THOUGHTWARE WORLDWIDE

How do you measure success?

Measuring success

Central Queensland UNIVERSITY

Central Queensland University turns to HP for resilient educational infrastructure—*realizes a 319% ROI*

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Chancellor
Mr Rennie Fritschy

Revenues
AUD $240,000,000+

Staff (Academic, Research and General)
1,200

Students
25,000

ROI Study Highlights

- **ROI of 319% in six years**
- **IRR of 110% in six years**
- **NPV of AUD $2.5 Million (USD $1.9 Million)**
- **1500% Improvement in operational efficiency**

Strategic Benefits

- **Enhanced Business Continuity**
- **Increased Agility**
- **Reduced errors through automation**
- **Increased Storage Utilization**
- **Accelerated Information archive and retrieval**

Study Scope

- **Storage Architecture**
- **HP StorageWorks EVA SAN and backup management**
- **HP Reference Information Storage System (RISS)**
- **Business Continuity and Disaster Recovery**

Executive Summary

Central Queensland University (CQU) is an internationally networked university based in Rockhampton, Queensland. CQU has campuses across the east coast of Australia, operates international campuses in Sydney, Brisbane, Melbourne, Gold Coast and Fiji, and has offshore delivery sites in Hong Kong, Singapore and Shanghai.

CQU serves a student body of 24,000 students, located in 120 countries. The university offers a rich curriculum, both on-campus and by distance education. To serve its international audience, CQU has a history of providing innovation to enhance learning. It is the university's ability to integrate and use technology that has helped establish it as a leader in distance education.

By 1998, the combination of CQU's student body growth, increased governmental requirements, and its strategy to create a virtual education marketplace was placing increased demand on an aging IT infrastructure. CQU's administrative operations, such as its manually intensive enrollment process, were suffering as evidenced by an increased student attrition rate. Disk storage rates were growing at a rate of 50% annually, with continued growth anticipated as enrollment increased .

Increased data access speed, availability and reliability emerged as the crucial criteria for CQU's revitalized IT infrastructure. CQU also needed to maximize its use of physical space. They required a solution that did not increase the footprint of their data center or the size of their staff—they needed to work with what they had and optimize their limited resources .

CQU embarked on a thorough vendor review and selected HP to provide the solution that would help them achieve continuous business operations and the high availability and recovery services they needed to serve their global students. HP emerged as the partner of choice due to its overall experience as a solutions provider and the compelling business value they offered CQU?. In particular, CQU was impressed with HP's approach to building a flexible solution that would address their heterogeneous environment and allow for easy integration and growth.

The HP solution improved availability of critical applications, and increased storage utilization and availability. HP's SAN technology set the stage for storage and server consolidation, and offered the advanced functionality CQU was looking for, such as virtualization, which allowed dynamic changes in the configuration and operating environment, eliminating planned downtime.

CQU enhanced their data protection, archiving, and file retrieval while improving IT staff efficiency through centralized backup solutions. It provides the seamless integration the university needed to eliminate costly and time-consuming standalone backups. Another factor that contributed to CQU's selection was HP's pay-as-you-go model, which translated into a smaller upfront investment.
HP has helped CQU realize a new strategy with a resilient infrastructure that enables the continuous operations the university needs to support its growing environment. . Students have improved access to a sophisticated information management system that is in compliance with new higher standards in education. The infrastructure enables the university to serve its academic community around the globe on a 24x7 basis—with less equipment, less maintenance, and lower operational costs.

As a result of the HP solution, CQU has better, more immediate access to its resources and the ability to grow for the future. The results show a 319% ROI in six years and a 1500% improvement in operational efficiency.

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"...we thought HP had the best value for the money,... they exuded confidence and we really liked their live support"

— John Voss, Associate Director, ITD

Operational Challenges

- **PeopleSoft commitment**
- **Increased competition in Higher Education Industry**
- **Increased requirements from government and student body for longer data retention (Information Standards 18, 31)**
- **Manually-intensive, paper-based enrolment processes causing increased student attrition**
- **Disk Storage requirements growing at ~50% per year**
- **Critical need for improved data access speed, reliability and availability as user requirements changed; paramount to CQU sustaining a leadership role in higher education**

Reliable Network Infrastructure—designing services resiliency

CQU needed to improve the data availability, access speeds and overall reliability of its network. They required a storage infrastructure that was robust enough to support CQU's global IT operations yet flexible enough to accommodate multi-vendor systems. There was also a call for improved server management in order to avoid the need for additional IT staff. While the student body, faculty and administration all needed the enhanced services an upgraded infrastructure could deliver, the improvements had to be space- and cost-effective for the university.

