coordinates: Latitude 12°58'15" S and Longitude: 38°30'38" W

Salvador was also chosen for its proximity to the sea and have a huge source of fresh water.

Datacenter Hardware & Software

The server and hardware specifications constructed by our scientists mimics a very solid and well-known Hyper-Converged infrastructure: VMware EVO:RAIL that combines compute, network, storage and management.

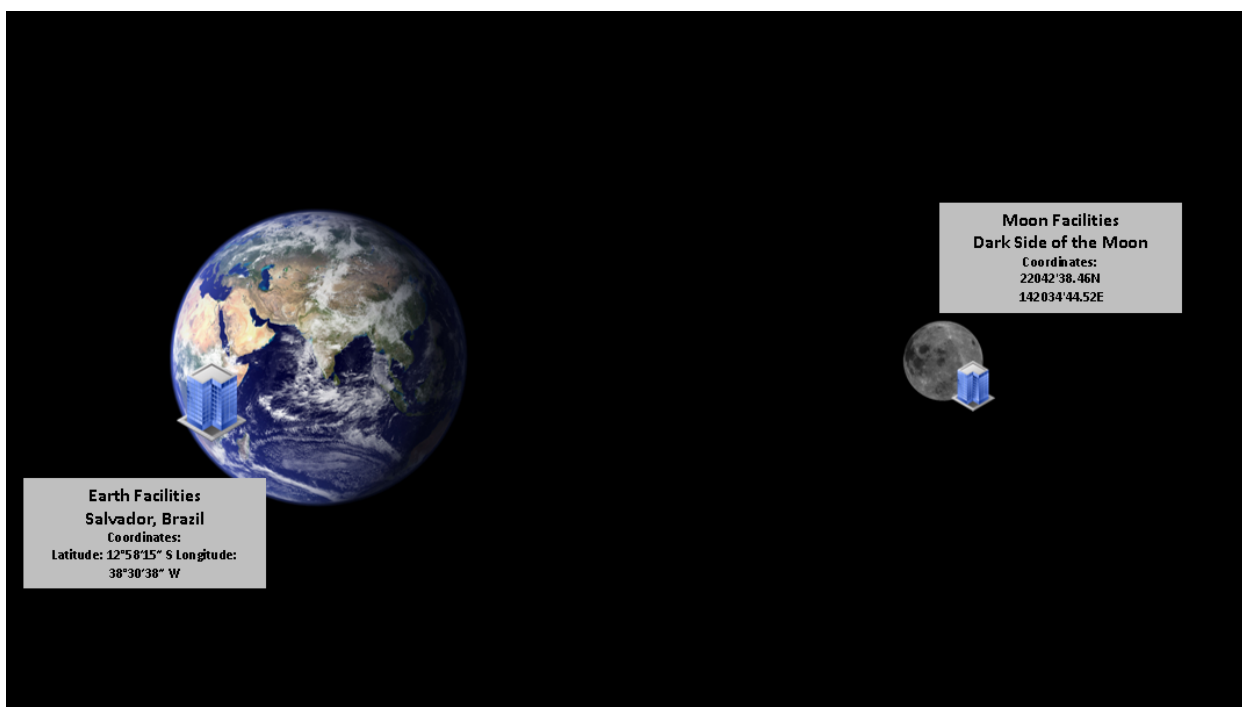
The hardware and software solution chosen for the creation of the data center have considered the following aspects:

- Scalability
- Performance
- Resiliency
- Security
- Efficiency
- Simplicity

Find below all the features and technical specifications of the server and software that will be used in the data centers.

Feature		Technical Specification
Software		EVO: RAIL Deployment, Configuration and Management Software <ul style="list-style-type: none"> • vCenter Standard • vSphere Enterprise+ • vSAN • Log Insight
Hardware	Appliance	4X server appliances w/ 4 server nodes in a single 2U server
	Processor	4X Intel E5 Processors Haswell 10 cores. Total of 80 cores
	Memory	1024GB of physical memory per node
	Storage	Twelve 1.2TB SAS drives, Eight 480 SSD Total of 20 drives per appliance and 18.2TB of raw storage
Network	8X 10GbE NIC ports fiber 4x 1GbE NIC ports cooper	

