

Detroit Medical Center Improves Patient Care, and Gains Nearly \$6.7 Million in Benefits with Hewlett-Packard Enterprise Virtual Arrays



“We saw our space requirements growing exponentially—literally every day we saw our data growing. We needed to add new storage, and had to do it without hiring extra staff for managing and maintaining it.”

– Keith Reed, SAN/UNIX Administrator
Detroit Medical Center

Urban health-care facilities are faced with conflicting demands—they face budgetary constraints, yet must deliver high-quality health care to city residents. So when the Detroit Medical Center needed to expand its storage capabilities, the health-care facility, in conjunction with its IT outsourcer, CareTech Solutions, looked for a cost-effective solution that would allow it to significantly expand storage without adding to its staff, and give medical professionals immediate access to medical records such as X-rays and Magnetic Resonance Imaging records (MRIs). Detroit Medical and CareTech Solutions chose the HP StorageWorks Enterprise Virtual Array 5000 (EVA5000) solution because it offered easy installation and maintenance, high-capacity storage without having to add staff, and flexibility in managing storage so that it can be used for a variety of medical applications. The solution has yielded nearly \$6.7 million in benefits, as well as improved patient care.

Benefits

Objective	Benefits Achieved
More flexible storage	Virtualization of disks allows for greater control, allowing storage to be more finely “sliced” for applications.
Cost savings	Because of the ease of installation and maintenance of the EVAs, 22 terabytes of storage were added, without requiring additional staff time to manage it.
Increased storage	Twenty-two terabytes of storage were added, with room for expansion.
Move to filmless records	Rather than shoot medical tests such as MRIs, X-rays, and ultrasounds to film, the results are stored digitally. The move to filmless records will save the medical center \$1.8 million annually, and patient safety is being improved because of the more timely availability of medical images.
Improved patient care	Patient X-rays, MRIs, and similar data are immediately accessible over the network by any medical professional anywhere in the medical center.



Challenge

For the Detroit Medical Center to significantly expand its storage capabilities so that it can improve patient care by digitally storing medical records such as X-rays and MRIs, without having to add staff to manage the increased storage.

Solution

HP StorageWorks Enterprise Virtual Arrays (EVA5000s)

Results

A five-year net benefit of \$6,694,613, driven by staff savings and increased user productivity due to improved storage availability. An annual ROI of 489%, a payback period of four months, and a total five-year savings per user of \$669. Improved patient care due to X-rays, MRIs and similar data being immediately accessible over the network by medical professionals.

About the Detroit Medical Center

The Detroit Medical Center, the leading health care system in metropolitan Detroit, operates 10 hospitals and institutes, two nursing centers, and more than 50 primary care practices throughout southeast Michigan. The center has 2,000 licensed beds, 3,000 affiliated physicians, and serves as the teaching and clinical research site for the Wayne State University School of Medicine. With more than 13,000 employees, it is Detroit's largest private employer.

The center has become known for its innovative use of technology—awarded the Most Wireless Award in 2003 from 'Hospitals & Health Networks' magazine, for its use of wireless technology for medical purposes. IT management and infrastructure for the center is outsourced to CareTech Solutions, which is co-owned by the Detroit Medical Center, Compuware, and Oakwood Health Care Solutions.

The Challenge: Meet Increasing Storage Demands Without Adding Staff

The Detroit Medical Center uses a Clinical Information System (CIS) to store all patient data. When doctors and nurses want to access patient information, order tests, find out information about medication, or perform any other task related to patient care, they use CIS, which is driven by a large Oracle database.

The center has also developed a Picture Archiving and Communications System (PACS), which is allowing it to use filmless records for patient image data such as X-rays, MRIs, CAT-SCANS, and eventually ultrasound images as well. These images are stored digitally, allowing them to be accessible by any medical worker in any health-care facility throughout the Detroit Medical Center's network of hospitals and health-care centers.

PACS images take up a great deal of storage space, and as the system is being brought online to more facilities, the medical center's storage needs have been growing exponentially. Its existing SAN storage solution could not handle the storage needs, and so a new storage solution was needed.