CQU conducted a thorough investigation of IT vendors and selected HP for the flexibility, stability and ease of management its solutions delivered, as well as its long-range roadmap for storage and server systems that would help CQU plan for the future and seamlessly implement change. CQU also found HP's pay-as-you-go model appealing as it required a smaller upfront investment than other solutions, offering immediate economic value for CQU.

CQU Business Challenges — growing need for change

In evolving its operations, CQU was committed to a PeopleSoft Student Administration solution, which was put in place in 1999 and was a key driver in the need for a more dynamic IT infrastructure. With a growing student body, global reach, and exponentially growing document storage and retention needs, CQU's disk storage requirements were growing at a rapid rate of approximately 50% per year. As CQU's demand for storage increased, so did the demands for functionality and up-time.

During this period, CQU was spending a significant amount of time and money to maintain its 15 functionally specific servers. It was estimated that scaling with this model would require a 30 to 40% increase in staff and over 100% increase in real estate, neither of which were feasible. Because each of these systems had direct attached storage (DAS), capacity planning was a critical requirement. System backups were exceeding the backup window, and this window was narrowing as CQU delivered services to additional countries in different time zones. With no built-in redundancy, CQU's ability to meet service level agreements (SLAs) and maintain business continuity was reaching unacceptable levels. At the same time, student dissatisfaction and attrition rates were rising.

Finding a Better Way — *using SAN technology to build the base*

Continuity and Agility

CQU's previous multi-vendor, device-driven infrastructure did not provide the necessary capacity for growth. User complaints included frustrations with the manually intensive processes, burdensome maintenance windows and a general lack of reliability and stability. CQU continues to maintain multiple operating systems and hardware platforms, including several Sun Solaris servers for educational purposes. HP StorageWorks EVA8000 supports this multi-vendor, multi-platform environment, while providing centralized management and increasing storage efficiency. The SAN provides increased availability of critical applications. Now, all mission-critical applications such as payroll, PeopleSoft solutions, Oracle databases and other critical teaching and research systems reside on the SAN. The SAN also provides increased storage utilization and increased IT staff efficiency. CQU was able to consolidate 70% of its servers onto the SAN, thus avoiding additional costs that would come with the need for more data center space.

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Prior to the HP SAN solution, responding to a client request to add storage to a server or to recover from a failed node within a cluster was a difficult task and required server downtime and staff overtime. The virtualization feature of the HP SAN provides CQU with storage on demand, which allows CQU to dynamically provision storage from a central management console. With Virtualization, capacity allocation is automatic, anyone can see how much space is being used, and system availability has increased 3500%

Automation

As CQU saw a substantial increase in demand for storage, its need to manage the physical storage resources increased as well. HP's SAN solution provides CQU with intelligent monitoring features, while HP OpenView Storage Operations Manager proactively notifies administrators of potential failures or disasters and documents (via error logs) all storage activity. The IT staff can now focus on providing storage services for applications and users, while the Storage Operations Manager monitors and documents all storage activity. Automation of key processes, storage provisioning, and server management has eliminated the labor intensive functions of the previous system. Elimination of these functions also helps reduce IT operational risk by reducing and eliminating the opportunity for human error.

HP's SAN solution provides the foundation for CQU's data center consolidation program and lays the groundwork for moving towards the HP StorageWorks Reference Information Storage System (RISS). RISS is a component of HP's Lifecycle Management solution and roadmap, which is designed to help organizations capture, manage, retain and deliver large volumes of structured and unstructured data

"HP has proven to us that we can do longer-range IT planning based on the HP roadmap for storage and server systems"

— Adrian Yarrow, Manager System Administrator Team

Building on the Base—*enterprise backup assures reliability*

CQU has improved business continuity and reliability by utilizing HP's centrally managed backup solution, enabling a quick recovery from system failure or other unforeseen interruptions. Building on the SAN, CQU implemented HP's StorageWorks Virtual Library System (VLS) as its enterprise backup solution (EBS). The VLS solution integrated seamlessly into CQU's existing environment, with no need for network changes.

With the HP VLS solution, CQU has centralized its backup processes to increase efficiency and tape management. HP StorageWorks VLS provides the faster and more secure backup solution needed to accommodate CQU's shrinking backup window. Emulation of popular system libraries has also reduced the learning curve and training requirements needed to operate effectively. With VLS, no major configuration changes were needed to the backup infrastructure. Disks are swapped without downtime (hot swappable array drives) and backup is faster (550 MBPS). As part of its disaster recovery strategy, simultaneous emulation of multiple tape drives allows more backup jobs to run in parallel, further reducing backup times. With HP's VLS, CQU has achieved acceptable SLAs on backups and restores for their business continuity strategies.

