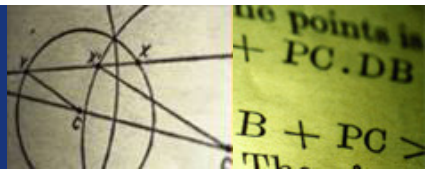
THOUGHTWARE WORLDWIDE

How do you measure success?



Measuring success

University Health Care

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**SVP for Health Sciences**
**Executive Dean, School of Medicine**
**CEO University Health Care**
Lorris Betz, M.D., Ph.D.

**CIO and Assoc. VP for Health Sciences**
Pierre Pincetl, M.D., CIO

**2005 Revenues:**
$547.2 million
**Employees:**
~10,000

## ROI Study Highlights

- 346% ROI
- 146% IRR
- $1.0 Million initial investment
- Payback within three months
- $4.8 Million net savings over 3 years vs. former solution

## Business Benefits

- **Capacity Management** – gives UUHSC increased ability to grow and meet the needs of their patients and customers
- **Remote Management** – HP OpenView enables UUHSC to quickly identify and manage server issues as they arise, 24x7
- **Change Management** – virtualization can be implemented with defined procedures
- **Reliability** – the HP BladeSystem servers provide high reliability and energy efficiency

## Study Scope

UUHSC IT Infrastructure:
- HP Services Consulting
- HP BladeSystems
- HP OpenView tools with HP Lights-Out cards
- HP VMWare software
- HP Financial Services Solutions

# University of Utah Health Sciences Center Teams with HP to Improve Patient Care and Accommodate Growth and Innovation at a Lower Cost—*realizes a 346% ROI*

## Executive Summary

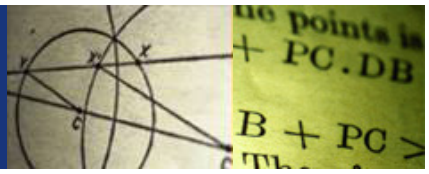
Recognized as one of "America's Best Hospitals" for the 13th year in a row, the University of Utah's Health Sciences Center (UUHSC) is renowned for its research and clinical expertise in the health sciences. Through its four major colleges—the School of Medicine; College of Pharmacy; College of Nursing; and College of Health—UUHSC conducts leading-edge research in genetics, cancer, pharmaceutical sciences, and numerous other areas of medicine. UUHSC is also the major training ground for Utah's physicians, pharmacists, nurses, therapists, and other health-care professionals.

UUHSC handles more than 900,000 outpatient visits and 23,000 inpatient admissions each year. While its programs are considered leading-edge, like most of its counterparts in the healthcare industry, IT has been struggling to keep up with demand. As UUHSC brought in more systems to support patient care, they were rapidly running out of data center space, power, and cooling capacity. Faced with a possible $7 million data center expansion, UUHSC began an investigation to shift its investments from more servers and their accompanying environmental costs to a consolidated environment that would reduce costs *and* allow UUHSC to focus on enhancing patient care.

In outlining their goals, containing rising data center and server costs was at the top of UUHSC's list. UUHSC sought to gain insight into their network, add capabilities without adding servers to accommodate growth needs, and provide 99.999% uptime for mission-critical applications, on a 24x7 basis. UUHSC conducted a thorough analysis which considered the leading IT vendors as consolidation partners. HP was selected for its ability to provide: technology that reduces risk, remote management capabilities, reliability with a proven track record; and its BladeSystem servers for their more efficient power and cooling consumption.

HP Services brought in partner Avnet to conduct an analysis of UUHSC's server infrastructure, whose findings validated the potential of UUHSC's consolidation goals versus building a new data center. Partnering with HP, UUHSC virtualized to achieve a 15:1 server consolidation—50% higher than originally expected. The organization has achieved significant cost savings by increasing efficiency and utilization of resources and controlling data center growth. Power and cooling consumption has been reduced with 25% fewer physical servers, and remote management capability is enabling UUHSC to quickly identify and manage server issues as they arise. With a clearly defined procedure for virtualization, UUHSC can now continue to add the capacity they need to support patient care and growth.

