

# Virtualization Update

**A proposed Data Center service  
provided centrally to campus**

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# What is Virtualization

Virtualization is the abstraction of computing resources, hiding the physical characteristics of a computer from the end user. It allows you to run multiple servers on a single physical box.

# Departmental Benefits

- **24x7x363 on site operations, UPS, generator**
- **Business Continuity – High Availability, vmotion**
- **Disaster recovery partnering**
- **Security software**
- **Staff (nearly) dedicated to virtualization**
- **DR backups included**

# Campus Benefits

not visible to department

- Reduce campus power utilization
- Reduce need to build out server rooms
- Critical departmental services are more available
- Reduce electronics waste
- Overall cost savings due to economies of scale not available to individual departments

# Why VMware

## Why SAN

- Campus enterprise solution – needed support
- Xen vs. VMware – VMware more mature
- Windows vulnerable, no memory oversubscription, not mature
- SAN needed for high availability
- SAN supports other critical campus apps

# Where Are The Costs?

- Hardware (6 Dell 2950 = \$30,000)
- License (VMWare ESX = \$27,000)
- Console (hardware + virtual center = \$8,000)
- Security (tripwire = \$3,000)
- Staff (\$65,000)
- SAN – supports Banner and DaFIS

# SAN Purchase

		qty	initial unit	total	purchase timeline	
					initial	fiscal 09/10
SAN	EMC CX4-240	1	72,014.25	72,014.25	72,014.25	
	dae 300GB 15K x 15	2	30,341.92	60,683.84	60,683.84	
	dae 1TB 7K SATA	2	21,243.60	42,487.20	42,487.20	
	dae 1TB 7K SATA	1	21,243.60	21,243.60		21,243.60
	brocade 32 port switch	2	12,501.93	25,003.86	25,003.86	
	NFS front end	1	19,980.00	19,980.00		19,980.00
				-	-	-
Total SAN replacement				241,412.75	200,189.15	41,223.60

# Virtualization Purchase

	qty	initial	total	purchase timeline		
		unit		initial	fiscal 09/10	
Virtualization	del 2950	2	7,000.00	14,000.00	796.26	
	del 2950	2	6,612.27	13,224.54		13,224.54
	del 2950	2	6,612.27	13,224.54	13,224.54	
	console	1	4,379.97	4,379.97	4,379.97	
	vmware virtual center	1	3,916.08	3,916.08	3,916.08	
	vmware single license	4	4,509.00	18,036.00	18,036.00	
	vmware single license	2	4,509.00	9,018.00		9,018.00
	security software	4	483.30	1,933.20	1,933.20	
	security software	2	483.30	966.60		966.60
	OnSite installation	1	16,000.00	16,000.00	16,000.00	
	training	1	4,000.00	4,000.00		4,000.00
	MS licensing	4	557.28	2,229.12	2,229.12	
	MS licensing	2	557.28	1,114.56		1,114.56
	<b>Total Virtualization</b>			<b>102,042.60</b>	<b>60,515.17</b>	<b>28,323.70</b>