Tasking the Next Step—*life cycle solutions for managing growth*

To manage continued growth, CQU purchased the HP StorageWorks Reference Information Storage System (RISS), an active-archiving platform that allows organizations to manage the growth in digital information associated with applications such as e-mail, and allows them to search and retrieve in seconds. CQU plans to employ this technology to integrate future functionality such as video and audio archiving, enabling the university to provide a more complete storage solution to its distance-learning students.

Selection Criteria

EVA8000-based SAN

- **Proven Platform**
- **Advanced Functionality**
- **Flexibility**
- **Easy to manage**

VLS Virtual Library System

- **Industry Experience**
- **Seamless Integration**
- **Transparency**
- **Standards Based**
- **Management Software**

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"Integrating future functionality such as video and audio archiving will enable us to provide a more complete storage solution for our students"

— Adrian Yarrow, Manager System Administrator Team

Technology Benefits

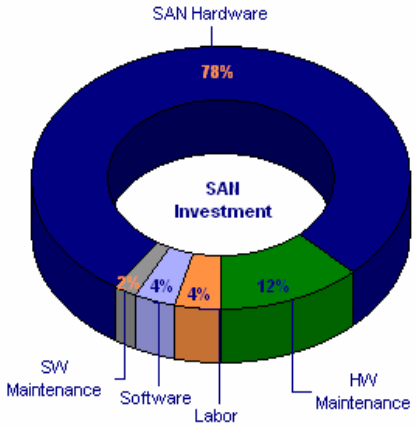
- **30% headcount avoidance for IT staff**
- **75% reduction in Staff Overtime**
- **AUD $1.1MM (USD $0.86MM) cost avoidance on datacenter space and environmentals**
- **70% of Storage has been moved to the SAN**

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

Thoughtware Worldwide conducted an extensive analysis of the investment and resulting benefits of CQU's implementation of the HP solution. Findings revealed that the investment was comprised mainly of hardware, which illustrates the ease of implementation of the HP solution. CQU was able to integrate the solution seamlessly into its existing multi-vendor infrastructure, providing benefits in both cost and time savings.

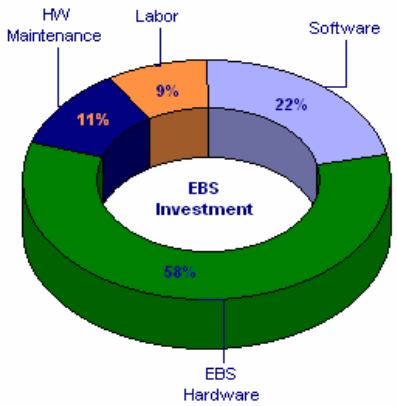
Quantifying the SAN Investment

- Hardware comprised of HP StorageWorks EVA, a 1.7TB RISS system and other supporting hardware at an investment of AUD $1.4MM (USD $ 1.1 MM)
- Labor costs included 50% of two FTE's time for six months during initial implementation, plus 25% of one FTE for subsequent modifications
- Software licenses and software maintenance were purchased on a three-year basis



Quantifying the Enterprise Backup Solution (EBS) Investment

- Hardware costs of AUD $0.38MM (USD $ 0.29MM) included HP StorageWorks VLS's, mini tape library systems plus other supporting hardware
- Labor costs were comprised of 50% of two FTE's time for six months during initial implementation, plus 25% of one FTE for subsequent modifications
- Software licenses for HP OpenView Data Protector™ and software maintenance provided additional savings over the previous solution



CQU required minimal headcount resources to implement the solutions. This both reduced CQU's upfront costs and provided flexibility and lower costs going forward. The HP solution allows CQU to better manage its human resources and optimize its utilization. By comparison, the previous system was very labor intensive, requiring CQUs IT resources to perform repetitive, non-value added tasks.

Integrated Solutions Deliver Exponential Value

The combination of HP StorageWorks EVA8000 and VLS virtual tape library provides CQU with system scalability without increasing headcount, maximizing storage capacity while minimizing system footprint, and offering faster, more reliable backups. CQU also consolidated 70% of its servers onto the SAN, avoiding significant costs associated with the need for additional data center space.