***As a result of the HP consolidation solution, UUHSC is realizing its patient care goals with a lower cost, virtualized server environment that increases efficiency, controls data center costs and allows room for growth and investments in innovation. The results show a 346% ROI in three years.***



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## UUHSC Business Challenge—*Achieve Enterprise-wide IT Consolidation to Improve Performance and Efficiency, Reduce Data Center Power and Cooling Requirements, and Accommodate Growth*

In 2005, UUHSC management realized that in order to keep pace with the explosive growth they were facing, they would either need to quickly build a new data center or find a way to consolidate hundreds of servers. The existing data center was so stressed that it had run out of space, power, and cooling capacity. According to Data Resource Center Director Jim Livingston, *"If we plugged in one more thing in the data center, we would have caused serious problems."*

As is the practice in many organizations, it was not unusual for UUHSC to receive a customer request, and simply add a server to the network to fulfill it. The result was an IT infrastructure that included more than 350 servers—most running at less than 10% utilization. Further, some of the existing servers (65) were older (more than 3 years) and less efficient in terms of environmental resources. Facing rapid growth, increasing customer demand for services, and exhausted resources without the ability to add even a single server, UUHSC embarked on an IT consolidation project.

UUHSC was looking to consolidate a number of database, application, and Citrix servers into a VMWare environment. Their initial objective was to cut server quantity by half, while improving system performance and utilization. They also sought to decrease the cost of server maintenance and software licensing as well as ease the manageability of the server environment. The following top-level goals were identified:

- Invest capital on care transformation, not new data centers
- Consolidate and reduce the number of physical servers
- Eliminate backlog of server requests and accommodate projected growth
- Monitor and manage servers from remote locations
- Gain insight into network problems
- Provide 24x7 support without increasing staff

HP was selected for its ability to address UUHSC's requirements. HP Services consultants brought in partner Avnet to assess UUHSC's existing server infrastructure, whose study of 352 existing Microsoft Windows servers validated UUHSC's consolidation goals. The consolidation program began by employing HP BladeSystem servers and using HP's OpenView Performance Insight to provide real-time utilization statistics. Partnering with HP, UUHSC virtualized in order to achieve a 15:1 server consolidation—50% higher than originally projected.

### Technology Benefits

With the HP solution, UUHSC's IT staff can better respond to changing demands by using virtualization. Running HP BladeSystems with VMWare software to virtualize the server environment allows UUHSC to build and provide servers 11 times faster than in the previous environment. The server team is now able to rebuild one server or multiple servers in less than 10 minutes, as opposed to the previous 2 to 3 hours per server.

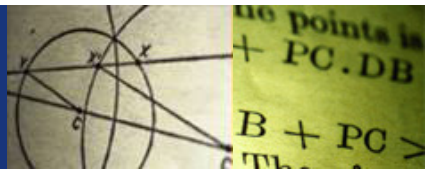
***" If we plugged in one more thing in the datacenter we would have caused serious problems."***

— Jim Livingston
Director, Data Resource Center

### Challenges

**According to UUHSC, the data center was at the point where not a single thing could be plugged in without potential serious ramifications. They turned to HP to help them:**

- Add capacity as business required without increasing server growth
- Provide 99.999% uptime for all mission-critical applications, 24x7
- Contain or reduce rising data center costs
- Reduce datacenter cooling and power consumption levels



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Establishing standards has allowed UUHSC to simplify server deployment by providing a standard image. Applications are tested and approved prior to delivery to ensure they will work on the server. HP technology has also provided a robust set of tools, including HP Network Node Manager and HP OpenView tools:

- Real-time utilization information on all the servers (OpenView Performance Indicator)
- Trending information on usage and critical transactions which in turn provides information for service level objectives (OpenView Internet Services)
- Data on server health for proactive monitoring (SIM technologies)
- 24/7 support without increasing staff

