

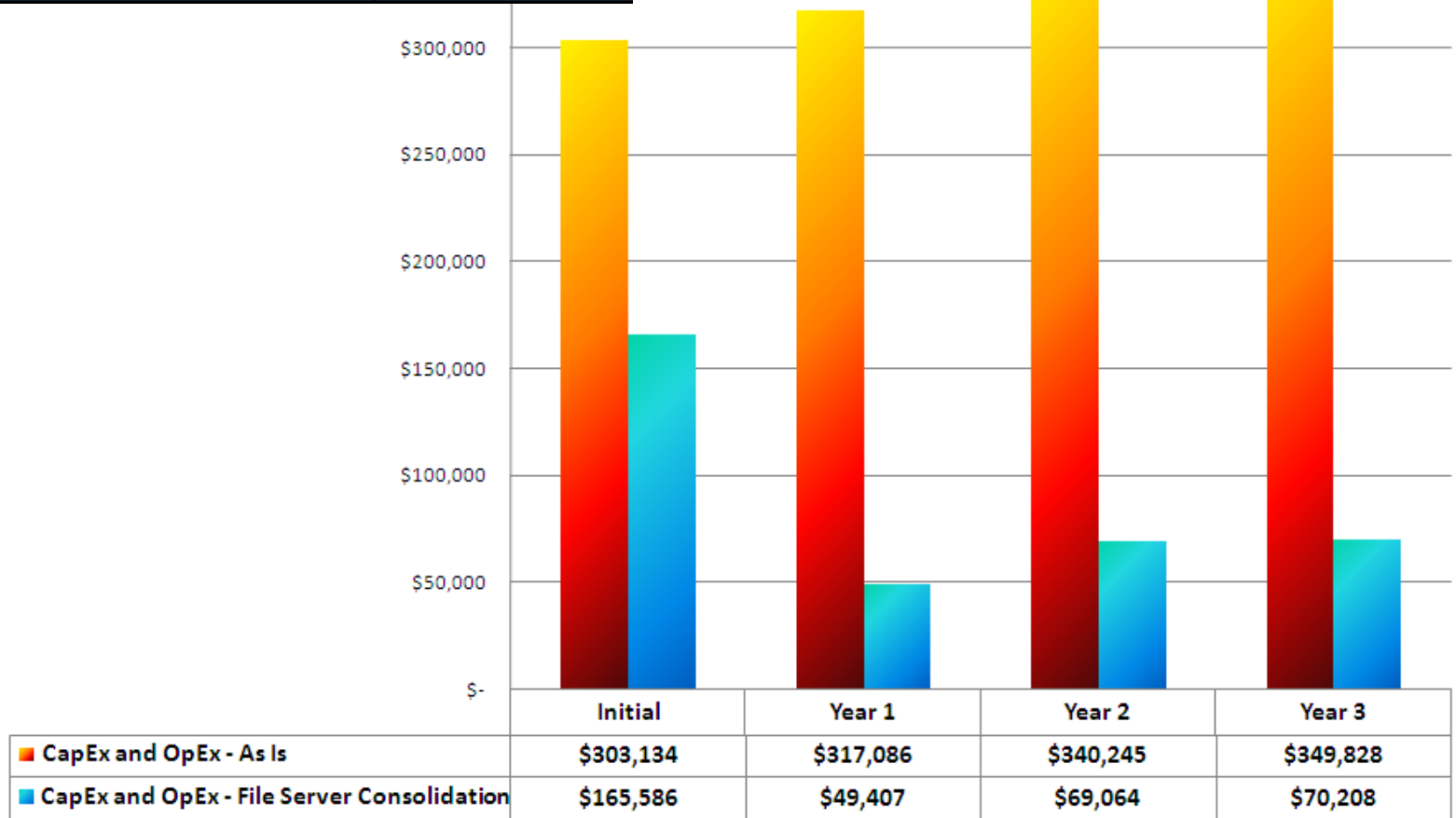
# File Server Consolidation TCO Analysis