“We did the EVA implementation ourselves and everything went smoothly. It was all straightforward, from plugging it in to waiting for our images to appear.”

— Keith Reed, SAN/UNIX Administrator, Detroit Medical Center

The Detroit Medical Center chose a Hewlett-Packard Enterprise Virtual Array (EVA) storage solution because the system could significantly expand the center's storage capacity without increasing staff, offers simple deployment and greater manageability, provides faster access to data, and is expandable enough to meet all of the medical center's future storage needs.

The Need for a New Storage Solution

The Detroit Medical Center needed to update its storage solution for a variety of reasons, most notably the following:

- To improve patient care. Going to the PACS system will give medical professionals instant access to vital patient data such as X-rays and MRIs. Because medical images are more quickly available than previously, patients can begin to receive the proper care more quickly.
- To increase storage. Data was growing exponentially, not only because of the PACS system, but because of increasing data on the CIS system as well. The Detroit Medical Center would run out of storage space unless it moved to a new solution.
- To better manage storage and associated costs. Setting up and maintaining storage can be an expensive proposition. The Detroit Medical Center needed to significantly expand its storage without adding any staff members.
- To improve performance. Because graphical data such as X-rays and MRIs are very large files, the center needed its storage to offer high-speed access to data; otherwise, medical professionals would spend significant amounts of time, waiting for the records to appear onscreen or to be printed.

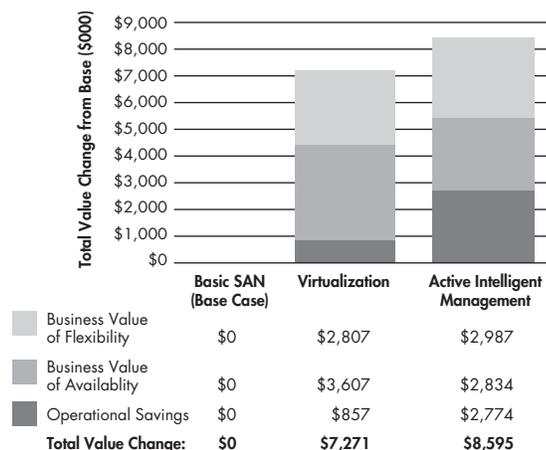
Detroit Medical Center Chooses HP EVAs

The Detroit Medical Center already had existing HP StorageWorks Enterprise Modular Arrays (EMAs). The center found its existing HP storage solution to be reliable and trouble-free, and was looking to supplement them. So it was decided early on to go with an HP storage solution, rather than one from another vendor.

The choice came down to adding Enterprise Virtual Arrays (EVAs), or staying with EMAs only. In order to demonstrate the value of the EVAs, the Hewlett-Packard sales team made use of the Business Value Model. This sales tool projected the benefits of moving to the new storage solution in terms of both IT benefits and business benefits.

Detroit Medical Center decided it would go with the virtual storage solution, because the EVAs offer greater expandability and flexibility, faster access to data, simple management, and more storage space. It would allow storage to be added without having to add extra staff, and it would let medical professionals get quicker access to patient data such as X-rays and MRIs.

Fig 1. Value of HP StorageWorks Solution for Detroit Medical



The value metrics represented here were generated using HP's NSS Business Value Model, developed by ITCentrix. This modeling tool combines value measurement software, industry benchmark data, and specific HP product information to demonstrate the business value contribution of a change in storage infrastructure.