## Built-in Value of HP Investment—*saving time and money*

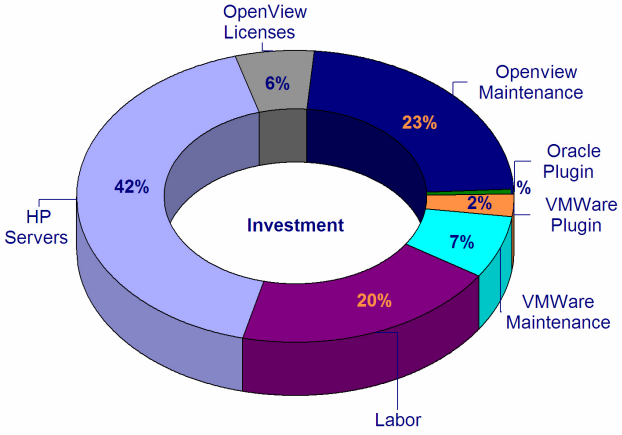
Thoughtware Worldwide's analysis showed that the HP tools provide economic benefits primarily around virtualization and headcount avoidance. Desktop Services (HP OpenView tools) is able to maintain a high quality of service (QoS) by utilizing centralized, remote management and streamlined problem resolution.

***" We have been using OpenView, and without it, we would need 10 times the staff."***

— Bryan Peterson
Principal Systems Engineer

### Quantifying the HP Investment

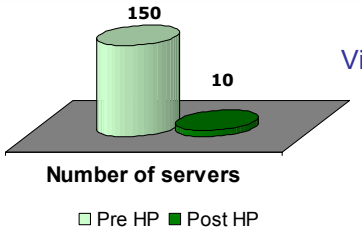
- The HP server leases and implementation labor make up 62% of the overall investment.
- OpenView and the necessary plug-ins for Oracle and VMWare make up the other 38% of the investment.




## Operational Benefits: Greater Reliability and Efficiency

### 15:1 IT Consolidation

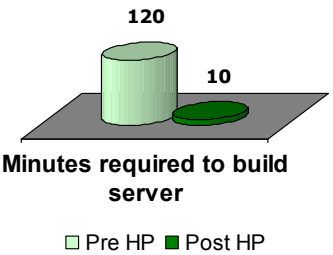
Virtualization allowed the data center to consolidate 150 physical servers onto 10 HP BladeSystem servers.




**93%**
Virtualization

### Greater Productivity

With the same headcount, the server team has increased productivity by 11x, i.e. from at least 2 hours to less than 10 minutes per server build.




**11x**
Improvement

### Selection Criteria

The HP consolidation solution was selected for its ability to provide:

- Technology that reduced risk
- Remote "Lights Out" management capability
- Reliability with a proven track record
- Efficient blade servers that would reduce power and cooling consumption and costs

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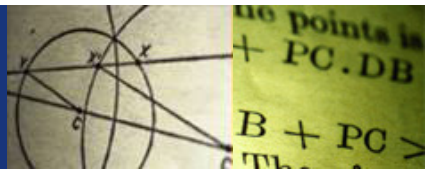
How do you measure success?



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***" It's all about the tools. If you get tools, you can manage and grow the environment. When I hear about a company with 25-50 [servers] per FTE, I think: There's a company that doesn't know what tools are out there."***

— Jim Livingston
Director, Data Resource Center

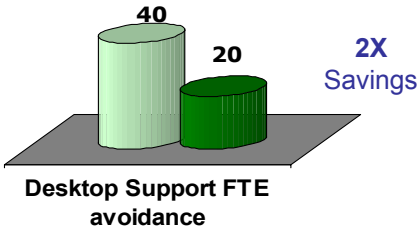
## Operational Benefits

**In adopting the HP consolidation solution and tools, UUHSC has achieved 15:1 server consolidation and avoided a ~ $7 million data center expansion**

- By standardizing on HP, UUHSC avoided increasing desktop support staff by approximately 100%
- Enabled by virtualization, IT reduced its number of physical servers by at least 20%, and avoided the purchase of 125 servers
- UUHSC realized significant HVAC, power and physical data center cost savings by using HP BladeSystems

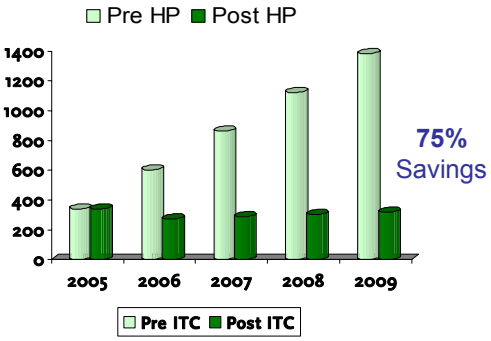
### Headcount Avoidance

Desktop support staff avoided an increase in headcount, holding at 20 employees and avoiding growing to 40 employees, a 100% staff cost savings.