Contact:	STA	888-477-8246	<a href="http://www.staweb.com">www.staweb.com</a>
Industry:	Government		

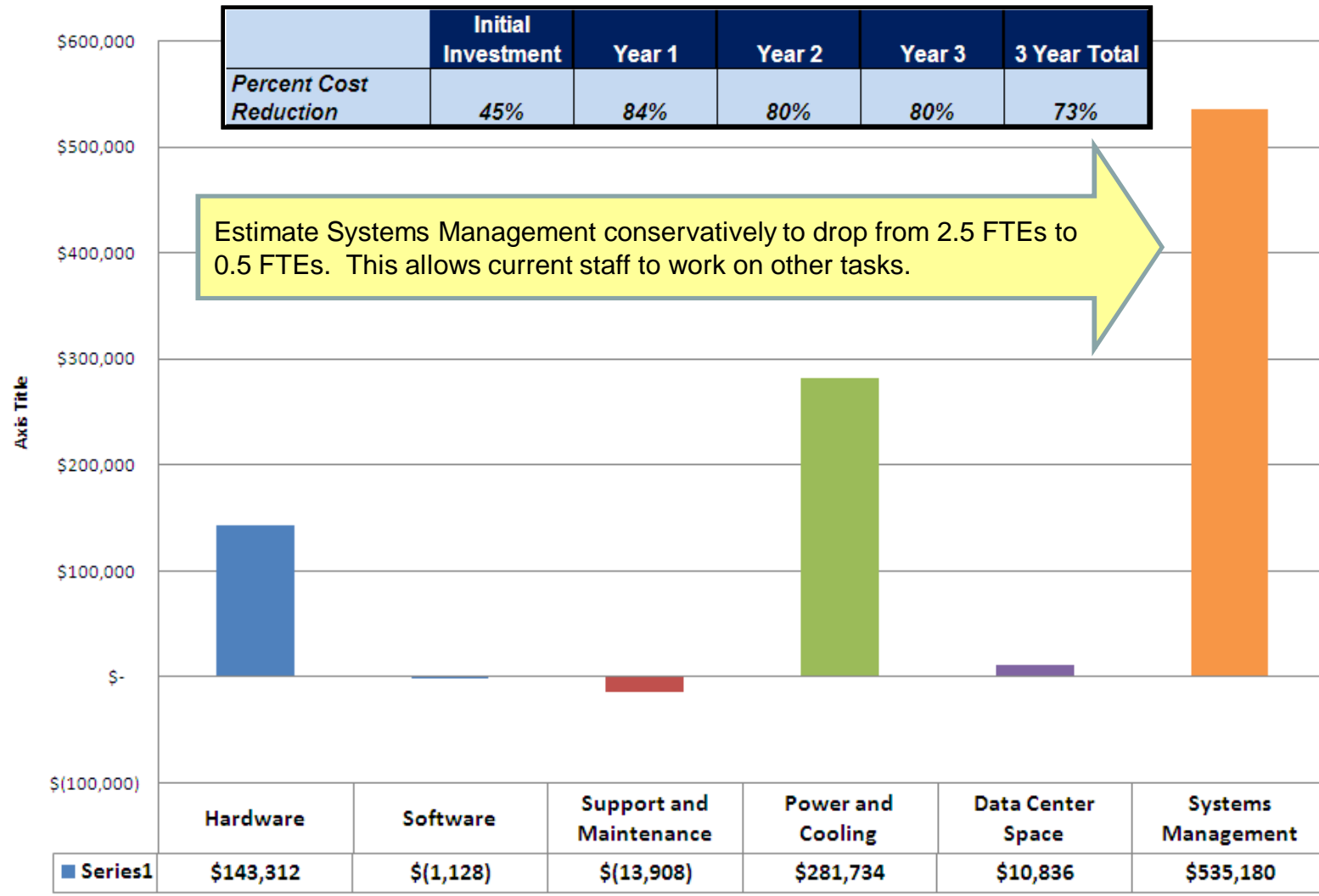
- STA prepared a 3 year Total Cost of Ownership (TCO) analysis based on information provided by Organization X. The analysis is designed to compare of the costs of the following options:
  - Option 1: Replace the existing 34 file servers with new servers of like, type, capacity, and performance.
  - Option 2: Replace the existing 34 file servers with 6 clustered NAS servers attached to networked storage.
- The cost areas compared include:
  - Hardware and software capital expenditure
  - Hardware and software support/maintenance
  - Power and cooling
  - Data center floor space
  - Systems management