Platform: Unix

Workload: Industry Unix Mix

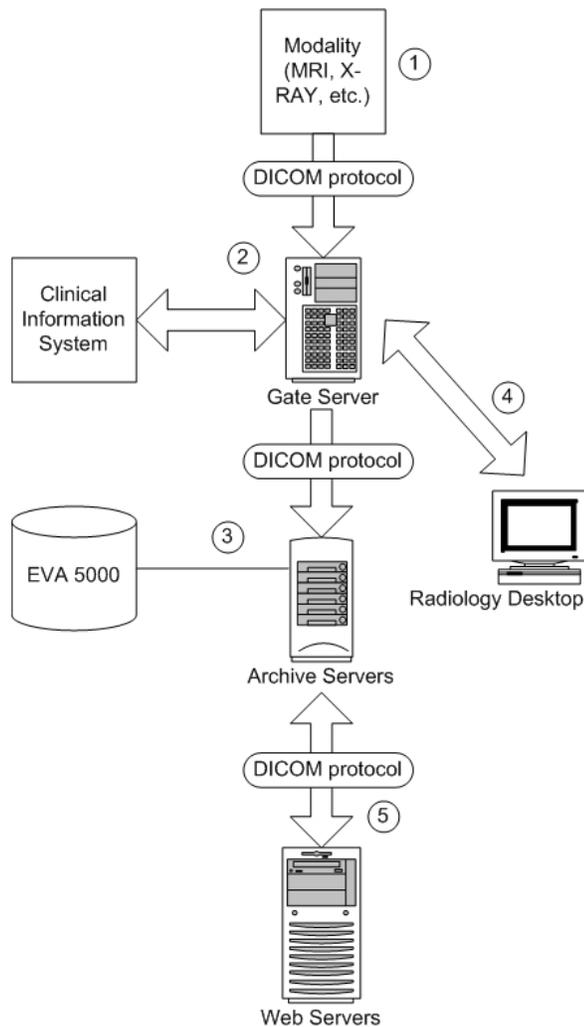
Depreciation Period: 5 Year

The greater availability of storage, medical images, and applications provided by the EVAs boosted productivity and leaves the Detroit Medical Center well-positioned to handle future growth and additional medical applications.

An Inside Look at the Hewlett-Packard Solution

HP StorageWorks EVAs form the core of the Detroit Medical Center's Picture Archiving and Communications System (PACS), which uses filmless records for patient image data such as X-rays, MRIs, and CAT-SCANS. The following figure shows how the system works.

Fig. 2 How HP EVAs Work with the PACS System at Detroit Medical Center



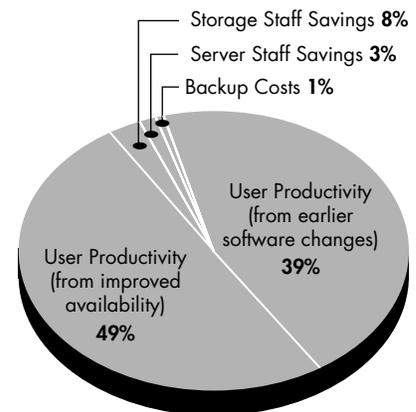
HP EVAs form the core of Detroit Medical Center's Picture Archiving and Communications System (PACS). In Step 1, an image such as an MRI or X-Ray is generated as a digital image, rather than as film. The digital image is sent via the DICOM communications protocol to the Gate Server (Step 2), which receives the image, manipulates it, notifies the Clinical Information System (CIS) of the image's existence and gets an ID number from CIS so that the image can be stored and accessed. From there, the image is sent to Archive Servers (Step 3), which store the image, using an Oracle database to map the image ID to an image location. The images are stored on HP EVAs, which offer easy installation and maintenance, high-capacity storage and flexible management. When an end user wants to view an image, he or she goes to an end-user viewing station (Step 4), such as at a radiology desktop machine, which allows diagnostic-grade viewing because of the digital image's high resolution. Web servers (Step 5) also allow users who are not at a dedicated desktop, to view images, although at a lower, non-diagnostic-grade resolution.

Detroit Medical Center's bottom line for the project: A cumulative five-year net benefit of \$6,694,613, an annual ROI of 489%, a payback period of four months, and a total five-year savings per user of \$669. Additionally, patient care will be improved because X-rays, MRIs, and similar data will be accessible over the network by any medical professional in the medical center.

The Bottom Line for the Detroit Medical Center

A detailed analysis of the implementation shows that the Detroit Medical Center will gain a cumulative five-year net benefit of \$6,694,613 from the project. It will yield an annual ROI of 489% and has a payback period of four months. The total five-year saving per user is \$669.