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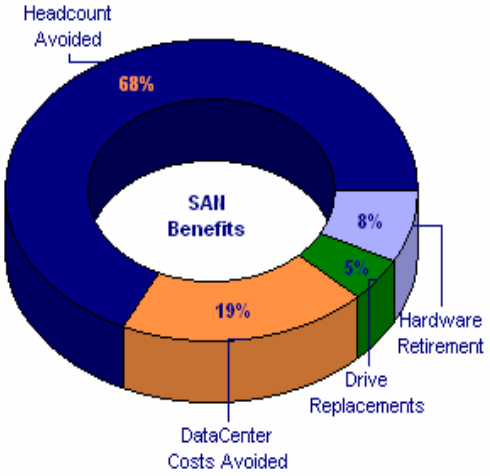
"There has been a significant improvement in our backup window, we're now going to disk instead of tape"
— Adrian Yarrow, Manager System Administrator Team

Business Benefits

- **Systems are available to students 24/7**
- **Single file restores are done in under five minutes, this represents a 1500% improvement in restore time**
- **Students' and faculty's increasing demand for storage are met**
- **First-class Business Continuity and Disaster Recovery Plans are achieved**
- **Mitigation of risks pertaining to inappropriate use of email and other University resources (RISS)**

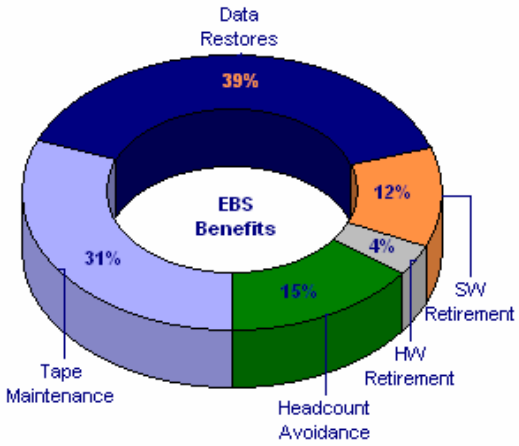
Benefits Achieved from SAN Investment

- 68% of savings resulted from the centralized HP StorageWorks EVA storage solution as CQU avoided an increase in labor by ~30% (19.5 FTEs)
- CQU reduced the physical footprint of the system and avoided additional data center costs by centralizing its storage to the EVA (e.g., fully loaded racks cost AUD $15,000 per year)
- The dynamic provisioning of storage eliminates the non-value-added tasks of replacing/upgrading DAS drives



Benefits Achieved from EBS Investment

- 92% reduction in time required for data restores accounts for 38% of overall savings
- 93% improvement in tape maintenance led to 31% of overall savings
- Headcount avoidance of six FTEs represented 15% of the overall benefits (one FTE per supported campus dedicating 25% of their time to daily backup functions)
- HP OpenView Data Protector replaced CQU's previous software solution, equaling 12% of the overall benefit



Centralized, more manageable and automated processes resulted in significant headcount avoidance, replacing the lengthy manual tasks of the past. The functionality of the EVA8000 and VLS virtual tape library allow for a wider range of support and manageability from a single console, resulting in a faster, more efficient and reliable solution for CQU.

Summary of CQU's Return on Investment (ROI)

HP's business continuity and availability solution combined with its multi-vendor capabilities that allowed seamless integration of HP hardware into their existing environment provided an ROI of 319%. As illustrated in the charts below, the benefits of the SAN and EBS significantly exceeded costs, with both investments reaching breakeven in year one.

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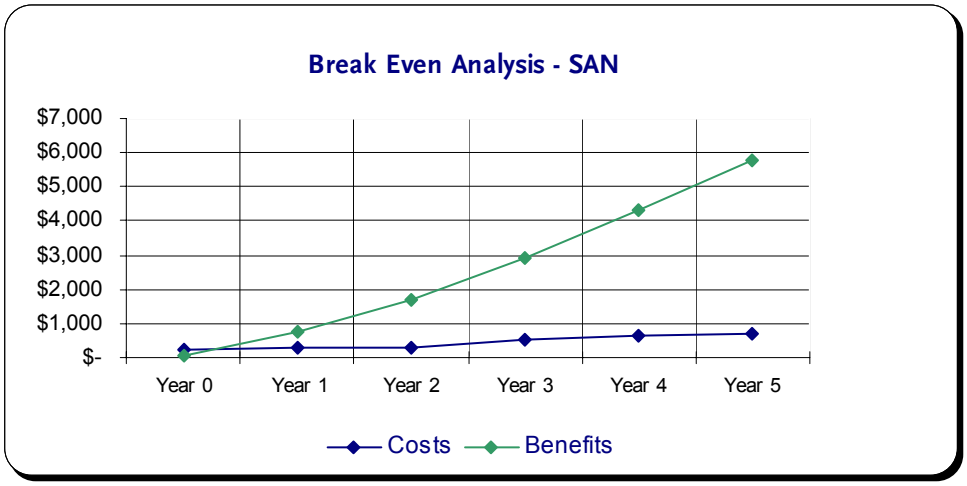
HP StorageWorks EVA8000