Earth & Moon Datacenters



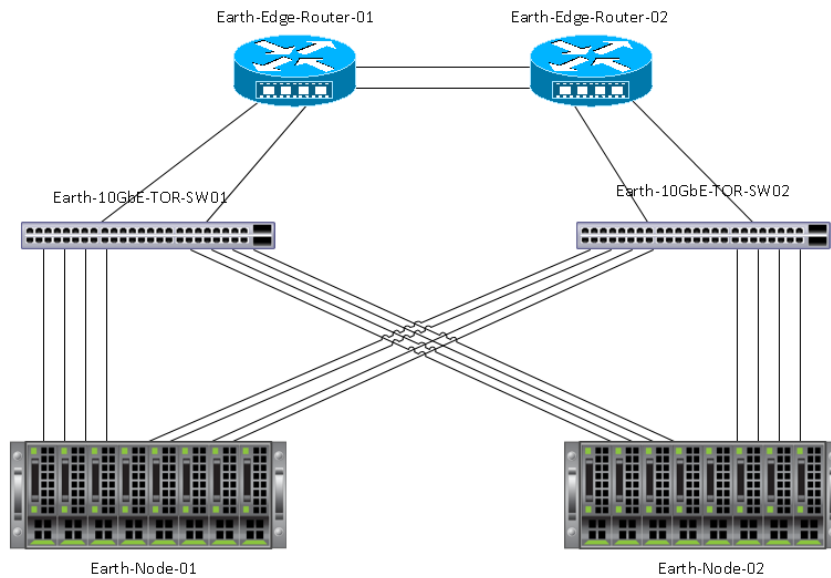
Each data center will be setup with the same configuration to provide simplicity through standardization.

For brevity only 1 datacenter layout will be show bellow.

Two distinct satellite data links will be used to link both datacenters. Link latency will be a risk to performance.

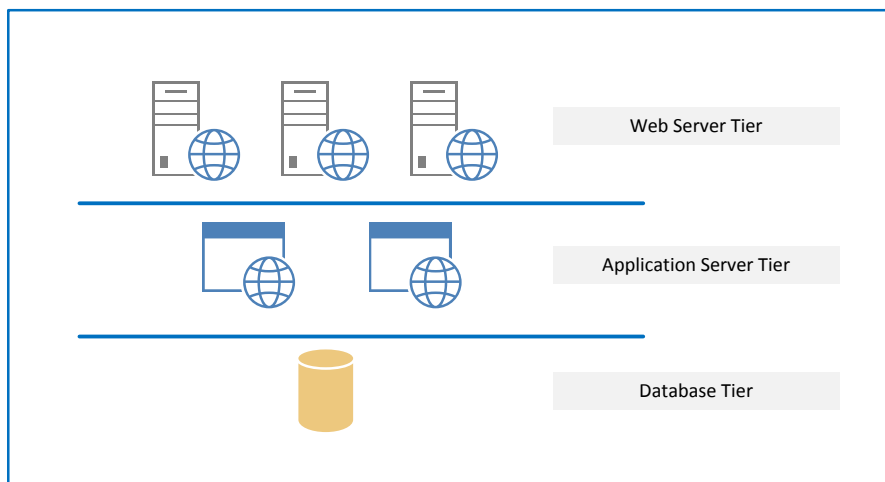


Earth Facilities Datacenter
Salvador, Brazil
Latitude: 12°58'15" S Longitude: 38°30'38" W



Application Deployment

The application HumanityLink software suite which consists in - 3 front end web servers, 1 database server and 2 application servers will be deployed in both datacenters and the databases will be replicated to compensate the link latency between Earth and Moon and provide a good user experience, assuming that will be users in both locations.



Future Expansion

The environment must also support 25 web servers, 5 database servers and 10 application servers.

The hardware proposed to this design was choose having in mind the future expansion of the environment and have enough capacity to support the actual workload.

To meet the expansion requirements more server appliances could be added in both locations.

Summary

Hardware

- 2 server appliances with 4 nodes will be deployed in each datacenter (Earth and Moon)

Software

- The cloud software suite chosen is:
 - EVO: RAIL Deployment, Configuration and Management Software
 - VMware vCenter Standard
 - VMware vSphere Enterprise+
 - VMware vSAN
 - VMware Log Insight

Earth and Moon Datacenter

- Both datacenters will have the same hardware to facilitate operation
- Two distinct satellite data links will be used to link both datacenters. Link latency will be a risk to performance

Application Deployment

- The application will be deployed in both datacenters
- The database will be replicated between both datacenters to mitigate link latency and provide a better user experience.

Future Expansion

- The hardware and software infrastructure was choose having in mind future expansions and have enough capacity to support the actual workload.
- More server appliances could be added to expand the workload if needed.