UPMC rewrites the rules on IT investment to facilitate tomorrow's healthcare innovations

Overview

- ***Business Challenge***
  UPMC, Pennsylvania's largest integrated healthcare delivery network, sought to lower the cost and complexity of IT infrastructure to enable the continued investment in next-generation clinical systems and to lay the foundation for the best possible patient care.
- ***Solution***
  Now in the middle of a landmark, 8-year strategic partnership with IBM, UPMC is transforming its systems through consolidation, standardization and—most importantly—virtualization. Relying on IBM products and services, the mid-stream effort has already resulted in the reduction of hundreds of servers across the UPMC network.
- ***Key Benefits***
  - *$30 million in capital and operating cost reductions*
  - *150 percent increase in processing capacity*
  - *40 percent reduction in IT infrastructure floor space requirements*
  - *67 percent reduction in number of physical servers*

Widely recognized for its innovations in patient care, research, technology and healthcare management, UPMC is the largest integrated healthcare enterprise in Pennsylvania and one of the leading nonprofit health systems in the United States. Based in western Pennsylvania, UPMC is the region's largest employer, with 48,000 employees and nearly $7 billion in revenue.

When the University of Pittsburgh Medical Center (UPMC) joined with IBM in an 8-year, $402 million partnership designed to transform its IT infrastructure, the deal was viewed as a watershed in how IT vendors and their customers work together. Today, with the deal approaching the halfway mark, the UPMC and IBM collaboration has met the original expectations and, in many instances, has exceeded them. What continues to make the partnership unique is how the companies' shared vision of the future of healthcare delivery is cemented by a shared commitment to fostering healthcare innovation. The predominant focus of the partnership is on transforming UPMC's entire IT infrastructure to lay the groundwork for the future, an effort that is far reaching in scope and subject to major challenges—most or all of which are shared by major healthcare providers today. UPMC's strategy is

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> – *Paul Sikora, VP of IT Transformation, UPMC*

Business Benefits

- $30 million in capital and operating cost reductions through virtualization-driven efficiencies
- 150 percent increase in processing capacity with no increase in IT support costs
- 40 percent reduction in IT infrastructure floor space requirements, freeing up space for revenue generating services
- 67 percent reduction in number of physical servers
- Expected increase in average utilization per server from three percent to nearly 80 percent
- Faster integration of acquired healthcare operations

based on the simple idea that having the resources to meet future demands—be they operational, clinical and technological—requires the maximum efficiency of IT resources across the entire enterprise. This story revisits the initial goals and drivers of the partnership and, more importantly, tracks its progress according to key milestones. A key takeaway from the UPMC-IBM experience is that a well conceived transformation strategy can not only adapt to changing circumstances or intensifying trends, but indeed thrive under them.

Gauging progress

When the project was conceived, all key measures of information processing activity, including the volume of data and the number of applications, were projected to grow sharply, producing a commensurate increase in infrastructure and support costs. The transformation plan put forward by IBM was designed to effectively uncouple growth from cost by remaking the IT infrastructure through consolidation, standardization and—perhaps most importantly—virtualization. Since the project began, however, UPMC's information processing volume has grown even faster than the plan's initial aggressive expectations. That IBM was able to not only meet—but actually exceed—its infrastructure efficiency goals is compelling evidence of the robustness of the virtualization framework that UPMC and IBM put into place.

> *"We were being crushed by our own infrastructure. We saw increasing demand all around us, while at the same time systems had to be more reliable and run faster. We didn't see any light at the end of the tunnel for additional funding or staffing, so it became a question of how do we do more with what we have."*
>
> – *Paul Sikora*

Here's the path it took to get there. Having evolved from a major academic medical center to Pennsylvania's largest integrated healthcare delivery system—with revenues of nearly $7 billion and 48,000 employees—UPMC has acquired a reputation as one of the nation's most respected and influential healthcare providers and as an innovator in patient care, research, technology and healthcare management. As part of its growth strategy, UPMC also acquired several hospitals (now numbering 20) along with numerous other kinds of care facilities. While such acquisitions strengthen both the clinical breadth and depth of the UPMC network, they also tend to complicate the IT picture by adding to the heterogeneity—and overall complexity—of its infrastructure, as each new acquisition brings its own set of applications. Moreover, because it made integration inherently more difficult, this reality conflicted directly with UPMC's vision of leveraging information from across its entire network for the benefit of its patients.