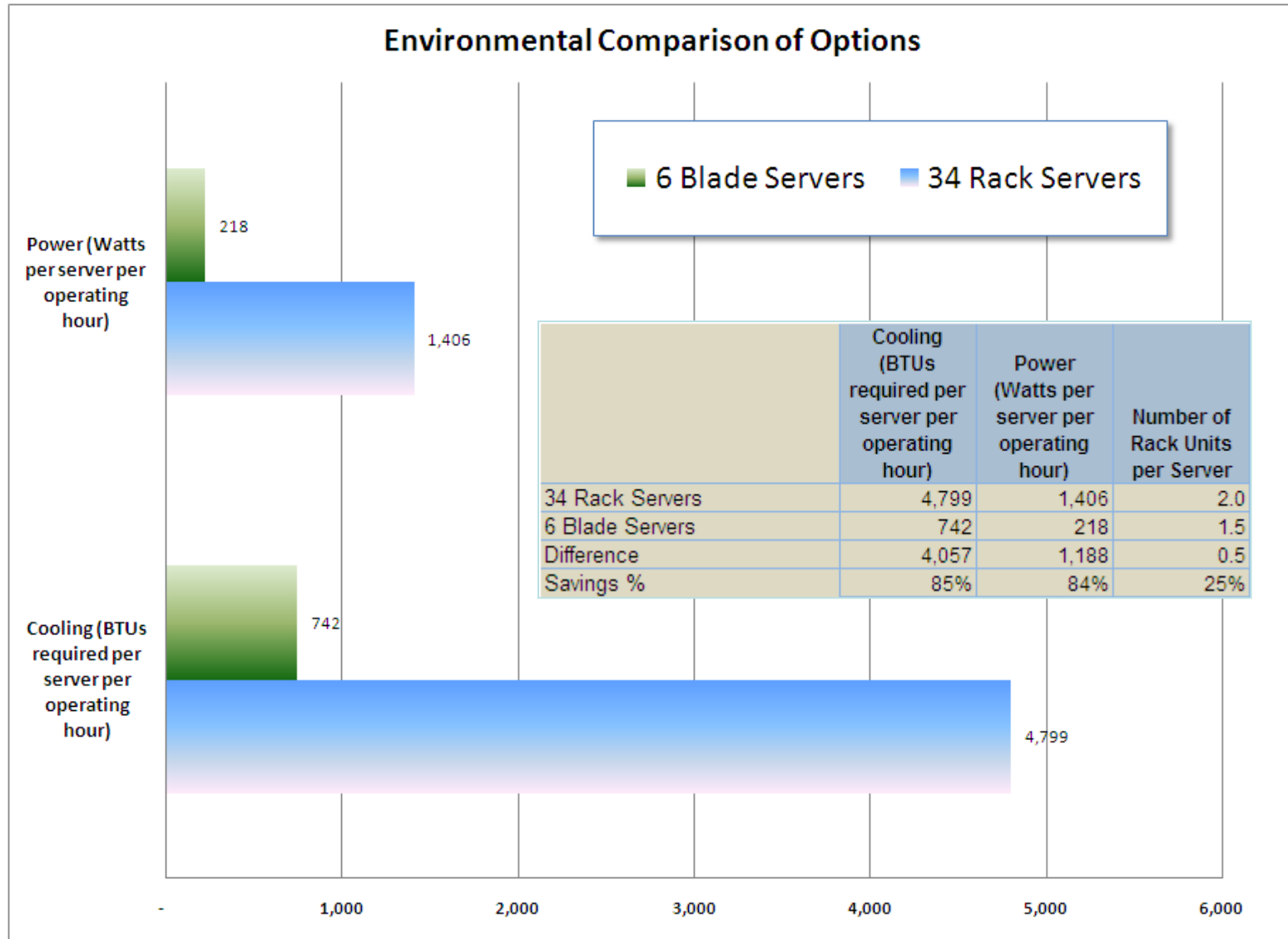
## File Server Consilodation Financial Impact - Cost Comparison

