

Virtualization Readiness Assessment Results



UC Davis

Executive Summary

Overview

This Consolidation Estimate was created with VMware Capacity Planner for UC DAVIS. This analysis utilizes information collected from your datacenter infrastructure:

- Provides a review of your current state of operations
- Identifies system consolidation and virtualization opportunities
- Represents achievable, optimized future state with VMware Virtual Infrastructure

Findings

Based on an analysis of your environment, this Consolidation Estimate suggests a reduction in US DAVIS servers from 17 to 2, representing a 88% reduction. In addition, there will be a decrease in datacenter infrastructure, such as:

- Server, Networking and SAN Infrastructure, Datacenter Power, Cooling and Floor Space

Next Steps

- Validate this consolidation Estimate with your technology team
- Leverage these results to build a business case with financial analysis
- Ensure a successful implementation of VMware Virtual Infrastructure

Assessment Methodology

PHASE 1

Data Collection: tool based collection of the performance and hardware characteristics of the UC Davis server environment

PHASE 2

Requirements Gathering: identify up to 25 ideal server candidates for virtualization and requirements for data collection

PHASE 3

Data Collection: 7-14 days of unattended data collection on server and application performance metrics

PHASE 4

Final Results and Deliverable Presentation: recommendations and outcomes based on data collected in Phases 1 and 2.

Virtualization Considerations

When a server is not a candidate for virtualization?

INVENTORY-BASED Exclusions	PRIME TIME UTILIZATION Exclusions
<ul style="list-style-type: none">• Greater than 4 network interface cards.• Is a tape backup server.• Is already a VMware virtual machine.• Contains specialized PCI devices (e.g. FAX Servers with modem boards).• System reported incorrect inventory (e.g. reports a 4 MHz CPU).	<ul style="list-style-type: none">• Greater than 40% CPU utilization.• Processor Queue Length greater than 5.4 *• Memory utilization greater than 3.6 GB.• Disk busy greater than 50% of the time.• SCSI Disk queue greater than 18.• Network bandwidth utilization greater than 300 Mbps.

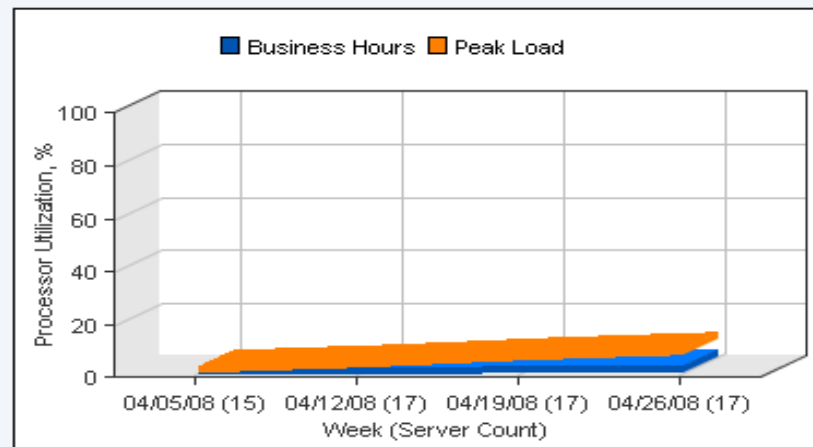


Survey of Existing Environment

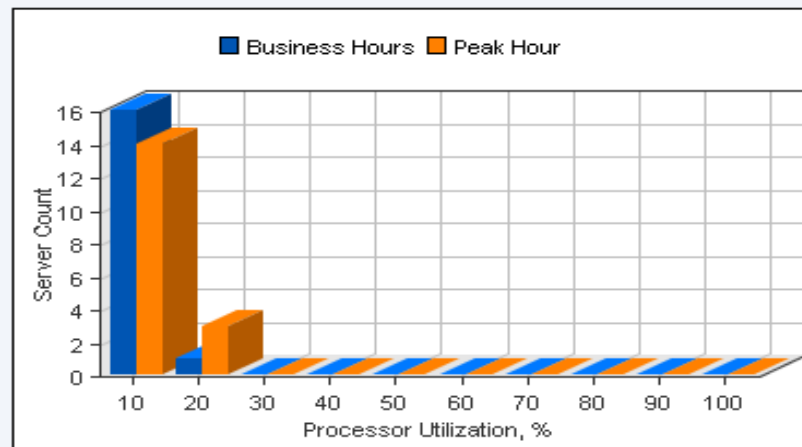
- A total of 17 systems were assessed in the tools-based portion of the discovery, using an agent-less WMI Performance Monitor.
- To supplement the collected data, additional information was gathered to properly identify virtualization risks and opportunities.
- Of the 17 systems, all are possible candidates for virtualization.