Breaking the cycle

Resource efficiency was another huge driver for the project. Historically, UPMC's IT costs had been propelled inexorably upwards by what seemed to be an ironclad logic. More applications—and more users of those applications—meant more data, which in turn meant more servers to buy and more people required to run them. The growing requirement for servers and storage also consumed more and more of

the UPMC's physical space, which could otherwise have been used for clinical—and revenue-generating—purposes. UPMC's leaders saw that rising IT costs were ultimately at odds with its long-term goals around innovation and patient care, a dynamic likely to intensify given the ongoing tightening of resources in the U.S. healthcare market. The central goal of the IBM-UPMC partnership is to break this linkage by going down a completely new path for its IT strategy by consolidating and standardizing its disparate server and storage resources, and aggressively implementing virtualization. "Virtualization isn't an option," observes Paul Sikora, vice president of IT Transformation at UPMC. "It's a necessity."

And, by all appearances, it's working. Indeed, judging by the results UPMC has been able to achieve—even in the relatively early stages of the project—the virtualization strategy being implemented by IBM is exceeding even the most optimistic projections. The most telling indicator of the project's success is the difference between UPMC's actual capital and operating costs (related to IT) and those that would have been incurred had it taken no action. As discussed above, a key backdrop for this comparison is the surge in processing and storage volume that resulted from the faster-than-projected expansion in the scope of UPMC's industry-leading electronic health records adoption. In the "baseline" case—that is, had no action been taken—UPMC would have needed to more than double its number of servers, to nearly 300. Instead, it was able to reduce the number of servers by two thirds, and the consequent reduction and avoidance of $30 million in capital and operating costs. This number is projected to rise to $40 million by the end of year three of the transformation project.

At a strategic level, the project is succeeding because it has enabled UPMC to uncouple the inevitable growth in its processing capacity from the growth of its IT costs, thus rolling back what had become a major threat to its future investment in new treatments and the technologies they require. More broadly, this breakthrough—whose fundamental enabler is IT virtualization—is allowing UPMC to rewrite the rules that govern its resource decisions. By simplifying its IT infrastructure through virtualization, for instance, UPMC is able to support 150 percent more server capacity without the need to hire any additional support staff. On top of that, the server consolidation afforded by its virtualization strategy enabled UPMC to reduce its floor space requirements by nearly 40 percent. In addition to enabling UPMC to avoid facilities expansion that would have been needed under the baseline scenario, consolidation freed up space that UPMC can now repurpose for revenue-generating clinical activities.

Solution Components

Software

- IBM WebSphere® Application Server
- IBM WebSphere Business Integration
- IBM Tivoli product suite

Servers

- IBM System x
- IBM System p
- IBM System z
- IBM BladeCenter
- IBM TotalStorage Enterprise Storage

Solution

- IBM Component Infrastructure Roadmap

Services

- IBM Global Technology Services
- IBM Healthcare and Life Sciences
- IBM Research
- IBM STG Services
- IBM SWG Services

Why it matters

By transforming its IT infrastructure through consolidation and virtualization, UPMC has achieved more than a quantum improvement in resource efficiency. It has fundamentally changed the link between processing and resource needs—enabling it to meet an ambitious clinical agenda with a far lower rate of IT investment growth.

The tools of virtualization

The transformation making these benefits possible is being implemented by IBM Global Technology Services. Working in close cooperation with UPMC and following a phased approach, IBM's role is comprehensive in scope, including the design and definition of a virtualized, dynamic architecture, the consolidation and migration of applications to the new system, and the optimization of applications to maximize performance.

IBM hardware products at the core of the effort include IBM System x™, System p™, System z™ and BladeCenter® servers, as well as IBM TotalStorage® Enterprise Storage Servers, which are running the two UPMC storage databases that were consolidated from 40. Virtualization within and across these resources is enabled by IBM's Advanced POWER™ Virtualization, which performs partitioning and dynamic load distribution for System p servers, and VMware's Virtual Infrastructure 3, which will be used to consolidate more than a thousand Intel-based servers to 20 IBM System x servers. In the latter case, the utilization rates of the servers are expected to increase from the current average of three percent per server to nearly 80 percent. To manage the infrastructure centrally and efficiently, the solution employs a common toolset based on IBM Tivoli® products. The modular, standardized nature of the solution means UPMC can integrate new acquisitions into its network faster—enabling the more prompt realization of the acquisition's operational and clinical goals.

If anything, the importance and urgency of healthcare as an issue has only risen since the outset of the transformation project, as has the intensity of public discourse over how to address the resource challenges for the industry—and for society as a whole. This, in turn, only strengthens the value proposition underlying UPMC's transformation strategy. While Sikora acknowledges the long road ahead, he sees the merits of UPMC's efforts as beyond dispute. "Considering that IBM and UPMC are only midway through this transformation project, the results have been impressive," says Sikora. "We have already proven that standardization, along with aggressive implementation of virtualization, yields unprecedented productivity and efficiency."

For more information

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