<b>Total 3 Year Savings</b>	<b>\$ 956,027</b>
<b>NPV of Savings</b>	<b>\$ 827,290</b>
<b>Return on Initial Investment</b>	<b>477%</b>
<b>IRR Based on Initial Investment</b>	<b>214%</b>

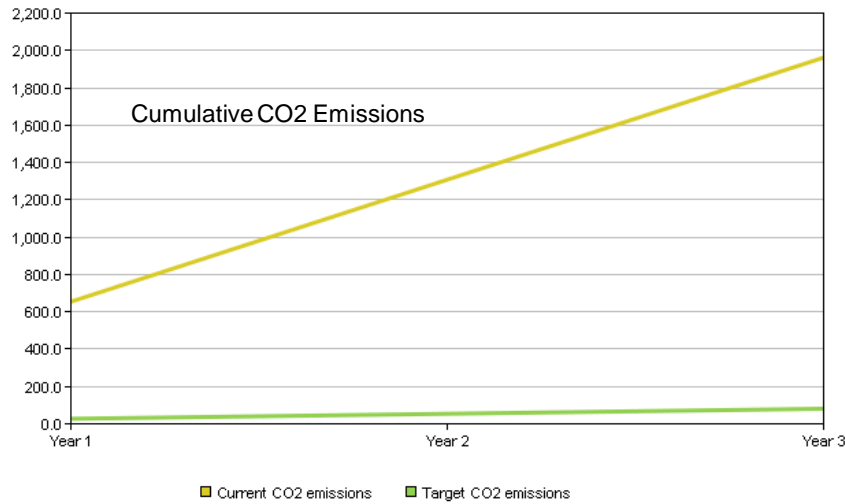


### Total 3 Year Savings of File Server Consolidation by Category





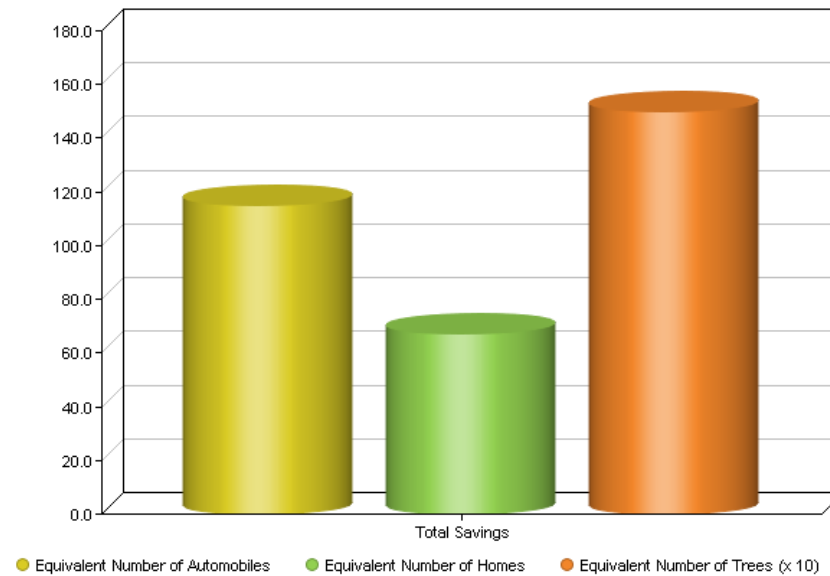
CO2 Emission Savings over Three Years



## Environmental Impact

- 627.1 metric tons of CO2 emissions savings annually
- Saving 115 cars worth of CO2 emissions
- Saving 67 homes worth of CO2 emissions
- Saving the equivalent sequestration power of 1,502 trees

