

# success story



"The HP Utility Data Center (UDC) makes it possible to leverage resources around the world in a way that would not otherwise be possible. Prior to this infrastructure, we had assets that were scattered throughout the organization, and often they were located in places where people could not share them. By putting in a standardized structure, we can shift in real-time from one use-model to another, based on the importance of a particular research project's or production application's need."

**John Sontag**

**Program Manager for Utility Data Center installation, HP Labs**

hp labs uses  
hp utility data center  
to boost productivity  
and research

From its humble beginnings in a garage to its position as a technology leader today, HP is a company fueled by progress and innovation. At HP Labs, the company's central research organization, 750 people worldwide are helping to create technologies for next-generation solutions and services, to deliver new value to customers and provide competitive advantages for HP.

### **growth demands bytes, bodies and bucks**

Since HP Labs was formed in 1966, its research agenda has changed dramatically over the years – and so has its IT structure. Servers were once spread throughout the world – in data centers, in closets, even under people's desks. Like many enterprises, HP Labs faced the challenge of trying to grow its research "business" while maintaining IT operating costs and space. John Sontag, program manager of HP Labs Utility Data Center installation, reflected, "We needed to find some way to harness these hundreds of systems together – to make their combined computing power leveragable – in a way that was both affordable and physically practical."

In reflecting on the impact of new projects Sontag continued, "In the past, we would have found additional data center space and filled it with the machines and operational staff. The challenge facing us was a portfolio of projects that would have normally added about 600 machines and 50-60 people to a data-center space that was already full. The total impact would have been \$1.5 million a year in terms of funding the additional staff and space. However, in the current economic climate, we set a goal to live within our current head count and IT budget."

### **next wave of computing**

The solution to this seemingly unsolvable problem actually was in HP Labs' own backyard – from a concept started within HP Labs itself and brought to market by HP's Infrastructure Solutions Organization, part of HP's Software

Global Business Unit. In direct response to customers' needs for more dynamic, more agile, and higher utilized computer systems and storage devices, coupled with the need for greater manageability and scalability, this organization was responsible for bringing to market an innovative end-to-end solution: the HP Utility Data Center (UDC).

The HP UDC is a solution that virtualizes all the resources in the data center – servers, networking, storage and applications – and allows dynamic resource allocation and reallocation among applications, thereby making the IT infrastructure more adaptive. The HP UDC provides a virtual infrastructure, which is moveable and dynamic to meet changing needs, and eliminates the need to change cabling or physically relocate servers.

In effect, the HP UDC gives enterprises the potential to double their data center efficiency and improve their total cost of ownership by allowing them to move computing resources when and where they are needed, using a drag-and-drop interface that HP calls the Utility Controller Software. With no need to physically move equipment, the resources can be switched in a matter of hours, or even minutes, instead of weeks or months.

### **early installation**

Since HP Labs is on the leading edge of invention, it is an early user of the UDC. HP Labs puts its UDC to work for its production and research computing needs and uses it as a test bed for future enhancements.

In moving to the UDC, HP Labs consolidated its distributed servers into two data centers; one in Palo Alto, CA and one in Bristol, England. These data centers will run the core applications for HP Labs, such as e-mail, web serving, and library services. These data centers also will serve as the computing platform for research going on throughout HP Labs – in areas as diverse as rich media, mobility, security, and fundamental

## **challenges**

- build a world-class infrastructure that will give way to next-generation invention
- combine the running of production applications with resources needed for research
- create and operate a new infrastructure within current budget and space constraints

## **solution**

- installed hp Utility Data Center with hp Utility Controller and hp OpenView software
- consolidated budgets of hp Labs research and hp Labs IT

## **results**

- added nearly 350 systems in Palo Alto without adding additional operational staff, saving over \$700,000 per year
- utilized existing data center space, saving the need for 500 sq. feet of additional space at \$150 per square foot, saving over \$750,000 per year
- added another 300 systems in Bristol, England, with similar cost savings on employees and space
- consolidated, standardized infrastructure is easier to manage and support
- obtained greater flexibility and availability of systems' resources
- operational staff can focus on higher level tasks
- computing resources can now be shared internally and externally with partners
- provided the opportunity for more UDC innovation

science such as nanotechnology. In fact, both data centers will be used to help invent technologies that further HP's vision of an adaptive enterprise.

### **single solution for many different uses**

According to Sontag, the UDC will fill a number of "shoes" for HP Labs. "Most importantly, it is our production facility, the place where we run all the services, that the HP Labs business uses on a daily basis," he said. "Secondly, it is where our researchers get access to servers, networking and storage resources to perform their research. It's also a platform that will allow us to collaborate with other HP businesses, like the Enterprise Systems Group (ESG), permitting us be able to run ESG's demo center and some of its capacity-planning processing here."