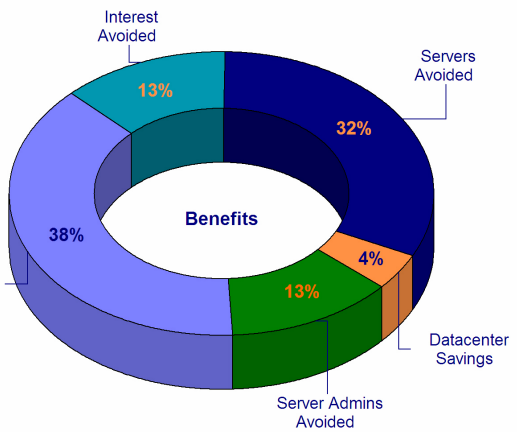

### Contained Server Growth

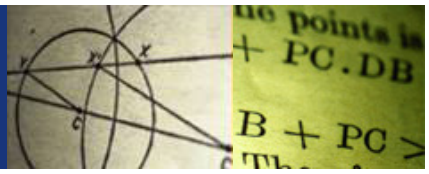
Without HP's IT Consolidation and virtualization, UUHSC would have reached over 1,000 servers based on their growth. Virtualization has reduced the growth of physical servers by ~90%.




### Benefits Achieved from HP Investment

- **Servers avoided:** Thoughtware Worldwide's analysis shows that UUHSC has avoided the purchase of 150 servers to date, with an additional estimated 50 servers avoided per year in subsequent years
- **IT staff avoidance:** Thoughtware Worldwide's study further estimates that IT support staff for desktop and printer support would have at least doubled with the previous solution (currently supporting 3000 desktops, 2000 servers)
- **Server administrators avoided:** With the industry average of 15-35 servers per admin, UUHSC has been able to achieve above-average results using HP tools
- **Data center savings**: With data center space exhausted, HP BladeSystem servers are the key components contributing to lower energy and cooling requirements. With virtualization they also contribute to space savings—virtual servers can be added to accommodate a user request instead of physical servers
- **Interest payments avoided**: Because UUHSC has financed its IT infrastructure with HP Financial Services, its server consolidation program can map to the three-year refresh cycle by consolidating servers coming off lease over time. This allows UUHSC to free up capital for patient care investments vs. depreciating hardware assets





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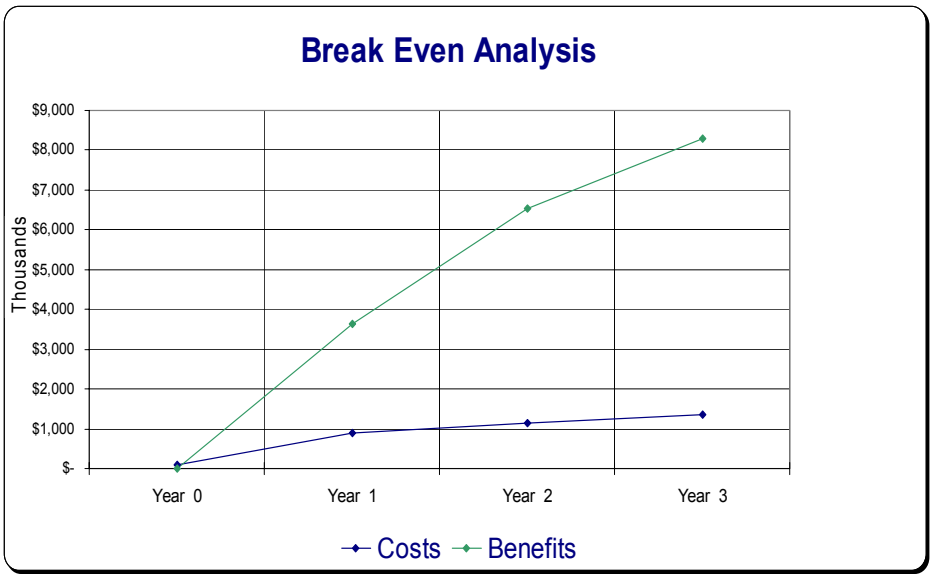
## Summary of UUHSC's Return on Investment (ROI)