CO2 Emission Savings





# Organization X - TCO Analysis

## File Server Consolidation Project



### TCO Summary

#### File Server Consolidation Project

TCO Comparisons	Initial Investment	Year 1	Year 2	Year 3	3 Year Total	Monthly Avg
<b>Option 1: Stay the Course and Replace Existing File Servers</b>						
Option 0: Capital Expense	\$ 289,228	\$ -	\$ -	\$ -	\$ 289,228	\$ 8,034
Option 0: Operating Expense	\$ 13,906	\$ 317,086	\$ 340,245	\$ 349,828	\$ 1,021,065	\$ 28,363
<b>Stay the Course - Total Expense</b>	<b>\$ 303,134</b>	<b>\$ 317,086</b>	<b>\$ 340,245</b>	<b>\$ 349,828</b>	<b>\$ 1,310,293</b>	<b>\$ 36,397</b>
<b>Option 2: File Server Consolidation with PolyServe</b>						
Option 1: Capital Expense	\$ 147,044	\$ -	\$ -	\$ -	\$ 147,044	\$ 4,085
Option 1: Operating Expense	\$ 18,542	\$ 49,407	\$ 69,064	\$ 70,208	\$ 207,222	\$ 5,756
<b>Option 1 - Total Expense</b>	<b>\$ 165,586</b>	<b>\$ 49,407</b>	<b>\$ 69,064</b>	<b>\$ 70,208</b>	<b>\$ 354,266</b>	<b>\$ 9,841</b>
<b>Net Savings with Option 2</b>	<b>\$ 137,548</b>	<b>\$ 267,679</b>	<b>\$ 271,180</b>	<b>\$ 279,620</b>	<b>\$ 956,027</b>	<b>\$ 26,556</b>
<b>Percent Cost Reduction:</b>	<b>45%</b>	<b>84%</b>	<b>80%</b>	<b>80%</b>	<b>73%</b>	<b>73%</b>

<b>Total 3 Year Savings</b>	<b>\$ 956,027</b>
<b>NPV of Savings</b>	<b>\$ 827,290</b>
<b>Return on Initial Investment</b>	<b>477%</b>
<b>IRR Based on Initial Investment</b>	<b>214%</b>
Cost of Capital Used for NPV	9%



# Organization X - TCO Analysis File Server Consolidation Project



Option 1: Stay the Course and Replace Existing File Servers					
Capital Expense Summary (Estimate)	Initial Investment	Year 1	Year 2	Year 3	3yr TCO
Hardware	\$ 242,240	\$ -	\$ -	\$ -	\$ 242,240
Software	\$ 46,988	\$ -	\$ -	\$ -	\$ 46,988
<i>Total Annual Capital Expense</i>	\$ 289,228	\$ -	\$ -	\$ -	\$ 289,228
Operational Expense Summary (Estimate)	Initial Investment	Year 1	Year 2	Year 3	3yr TCO
Support and Maintenance	\$ 13,906	\$ -	\$ 13,906	\$ 13,906	\$ 41,718
Power and Cooling	\$ -	\$ 91,879	\$ 96,473	\$ 101,297	\$ 289,648
Data Center Space	\$ -	\$ 5,156	\$ 5,414	\$ 5,685	\$ 16,255
Systems Management	\$ -	\$ 220,051	\$ 224,452	\$ 228,941	\$ 673,444
<i>Total Annual Operational Expense</i>	\$ 13,906	\$ 317,086	\$ 340,245	\$ 349,828	\$ 1,021,065
<b>Total Cost of Ownership</b>	<b>\$ 303,134</b>	<b>\$ 317,086</b>	<b>\$ 340,245</b>	<b>\$ 349,828</b>	<b>\$ 1,310,293</b>
<b>Average Monthly Expense</b>					<b>\$ 36,397</b>
Option 2: File Server Consolidation with PolyServe					
Capital Expense Summary (Estimate)	Initial Investment	Year 1	Year 2	Year 3	3yr TCO
Hardware	\$ 98,928	\$ -	\$ -	\$ -	\$ 98,928
Software	\$ 48,116	\$ -	\$ -	\$ -	\$ 48,116
<i>Total Annual Capital Expense</i>	\$ 147,044	\$ -	\$ -	\$ -	\$ 147,044
Operating Expense Summary (Estimate)	Initial Investment	Year 1	Year 2	Year 3	3yr TCO
Support and Maintenance	\$ 18,542	\$ -	\$ 18,542	\$ 18,542	\$ 55,626
Power and Cooling	\$ -	\$ 2,510	\$ 2,636	\$ 2,768	\$ 7,914
Data Center Space	\$ -	\$ 1,719	\$ 1,805	\$ 1,895	\$ 5,418
Systems Management	\$ -	\$ 45,178	\$ 46,082	\$ 47,003	\$ 138,263
<i>Total Annual Operational Expense</i>	\$ 18,542	\$ 49,407	\$ 69,064	\$ 70,208	\$ 207,222
<b>Total Cost of Ownership</b>	<b>\$ 165,586</b>	<b>\$ 49,407</b>	<b>\$ 69,064</b>	<b>\$ 70,208</b>	<b>\$ 354,266</b>
<b>Average Monthly Expense</b>					<b>\$ 9,841</b>
Average Monthly Savings					\$ 26,556
Average Annual Savings					\$ 318,676
3yr Savings					\$ 956,027