# Service Model

## Estimated Yearly Costs

- **Small Server -- \$380**

- 512 MB RAM
- Single core (1.5 GHz)
- 100MB network

- **Medium Server -- \$1,200**

- 2 GB RAM
- Single core (2 GHz)
- 1GB network

- **Large Server -- \$2,300**

- 4 GB RAM
- Dual core (2 GHz)
- 1 GB network

# Service Model

## Estimated Yearly Costs

- **Miniscule Server -- \$190**

- 256 MB RAM
- Single core (1GHz)
- 100MB network
- 10 GB disk

- **Huge Server -- \$4,500**

- 8 GB RAM
- Three cores (2 GHz)
- 1GB network

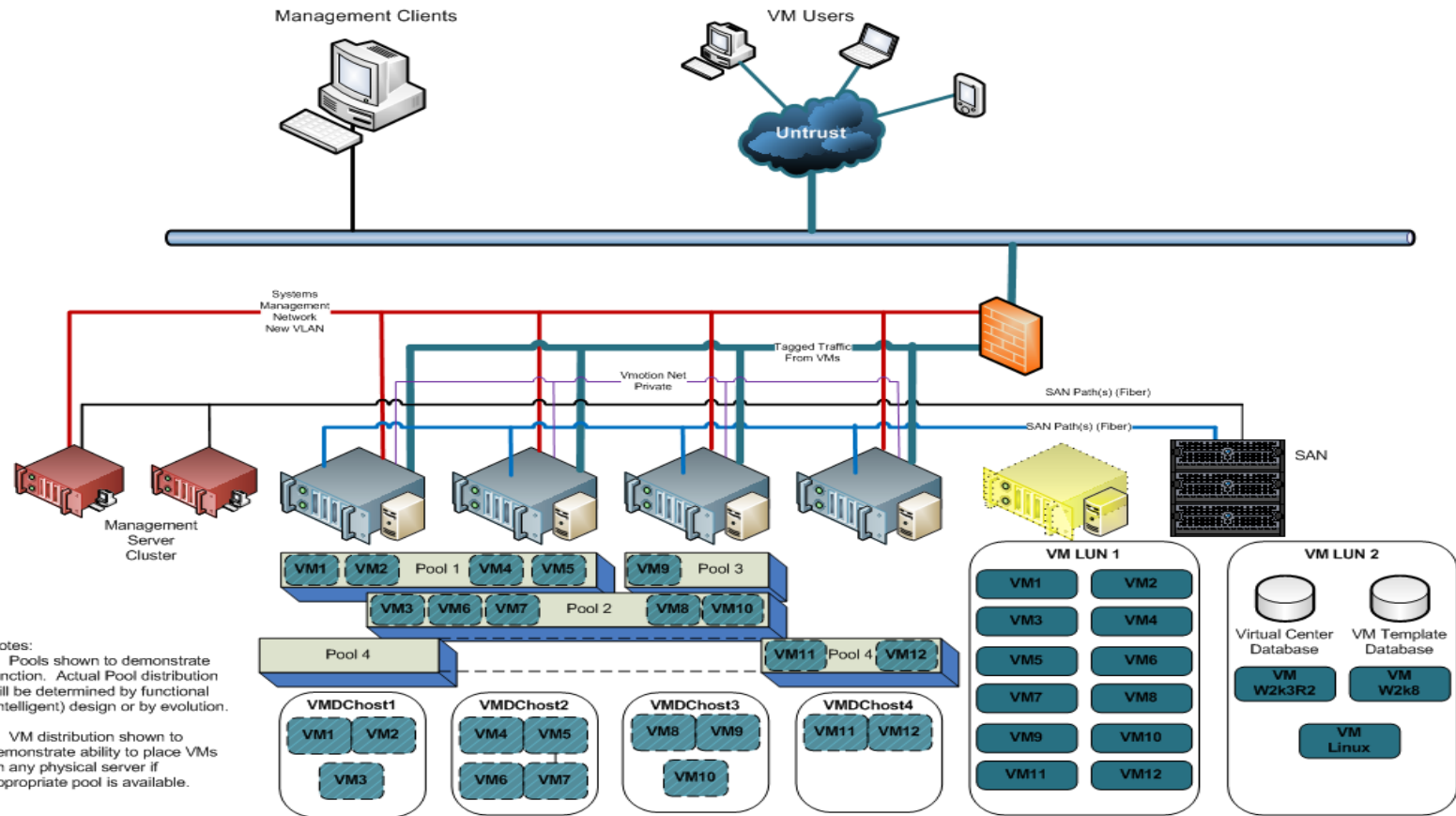
- **Custom sizes available**

- **SAN Disk Storage**

- High speed (15K RPM 4GB FC) -- \$8 / GB
- Economy (7K RPM SATA) -- \$5.50 / GB

# Topology

## DC Virtualization Network and VM Topology



**Notes:**

1. Pools shown to demonstrate function. Actual Pool distribution will be determined by functional (intelligent) design or by evolution.

2. VM distribution shown to demonstrate ability to place VMs on any physical server if appropriate pool is available.

# Next Steps

- **Finalizing exact service offering**
- **Gather comparison costs for running a departmental service**
- **Submit 200-45**
- **Submit rate package to ORMP**
- **Purchase equipment (done 2009-3-16)**

# Frequently Asked Questions

- Can I add external devices to virtual server - No
- Can I build larger, smaller server - Yes
- Can I specify MAC address - Yes
- Can I purchase a dev/test el-cheapo solution without HA - no
- Experience with application virtualization?

# Frequently Asked Questions

- How long will it take to provision? – less than 48 hours after VLAN exists
- Can IET administer the OS – yes
- Can I run any OS – yes (same as for physical server)
- What if I image and store old copies? – disk charge

# Frequently Asked Questions

- Run VLAN firewall on v-server?  
Network bandwidth question ....

- Networking**

- 2 1GB client traffic
- 1 1GB iSCSI
- 1 1GB management vmotion