Processor Utilization Summary

Processor Utilization Most Recent 12 weeks



Server Distribution by Processor Utilization Active Servers



Click on these graphs to view detailed information for specific systems.

Server Count

CPU(s)	Servers
No Inventory	<u>6</u>
2	<u>13</u>
4	<u>6</u>
Total Servers	25

Processor Summary

CPU Mhz	129,614
Ave CPU Utilization	1.55
Peak CPU Utilization	3.90
CPUs	46
Ave Mhz/CPU	2,818
Ave Mhz/Server	7,624

Optimization Opportunities

Consolidation:	<u>17</u>
Anomalies:	<u>0</u>
Alerts:	<u>6</u>
Trend Deviations:	<u>0</u>
Servers with CPU <350 Mhz:	<u>0</u>

Power and Cooling Information

Total Power (KW)	5.062	Avg. Power/Server (W)	202.49
Total Cooling (Tons BTU/hr)	1.303	Avg. Cooling/Server (BTU/hr)	625.40

Overview of Current Infrastructure

Source Systems

Number of Systems: 17

Existing Environment

System Name		Make/Model		Capacity								Utilization									
				Processors		Memory	Disk	Network		Physical				Processor		Memory			Disk		Network
				Count	Speed (MHz)	Size (MB)	Size (GB)	Count	Speed (MB/sec)	Rack Units	Weight (lbs)	Power (W)	Thermal (BTU/hr)	% Used	Queue per CPU	% Used	File Sys Cache (MB)	Page File %	Paging (Pg/sec)	I/O (Ttrans/sec)	I/O (MB/sec)
Reusable Systems																					
🌱	LACTOKNOWDB	AT/AT COMPATIBLE/AT/AT COMPATIBLE	4	3,391	4,096	0.00	2	2,000	0	0	0	0	2.57	0.00	56.17	172.01	0.56	58.60	142.41	5.94	0.00
🌱	GSDC-MOBY	AT/AT COMPATIBLE/AT/AT COMPATIBLE	2	2,660	2,048	0.00	0	0	0	0	0	0	2.52	0.05	37.44	133.02	1.24	20.88	12.03	0.24	0.00
🌱	GSDC-BACCUS	AT/AT COMPATIBLE/AT/AT COMPATIBLE	4	2,327	4,096	0.00	0	0	0	0	0	0	1.15	0.00	21.55	135.92	0.98	21.46	9.16	0.18	0.00
🌱	STEADFAST	Dell/PowerEdge 2850	2	2,793	4,096	183.05	2	2,000	2	59	508	1,733	6.22	0.02	60.62	173.74	0.82	49.28	113.91	3.64	0.00
🌱	UTILITIES-API	Dell/PowerEdge 2550	2	993	1,024	36.40	2	100	2	55	335	1,143	6.72	0.08	66.21	160.22	3.18	84.40	35.10	0.85	0.00
🌱	UTILITIES-PI	Dell/PowerEdge 2850	2	3,790	4,096	513.36	2	2,000	2	59	508	1,733	2.53	0.10	18.77	111.67	0.81	70.91	27.02	0.69	0.00
🌱	UTILITIES-TES	Dell/PowerEdge 1850	2	3,790	2,048	146.69	2	2,000	1	35	442	1,510	11.63	0.13	46.80	191.21	3.89	180.71	45.94	1.05	0.00
🌱	UTILITIES-WW1	Dell/PowerEdge 1850	2	3,790	2,048	146.69	2	2,000	1	35	442	1,510	9.67	0.21	38.12	181.09	2.79	200.48	57.68	1.18	0.00
🌱	UTILITIES-WW2	Dell Inc./PowerEdge 1950	2	2,660	4,096	299.43	0	0	1	0	512	1,746	0.99	0.08	13.71	171.23	2.05	20.06	10.62	0.14	0.00
🌱	RAMREE	Dell/PowerEdge 1850	2	2,992	2,048	36.36	2	2,000	1	35	442	1,510	7.95	0.00	35.53	209.30	0.89	140.58	33.42	0.53	0.00
🌱	ORACULUM	AT/AT COMPATIBLE/AT/AT COMPATIBLE	4	2,784	2,048	0.00	2	0	0	0	0	0	0.74	0.00	24.68	132.11	1.46	35.20	53.63	1.75	0.00
🌱	LACTOKNOWWEB	AT/AT COMPATIBLE/AT/AT COMPATIBLE	4	3,391	4,096	0.00	2	2,000	0	0	0	0	1.67	0.00	34.08	364.76	1.84	35.39	40.87	0.53	0.00
🌱	VSH1	Dell/PowerEdge 1550/1400	2	1,396	4,096	72.72	2	0	1	26	240	0	18.34	0.30	52.67	126.35	1.67	120.35	26.82	0.75	0.00
🌱	ROWLETT	Dell/PowerEdge 2850	2	2,793	4,096	237.94	3	3,000	2	59	508	1,733	2.96	0.02	52.08	145.13	0.43	21.41	60.25	1.94	0.02
🌱	VSH2	Dell/PowerEdge 1550/1400	2	1,396	4,096	36.36	2	0	1	26	240	0	12.11	0.54	26.79	148.29	1.82	12.49	12.62	0.08	0.02
🌱	OAK	AT/AT COMPATIBLE/AT/AT COMPATIBLE	4	2,992	4,096	0.00	2	2,000	0	0	0	0	1.31	0.00	39.97	139.35	0.75	19.40	7.34	0.19	0.00
🌱	TEAK	AT/AT COMPATIBLE/AT/AT COMPATIBLE	4	2,992	4,096	0.00	2	2,000	0	0	0	0	1.44	0.00	48.24	132.35	0.75	32.87	10.61	0.24	0.00
All Systems				116.7 GHz	56.3 GB	1.71	29	21.1 GB	14	389	4.2 KW	1.1 Tons	4.03	0.05	38.73	2,827.74	1.53	1,124.47	699.42	19.91	0.05