### Server Hardware: 34 rack servers vs. 6 blade servers

Solution A: File Servers before Consolidation				
Server Census	Server Model	Number of Servers	Average Cost per Server	Total Cost (servers*cost)
User presentation tier	None	0	\$0	\$0
Application tier	HP - ProLiant DL380 G6 (2U) Xeon E5520 2.26GHz (1ch/4co)	34	\$5,000	\$170,000
Total		34		\$170,000

Solution B: With PolyServe Consolidation				
Server Census	Server Model	Number of Servers	Average Cost per Server	Total Cost (servers*cost)
User presentation tier	None	0	\$0	\$0
Application tier	HP ProLiant BL460c Xeon X5460 3.16GHz 6MB (2ch/8co)	6	\$7,458	\$44,748
Total		6		\$44,748

Storage Acquisition Costs		Solution A	Solution B
Total storage (GB)		12000	9000
Type of storage		Mid range SAN	Mid range SAN
Cost per GB of storage		\$6.02	\$6.02
Total storage costs (total storage * cost per GB of storage)		\$72,240	\$54,180

Solution A Acquisition Cost	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
Server hardware (from above)	\$170,000	\$0	\$0	\$0	\$0	\$0
Storage (from above)	\$72,240	\$0	\$0	\$0	\$0	\$0
Total (sum of each)	\$242,240	\$0	\$0	\$0	\$0	\$0

Solution B Acquisition Cost	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
Server hardware (from above)	\$44,748	\$0	\$0	\$0	\$0	\$0
Storage (from above)	\$54,180	\$0	\$0	\$0	\$0	\$0
Total (sum of each)	\$98,928	\$0	\$0	\$0	\$0	\$0



# Organization X - TCO Analysis File Server Consolidation Project



**Server Software: 34 rack file servers vs. 6 blade servers with PolyServe software**

Solution A: File Servers before Consolidation				
Initial Server OS Software Licensing Costs	Operating System	Number of cores	Average Cost per core	Total Cost
User presentation tier	Microsoft Windows Server 2003 / 2008	0	\$0	\$0
Application layer tier	Microsoft Windows Server 2003 / 2008	34	\$793	\$26,962
<b>Total</b>				<b>\$26,962</b>

Solution B: With Poly Serve Consolidation				
Initial Server OS Software Licensing Costs	Operating System	Number of cores	Average Cost per core	Total Cost
User presentation tier	Microsoft Windows Server 2003 / 2008	0	\$0	\$0
Application layer tier	Microsoft Windows Server 2003 / 2008	6	\$793	\$4,758
<b>Total</b>				<b>\$4,758</b>