IT consolidation has helped UUHSC achieve cost savings by reducing the number of physical servers and containing future server growth, enabling greater productivity (number of servers per FTE), and headcount avoidance. Performance improvements have been achieved by migrating some application servers to virtual machines, and power and cooling requirements are down through a 25% reduction in the number of physical servers. The new IT model allows for capacity to be added to support UUHSC's patient care goals and overall growth. The HP solution has delivered an ROI of 346% over 3 years and a significant internal rate of return (IRR) of 146%, validating the quality and value of the investment. As illustrated in the chart below, the benefits of the HP solution exceeded costs, with the investment reaching breakeven in just one month.




***" HP consolidation saved us so that we could continue to grow."***

— Jim Livingston
Director, Data Resource Center

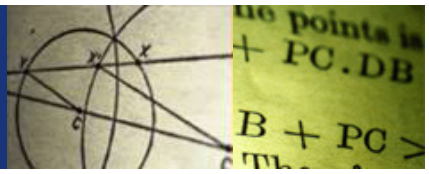
**FINANCIAL MEASUREMENT EXPLAINED**

**ROI** (Return on Investment)
- Quantifies how much profit or cost savings will be achieved as a result of the investment
- Discount any future costs/benefits by the Weighted Average Cost of Capital (WACC)
- WACC is an average cost of capital using a combination of equity and debt borrowing
- Demonstrates the overall value of an investment; e.g., is breakeven achieved (100%) or is positive value achieved(101%+; investment plus value)

**WACC** (Weighted Average Cost of Capital)

WACC = E/V x Re + D/V x Rd x (1-Tc)
- Re = Cost of Equity
- Rd = Cost of Debt
- E = The market value of the firm's equity
- D = The market value of the firm's debt
- V = E + D
- E/V = Percentage of financing that is equity
- D/V = Percentage of financing that is debt
- Tc = The corporate tax rate

**IRR** (Internal Rate of Return)
- Discounted cash flow measure of valuation and investing. IRR is the true interest yield of an investment
- Net benefits restated as an interest rate
- IRR demonstrates how quickly an investment generates positive net benefits



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## About the Value Measurement Series

This case study is based on original research and analysis conducted by Thoughtware Worldwide, LLC., an independent research and information services firm. Thoughtware Worldwide's research included on-site interviews with members of University of Utah Health Sciences Center (UUHSC) management team and reviews of company financial and planning documents.

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hp invent

## UUHSC Has the Opportunity to Harvest Additional Value

During the course of the Thoughtware Worldwide study, the UUHSC team identified a number of additional areas where it could maximize the benefits realized from its HP investment. Leveraging its HP server consolidation strategy and tools, UUHSC has the opportunity to harvest additional value by:

- Consolidating applications where possible will allow UUHSC to improve utilization of computing resources and precious data center space, and help reduce administrative and maintenance tasks
- Using HP Integrity servers to replace some of the existing UNIX servers can deliver low total cost of ownership and a potential 30-1 consolidation ratio
- Building an access portal for customer Service Level Agreement review
- Employing HP Instant Capacity (iCAP) software, a utility pricing solution that provides the ability to increase processing capacity instantly
- Moving to HP c-Class BladeSystems with Virtual Connect Architecture, which allows server administrators to automatically manage resources independent of server connections to network and storage resources in an HP BladeSystem, saving administrative "wait time."

## Summary

HP's consolidation solution is helping UUHSC deliver the available, reliable data the medical staff needs to provide high-quality, innovative care and achieve high patient satisfaction levels. HP hardware, architecture, tools, and knowledge have helped UUHSC virtualize its server environment and bring new levels of service capabilities to staff— cutting costs, yielding increased efficiency and utilization of resources, and controlling data center and server growth. Performance improvements have also been achieved by migrating some application servers to virtual machines, and power and cooling requirements are down by over 20% from a reduction in the number of physical servers. The new IT model allows UUHSC to redeploy capital to investments that directly support patient care and innovation while providing capacity, growth and manageability to better support their patient care goals and overall organizational growth.