The benefit of \$6,694,613 is made up of increased user productivity due to the greater availability of network storage and medical applications being installed more quickly; and staff savings because extra technicians will not need to be hired in order to install and maintain the



Cumulative 5 Year Benefit = \$6,694,613

Fig 3. Business Analysis of the Solution

Project Summary						
Annual ROI		489%				
Total 5 Year Benefit/User		\$669				
Cumulative Five Year Net Benefit		\$6,694,613				
Payback Period (months)		4				

Project Costs (\$000)	Startup	Year 1	Year 2	Year 3	Year 4	Year 5
HP EVA Virtualization Hardware, Software & Implementation Services	\$524	\$258	\$209	\$201	\$196	\$192
Alternative Basic SAN Hardware, Software & Implementation Services	\$250	\$183	\$149	\$144	\$140	\$137
Net Project Cost	\$274	\$74	\$60	\$58	\$56	\$55

Benefits (\$000)	Year 1	Year 2	Year 3	Year 4	Year 5
Server Staff Savings	\$31	\$49	\$49	\$49	\$49
Storage Staff Savings	\$67	\$115	\$123	\$132	\$141
Backup Cost Savings	\$9	\$9	\$10	\$11	\$12
User Productivity (from improved availability)	\$491	\$779	\$779	\$779	\$779
User Productivity (from earlier software changes)	\$382	\$606	\$606	\$606	\$606
Total Benefits	\$979	\$1,559	\$1,568	\$1,578	\$1,587

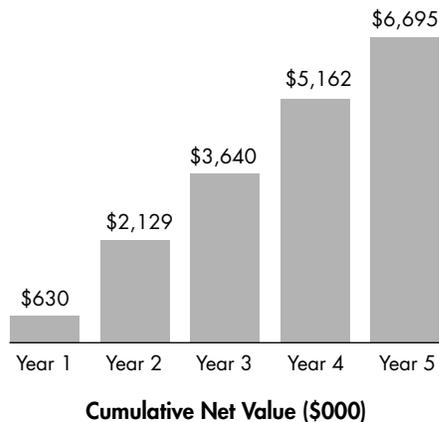
Financial Analysis (\$000)	Startup	Year 1	Year 2	Year 3	Year 4	Year 5
Net Value	(\$274)	\$904	\$1,499	\$1,511	\$1,522	\$1,533
Cumulative Value	(\$274)	\$630	\$2,129	\$3,640	\$5,162	\$6,695
Net Present Value	\$5,254					
Annual ROI	489%					
IRR	370%					
Payback Period (months)	4					

Key Performance Indicators (KPIs)	
Total 5 Year Benefit/User	\$669

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“Over and above the value that was provided by the IT solution, we are now able to gain an additional savings of \$1.8 million annually due to the digital access of PACS files instead of using film.”

— Joe Francis, Director of Application Services,
Detroit Medical Center



new storage. The greater availability of storage, medical images, and applications in particular boosted user productivity.

The Detroit Medical Center has been able to install and maintain 22 terabytes of additional storage using the EVAs without adding additional staff. Maintenance time has been cut for the new system. For example, setting up 18 RAID sets on the EVAs took only 10 minutes, while setting up the same number of RAID sets on EMAs takes approximately an hour. There will also be cost savings of \$1.8 million per year because expensive film will no longer be used; it is being replaced by digital images.

Perhaps more important is that the EVAs will help improve the quality of medical care at the center. Patients will no longer be required to obtain X-rays, MRIs and similar patient data from the center and then carry them or have them manually delivered from doctor to doctor. Medical professionals will have immediate access to those kinds of patient records, where previously they would have to wait to have the records delivered by hand.

The Detroit Medical Center Looks to the Future

The PACS system using HP EVAs is not yet fully in place throughout all of the Detroit Medical Center, but because of the success of the initial deployment, it is being expanded to all of the facilities. Additionally, the Detroit Medical Center is considering using HP EVAs for disaster recovery and backup as well.

“We’re pleased with the financial benefits of the Hewlett-Packard solution,” says Don Ragan, Detroit Medical Center’s Senior Vice President and CIO. “But the real bottom line is that it’s helping us improve the quality of care for our patients.”

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For a customized Business Value assessment, including financial analysis, contact your HP storage sales specialist or send an email to BVMModel@hp.com.

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