Initial Software Licensing Costs (other than OS)	Solution A			Solution B		
	Units	Average Cost per Unit	Total Cost (units * cost)	Units	Average Cost per Unit	Total Cost (units * cost)
Application - user licensing	0	\$0	\$0	0	\$0	\$0
Application - server licensing	136	\$0	\$0	1	\$39,824	\$39,824
Database	0	\$0	\$0	0	\$0	\$0
Systems management	34	\$514	\$17,476	6	\$514	\$3,084
Disaster recovery	34	\$75	\$2,550	6	\$75	\$450
<b>Total</b>			<b>\$20,026</b>			<b>\$43,358</b>

Server Software	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
Solution A Software Cost	\$46,988	\$0	\$0	\$0	\$0	\$0
Solution B Software Cost	\$48,116	\$0	\$0	\$0	\$0	\$0



## Organization X - TCO Analysis File Server Consolidation Project



**Server and Software Support: 34 rack file servers vs. 6 blade servers with PolyServe software**

Hardware and Software Support and Maintenance	Solution A: File Servers before Consolidation		Solution B: With Poly Serve Consolidation	
	Initial Purchase Price	Annual Support and Maintenance	Initial Purchase Price	Annual Support and Maintenance
Server Hardware	\$204,000	\$9,486	\$44,748	\$2,250
Operating system	\$26,962	\$0	\$4,758	\$0
Application - user licensing	\$0	\$0	\$0	\$0
Application - server licensing	\$0	\$0	\$39,824	\$15,512
Database	\$0	\$0	\$0	\$0
Systems management	\$17,476	\$4,420	\$3,084	\$780
Disaster recovery	\$0	\$0	\$0	\$0
<b>Total (sum of each)</b>	<b>\$248,438</b>	<b>\$13,906</b>	<b>\$92,414</b>	<b>\$18,542</b>
<b>Annual Support and Maintenance</b>				
	<b>Initial</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
Solution A Support Costs	\$13,906	\$13,906	\$13,906	\$13,906
Solution B Support Costs	\$18,542	\$18,542	\$18,542	\$18,542



# Organization X - TCO Analysis File Server Consolidation Project



## Power, Cooling, and Space: 34 rack file servers vs. 6 blade servers

Average cost per kWatt hour	\$0.11	n1				
Average annual cost per square foot of data center space	\$68.75	n2				
<b>Solution A: File Servers before Consolidation</b>						
Server Census	Server Model	Cooling (BTUs required per server per operating hour)	Power (Watts per server per operating hour)	Number of Rack Units per Server		
User presentation layer	None	0	0	0		
Application layer	HP - ProLiant DL380 G6 (2U) Xeon E5520 2.26GHz (1ch/4co)	4,799	1,406	2		
<b>Solution B: With PolyServe Consolidation</b>						
Server Census	Server Model	Cooling (BTUs required per server per operating hour)	Power (Watts per server per operating hour)	Number of Rack Units per Server		
User presentation layer	None	0	0	0		
Application layer	HP ProLiant BL460c Xeon X5460 3.16GHz 6MB (2ch/8co)	742	218	1.5		
		Solution A		Solution B		
	Number of Servers	Average Annual Cost per Server	Total Annual Cost	Number of Servers	Average Annual Cost per Server	Total Annual Cost
<b>Annual Server Facilities Costs</b>						
<b>Cooling and Power Cost</b>						
User presentation layer	0	\$0.00	\$0	0	\$0.00	\$0
Application layer	34	\$2,702.32	\$91,879	6	\$418.41	\$2,510
<b>Total Cooling and Power cost</b>			\$91,879			\$2,510
<b>Data Center Space Cost</b>						
User presentation layer	0	\$0.00	\$0	0	\$0.00	\$0
Application layer	34	\$151.65	\$5,156	6	\$286.46	\$1,719
<b>Total Data centre Space Cost</b>			\$5,156			\$1,719
<b>Total Facilities Cost</b>			\$97,035			\$4,229
<b>Annual Power and Cooling Costs</b>						
	Year 1	Year 2	Year 3	Year 4	Year 5	
Solution A	\$91,879	\$96,473	\$101,297	\$106,361	\$111,679	n8
Solution B	\$2,510	\$2,636	\$2,768	\$2,906	\$3,051	n9
<b>Annual Data Center Space Cost</b>						
	Year 1	Year 2	Year 3	Year 4	Year 5	
Solution A	\$5,156	\$5,414	\$5,685	\$5,969	\$6,267	
Solution B	\$1,719	\$1,805	\$1,895	\$1,990	\$2,089	