Server Consolidation Recommendation

Dell PowerEdge 2950 w/ 32GB memory and Dual, Quad Core Processors

New Hardware Configuration														Max Load Thresholds								
Make/Model		Capacity												Utilization Limits								
		Processors			Memory		Disk		Network		Physical					Processor		Memory			Disk	
Count	Speed (MHz)	Word Length	Size (MB)	Size (GB)	I/O (MB/sec)	I/O (Trans/sec)	Count	Speed (MB/sec)	Rack Units	Weight (lbs)	Power (W)	Thermal (BTU/hr)	% Used	Queue per CPU	% Used	File Sys Cache (MB)	Page File %	Paging (Pg/sec)	I/O (Trans/sec)	I/O (MB/sec)	Speed (MB/sec)	
★ Dell/Dell PowerEdge 2950	8	2,660	64	32,798	32,798	5,000	500	6	1,000	2	56	477	1,628	60	6	60	1,907	70	6,000	5,000	50	10

Consolidation Results

Scenario Recommendations

Number of Systems Out: 2

Scenario Group 1

Operating Systems: All OSes Architecture: All Architectures

Function: All Functions Location: All Locations Department: All Departments Environment: All Environments

		Capacity										Estimated New Utilization								
		Processors		Memory	Disk	Network		Physical				Processor		Memory			Disk		Network	
Target System Name	Source System Name(s)	Count	Speed (MHz)	Size (MB)	Size (GB)	Count	Speed (MB/sec)	Rack Units	Weight (lbs)	Power (W)	Thermal (BTU/hr)	% Used	Queue per CPU	% Used	File Sys Cache (MB)	Page File %	Paging (Pg/sec)	I/O (T Trans/sec)	I/O (MB/sec)	Speed (MB/sec)
Systems with Exceptions - None																				
Reused Systems - None																				
New Systems																				
★ Phantom1-1	(Totals)	8	2,660	32,798	32,798.00	6	6,000.00	2	56	477	1,628	19.49	0.21	57.83	2,509.84	2.07	633.74	407.28	12.38	0.04
★	LACTOKNOWDB	1	500	3,840			10.00					1.43	0.00	6.97	162.38	0.07	58.60	142.41	5.94	0.00
★	GSDC-MOBY	1	200	1,280			10.00					0.80	0.01	2.27	129.98	0.07	3.34	6.66	0.06	0.00
★	GSDC-BACCUS	1	200	1,536			10.00					0.54	0.00	2.64	133.69	0.12	2.86	2.23	0.03	0.00
★	STEADFAST	1	500	4,352			10.00					1.21	0.00	7.55	172.89	0.10	47.77	31.60	1.48	0.00
★	UTILITIES-API	1	200	1,280			10.00					0.61	0.00	1.94	157.50	0.09	81.65	35.10	0.85	0.00
★	UTILITIES-PI	1	300	1,280			10.00					0.99	0.03	2.33	110.41	0.10	70.91	27.02	0.69	0.00
★	UTILITIES-TES	1	1,200	1,792			10.00					1.39	0.00	2.92	188.10	0.24	56.73	30.62	0.72	0.00
★	UTILITIES-WW1	1	1,000	1,280			10.00					4.60	0.07	2.36	178.20	0.17	120.87	39.95	0.83	0.00
★	UTILITIES-WW2	1	100	1,024			10.00					0.16	0.01	1.64	169.67	0.25	17.20	9.57	0.12	0.00
★	RAMREE	1	700	1,280			10.00					0.35	0.00	2.13	209.30	0.05	7.70	2.99	0.04	0.00
★	LACTOKNOWWEB	1	300	2,304			10.00					1.29	0.00	4.14	361.01	0.22	31.21	36.28	0.48	0.00
★	VSH1	1	700	3,584			10.00					3.21	0.03	6.43	121.89	0.20	114.12	26.82	0.75	0.00
★	ROWLETT	1	300	3,328			10.00					0.60	0.00	6.46	136.77	0.05	1.36	6.48	0.18	0.02
★	VSH2	1	500	1,792			10.00					1.93	0.05	3.28	140.04	0.23	0.02	2.22	0.02	0.02
★	OAK	1	200	2,048			10.00					0.38	0.00	4.76	138.02	0.08	19.40	7.34	0.19	0.00
★ Phantom2-1	(Totals)	8	2,660	32,798	32,798.00	6	6,000.00	2	56	477	1,628	1.24	0.00	7.55	262.12	0.19	40.73	56.81	1.78	0.00
★	ORACULUM	1	100	1,024			10.00					0.39	0.00	1.53	129.77	0.09	34.80	53.63	1.75	0.00
★	TEAK	1	300	1,792			10.00					0.85	0.00	6.02	132.35	0.09	5.93	3.17	0.04	0.00
All Systems			30.3 GHz	65.6 GB	65.596 TB	12	12.0 GB	4	112	1.0 KW	0.3 Tons	10.36	0.10	32.69	2,771.96	1.13	674.46	464.08	14.17	0.04



