Wintel Server Virtualization

Environmental and Human Health Impact: **1.3 million Kwh saved** and 249 percent reduction in raw materials, energy, and labor due to the avoided purchase of 284 additional servers.

Business Impact: Approximately **$1.7 million in savings** from June 2010 through May 2011.

Challenge

Virtualization refers to the capability to mimic the functionality of physical servers by creating multiple virtual servers running off of a software layer within a physical server. In simple terms, it is the replication of hardware functionality, here computing power, through the utilization of software developed specifically for this purpose.

From an end user perspective, the application and experience are the same on physical and virtual servers. Until June 2010 Kaiser Permanente had no formal virtualization processes in place for Wintel (Windows operating system, Intel chipset) servers ("servers"). Consequently, KP purchased excess physical servers, which occupied valuable data center space and resulted in unnecessary power consumption and maintenance expenses. The servers acquired by KP from June 2010 through May 2011 have an average physical to virtual ratio of 1 : 2.49.

Aim/Goal

Implement virtualization as often as possible when acquiring servers for growth and technology refresh purposes to minimize the number of physical servers purchased.

Team

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Action Taken

✓ In early 2010 Strategic Sourcing facilitated the purchase of a large bundle of virtualization software licenses from VMware, which allowed KP to increase the virtualization ratio of physical servers it acquired.
✓ A few months later, due in part to inquiries and comments from Sourcing, IT implemented a policy under which virtualization capability was required on all future server acquisitions, waivers to this policy requirement are issued on an ad hoc basis.

Results

Annual Energy Savings

Total kWh (kilowatt hours)	Watts/ Server/Hr.	kWh/ Server/Yr.	Watts/Cabinet (6 Servers)/Hr.	kWh/Cabinet (6 Servers)/Yr.
1,255,746 on 47 cabinets with 6 Servers each	508.33	4,453	3050	26,718

Financial Benefit (Costs avoided due to virtualization; excludes energy costs)

Total Initial	Total Recurring/Yr.	Hardware	Operating Expenses/Yr.	Maintenance & Support/Yr.
$1,705,091	$581,603	$1,123,488	$473,760	$107,843

There are two primary benefits of virtualization:

1. Environmental: Such as the reduction in the use of raw materials, energy, and labor associated with physical server production as well as a corresponding reduction in the amount of waste produced during the manufacturing process.
2. Financial: The cost of physical servers not acquired, data center expenses/operating costs that would be accrued by physical servers and maintenance costs associated with the same.

Lessons Learned

✓ Physical servers with virtualization capabilities are generally more robust and more expensive (due to the loads to be placed on them as well as the cost of the associated virtualization software licenses) than standard physical servers but the overall benefits far outweigh the cost increases.

Next Steps

✓ Monitor the project status and assist IT in meeting the milestones below.

Virtualization Milestones	25%	30%	40%	50%
Target Date	6/30/10	3/31/11	12/31/11	12/31/12
Status	Complete	Complete	In-progress	Pending

✓ Continue to refine the server virtualization project to increase the virtualization ratio of physical servers acquired in the future.
✓ Expand the virtualization policy to personal computers to the extent possible.