The HP Labs' UDC also is an infrastructure that lends itself to collaboration with customers and researchers outside of HP. Examples include organizations such as the University of California, Berkeley; the University of Bristol, England; and the Gelato Federation, a worldwide consortium focused on enabling open source computing solutions for research. "The HP UDC allows us to make resources available to employees and partners anywhere we need them – on the Internet and on our intranet – to work on joint research and advanced development between HP, universities and research institutions worldwide," commented Sontag.

### **pooling financial resources**

One factor that enabled HP Labs to implement the UDC was the ability to pool the portion of the research budgets allocated to the purchase of computer systems with the IT budget for running production applications. This allowed the leveraging of physical assets and people from both organizations and increased the buying power. "By capturing all of the budget for our IT expenditure in one place, we were able to bring a higher level of commitment to the UDC inside

HP Labs, and it enabled us to purchase more equipment," Sontag said.

### **HP UDC configuration**

The Palo Alto site UDC has the following components: a management rack – including the Utility Controller Software and the portal interface; a backup rack with automated storage back-up via total Linear Tape Open (LTO) tape drives; an operations center rack with pre-integrated operations support – including HP OpenView Service Desk for trouble management and HP OpenView Operations for fault management; network fabric racks of two Cisco 6509 Switches; HP StorageWorks Disk Arrays xp1024 and xp512 storage – each with capacity of up to 27 TB; and finally, a resource pool of about 30 PA-RISC servers running HP-UX and nearly 300 IA-32 and Itanium servers running Microsoft Windows and Linux. As part of HP Labs' research agenda, the UDC will eventually include two-way Itanium-based systems that run a combination of HP-UX, Linux and Windows and up to 700 servers in total. The Bristol site has a similarly configured UDC.

The UDC easily facilitates high availability and, in particular, the HP Utility Controller software performs fault management as well as on-going resource usage and storage management. "Because of the nature of the HP Utility Data Center, we can swap in replacement equipment immediately, reallocate the new resources to a particular research project and take the replaced equipment off line. This may not seem like a big deal on a daily basis, but when multiplied across hundreds of machines and services, the impact to maintaining high availability is significant," noted Sontag.

The HP UDC includes essential functionality from HP Integrated Services Management (ISM), which combines operations and business support functions with HP Utility Controller software to manage the virtualized resource pools within the HP UDC. By joining these functionalities, the HP UDC enables the

## **solution highlights**

- management rack with Utility Controller Software that provides portal interface for data center operators and farm administrators
- backup rack with automated storage back-up via total Linear Tape Open (LTO) tape drives
- operations center rack with pre-integrated operations support, including hp OpenView Service Desk for trouble management and hp OpenView Operations for fault management
- network fabric racks of Cisco 6509 Switches
- hp StorageWorks Disk Array xp 512 and xp1024 storage, each with capacity up to 27 TB
- an average of 300 servers in each of the two resource pools containing at least
  - ▶ 25 HP-UX servers (rp7400, rp5470 rp2470 and rp2450)
  - ▶ nearly 150 IA-32 servers (lp 2000rs, dl580G2, dl360G2 and dl580D2)
  - ▶ approximately 130 IA-64 Itanium servers (rx2600) running Microsoft Windows and Linux

servers and applications to be more seamlessly and cost effectively managed than ever before. "Routine tasks that used to require a lot of time – restoring systems, setting up for projects, etc. can all be done in a short timeframe. Now, our operations staff can focus its efforts on the support of actual services and experiments," Sontag observed.

### functionality begets benefits

The installation of the UDC at HP Labs immediately provided numerous benefits. The first clearly was financial. "Installing the UDC is enabling us to quadruple the number of servers in our data centers in Palo Alto and Bristol while keeping our people and real-estate costs essentially flat," said Sontag.

"With HP UDC, we have been able to create an environment that we could not have attained any other way," he noted. "Equally important, the flexibility of the UDC gives us an entirely new level of capabilities that we could not have

achieved in any other environment. In addition, we can continually refresh equipment on a monthly or quarterly basis as our needs and finances change."

The HP Utility Controller software can be used to create and manage multiple mini-data centers within an enterprise or among value chain partners. Sontag explained, "The UDC makes it possible to leverage resources around the world in a way that would not otherwise be possible. Prior to this infrastructure, we had assets that were scattered throughout the organization, and often they were located in places where people could not share them. By putting in a standardized structure, we can shift in real-time from one use-model to another, based on the importance of a particular research project's or production application's need."

The UDC also is expected to provide HP Labs with a large-scale infrastructure

available for experimentation and critical research, at a level not previously possible. "Being able to give, for example, 100 servers on a weekend to a scientist doing work in a compute-intensive area – like bioinformatics or quantum physics – could speed the pace of the research," said Sontag.

He concluded, "By being able to have a production and research facility that is shared, our researchers can actually monitor the impact of new ideas upon real production resources, understand how they are utilized and assess the demands that are consequently put on the infrastructure. In other words, the UDC allows us to better target HP's research into the next generation of adaptive infrastructures."

For additional information, please visit [www.hp.com/go/hpudc](http://www.hp.com/go/hpudc)



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