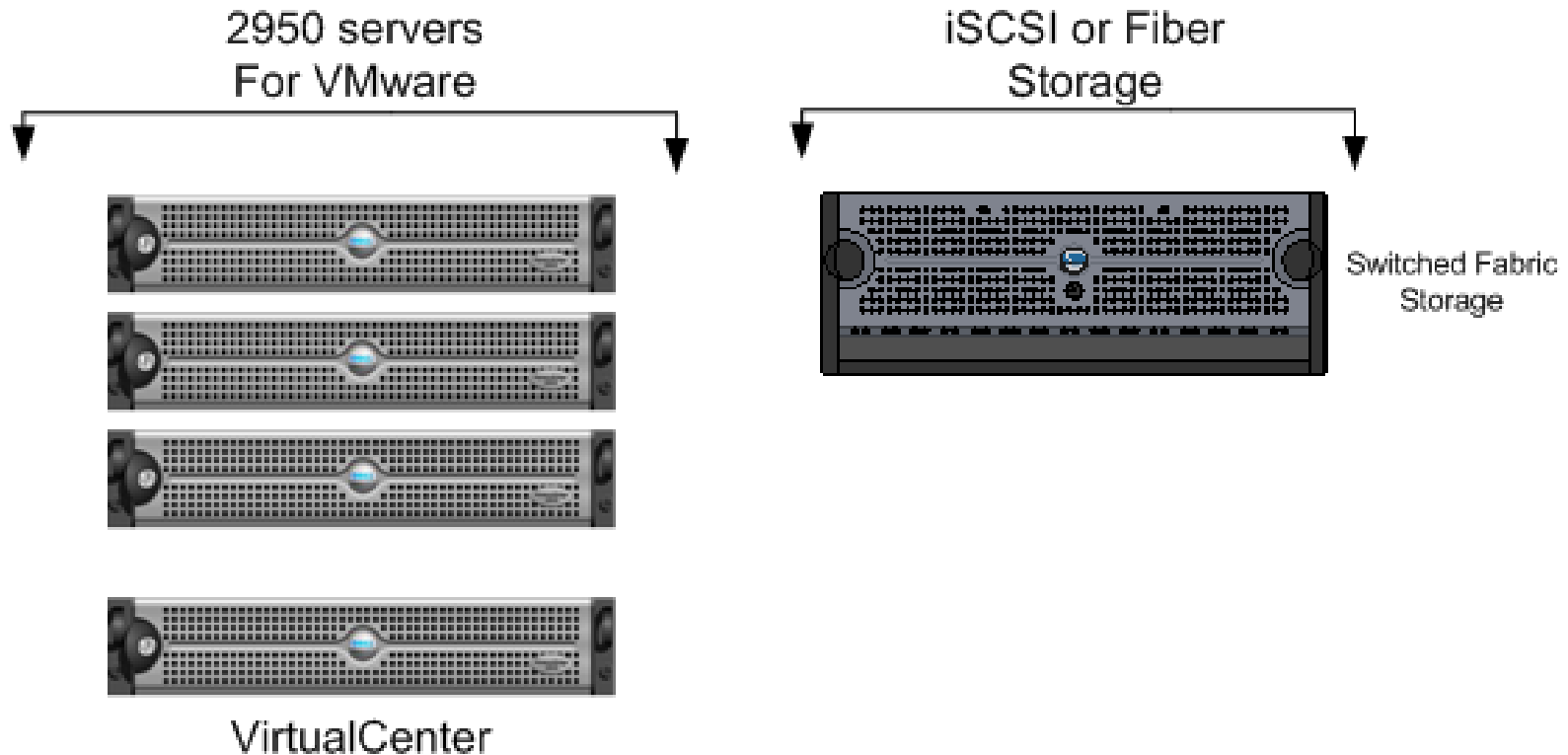
Total Results

Scenario Summary																		
	Capacity									Estimated New Utilization								
	Processors	Memory	Disk	Network		Physical				Processor		Memory			Disk		Network	
	Speed (GHz)	Size (GB)	Size (TB)	Count	Speed (GB/sec)	Rack Units	Weight (lbs)	Power (KW)	Thermal (Tons BTU/hr)	% Used	Queue per CPU	% Used	File Sys Cache (MB)	Page File %	Paging (Pg/sec)	I/O (Trans/sec)	I/O (MB/sec)	Speed (MB/sec)
Before Analysis	116.680	56.320	1.709	29	21.100	14	389	4.178	1.051	4.03	0.05	38.73	2,827.74	1.53	1,124.47	699.42	19.91	0.05
New System Totals	30.299	65.596	65.596	12	12.000	4	112	0.954	0.271	10.36	0.10	32.69	2,771.96	1.13	674.46	464.08	14.17	0.04
After Analysis	30.299	65.596	65.596	12	12.000	4	112	0.954	0.271	10.36	0.10	32.69	2,771.96	1.13	674.46	464.08	14.17	0.04
Systems Savings	86.381	-9.276	-63.887	n/a	9.100	10	277	3.223	0.780	1.81	0.03	-3.96	55.78	0.40	450.01	235.34	5.74	0.00

All 17 servers can be virtualized.

- 2 New Dell PowerEdge 2950 Servers
- 88% Physical Consolidation Ratio
- 4U Used = 10U Rack Space Savings
- 3.223 KW Saved
- .78 BTU/hr Saved
- Based on numbers from VMware, a \$600 savings per server for both power and cooling for a \$9,000 savings per year. (17 Servers – 2 Servers X \$600)

VMware Diagram



Conclusions

UC Davis stands to make significant operational and financial gains from virtualizing its server environment and deploying any new / replacement servers as virtual machines

The identified risks are manageable, based upon Dell's experience in implementing such migrations

Migration will enhance the serviceability of the environment, while improving end-user performance and reducing operating costs

Next Steps

Recommended Plan of Action

- Implement full VMWare Assessment to assess entire environment
- Internal Review
- Proof of Concept Phase
- Detailed Design Engagement – final virtualization design to include SAN, Disaster Recovery, and Business Continuity strategies
- Establish a formal VMware training program for support staff
- Deploy all new or replacement servers on virtual machines

Available Dell Services

- Proof of Concept Phase
- Detailed Design
- Physical to Virtualization Assistance
- DR and BC Planning
- Training – Quick Start (4 Day On-site Training Your Staff)

Findings/ Recommendation Summary

Virtual Infrastructure 3.0 Licensing Requirements

- PSO or VMware Partner Jumpstarts
- PSO or VMware Partner Services Requirements

Un-solicited proposal from VMware and / or VMware Partner

Thank you for your time.