# Organization X - TCO Analysis File Server Consolidation Project



## Systems Management Labor: 34 rack file servers vs. 6 blade servers

IT Operations Labor	Solution A: File Servers before Consolidation			Solution B: With PolyServe Consolidation		
	Annual FTEs	Average Burdened Salary	Total Annual Cost (year 1)	Annual FTEs	Average Burdened Salary	Total Annual Cost (year 1)
Service desk	0.122	\$53,827	\$6,567	0.025	\$53,827	\$1,346
Performance and availability management	0.357	\$89,712	\$32,027	0.073	\$89,712	\$6,549
User administration	0.128	\$89,712	\$11,483	0.026	\$89,712	\$2,333
OS support	0.128	\$89,712	\$11,483	0.026	\$89,712	\$2,333
Break-fix management	0.198	\$89,712	\$17,763	0.041	\$89,712	\$3,678
Software deployment	0.064	\$89,712	\$5,742	0.013	\$89,712	\$1,166
Application management (provisioning and scheduling)	0.256	\$89,712	\$22,966	0.053	\$89,712	\$4,755
Systems management	0.128	\$89,712	\$11,483	0.026	\$89,712	\$2,333
Disk and file management	0.198	\$89,712	\$17,763	0.041	\$89,712	\$3,678
Storage management	0.192	\$89,712	\$17,225	0.039	\$89,712	\$3,499
Security management	0.128	\$89,712	\$11,483	0.026	\$89,712	\$2,333
Database management and administration	0.256	\$98,683	\$25,263	0.053	\$98,683	\$5,230
<b>Total</b>	<b>2.155</b>		<b>\$191,248</b>	<b>0.442</b>		<b>\$39,231</b>
IT Administration Labor	Annual FTEs	Average Burdened Salary	Total Annual Cost (year 1)	Annual FTEs	Average Burdened Salary	Total Annual Cost (year 1)
Vendor management	0.053	\$116,611	\$6,180	0.011	\$116,611	\$1,283
Procurement	0.053	\$116,611	\$6,180	0.011	\$116,611	\$1,283
Asset management	0.053	\$116,611	\$6,180	0.011	\$116,611	\$1,283
Compliance management	0.021	\$116,611	\$2,449	0.004	\$116,611	\$466
IT finance and chargeback	0.053	\$116,611	\$6,180	0.011	\$116,611	\$1,283
IT training	0.014	\$116,611	\$1,633	0.003	\$116,611	\$350
User training	0	\$116,611	\$0	0	\$116,611	\$0
<b>Total Administration</b>	<b>0.247</b>		<b>\$28,803</b>	<b>0.051</b>		<b>\$5,947</b>
Number of servers	34			6		
Total FTEs Required to Manage Servers	2.40			0.49		
Systems Management - Cost	Year 1	Year 2	Year 3	Year 4	Year 5	
Solution A	\$220,051	\$224,452	\$228,941	\$233,520	\$238,190	n21
Solution B	\$45,178	\$46,082	\$47,003	\$47,943	\$48,902	n22
Systems Management - FTEs	Year 1	Year 2	Year 3	Year 4	Year 5	
Solution A	2.402	2.402	2.402	2.402	2.402	n24
Solution B	0.493	0.493	0.493	0.493	0.493	n25
Average annual increase in IT staff costs					2.00%	n28