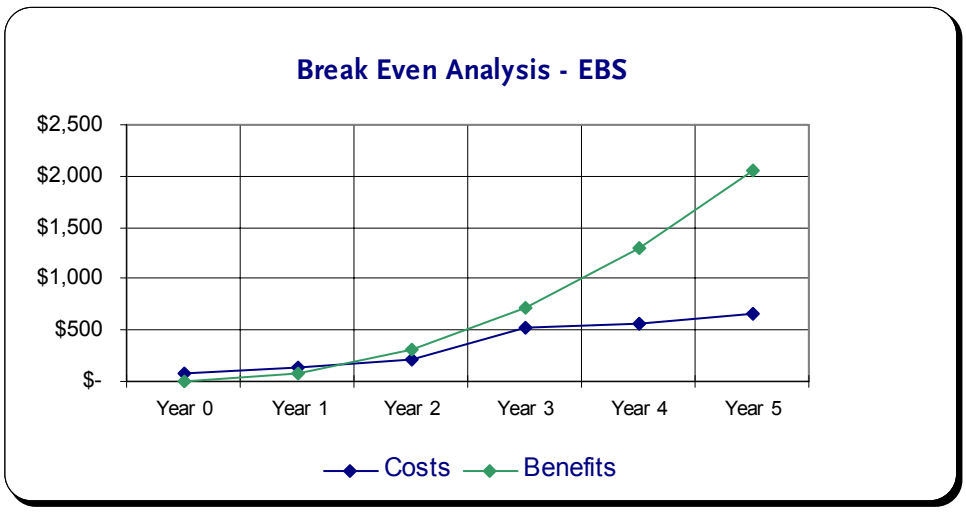
CQU's investment of AUD $1.8MM (USD $1.4 MM) was quickly recovered by the AUD $1.1MM (USD $ 0.86MM) data center costs avoided and the AUD $3.9MM



(USD $3.0 MM) headcount avoided by implementing the HP SAN.

HP StorageWorks VLS virtual tape library

The AUD $0.65MM (USD $0.5MM) HP investment, which provides an Enterprise Backup Solution (EBS), was recovered by immediate operational cost avoidance of AUD $1.4MM (USD $1.1MM), software retirement of AUD $0.24MM (USD $0.18MM) and six FTE headcount avoidance of AUD $0.31MM (USD $0.24MM).



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

Operational Benefits

- **Labor costs were 10% of the overall investment; this is relatively low for an IT implementation**
- **Integrates easily into existing environment to provide immediate value**
- **HP EVA and SAN use most of the drives previously purchased for the DAS solution, offering investment protection for CQU**
- **CQU is now positioned to achieve Information Lifecycle Management (ILM)**

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Operational Benefits

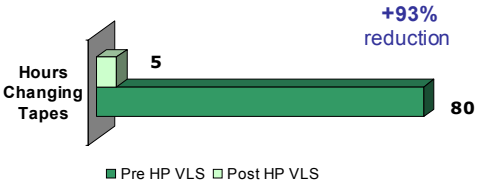
- **Faster, centrally managed, industry standard backups**
- **Storage provisioning is dynamically assigned**
- **Backup tape management is handled by the HP VLS, this contributes 25% labor avoidance for six FTE backup staff**
- **Dynamic, flexible storage solutions independent of operating system or data formatting**

Operational Benefits

Beyond the financial returns, the Thoughtware Worldwide study uncovered numerous strategic, operational and technological benefits that are transforming the way CQU provides educational services, including:

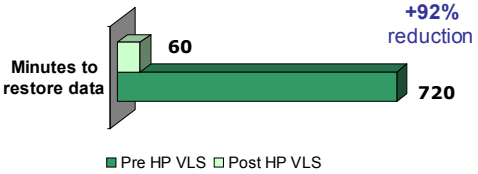
EBS Operational Efficiency

93% reduction in time spent changing tapes and performing tape maintenance—With HP StorageWorks VLS, the technical staff has reduced time spent from 20 hours per week to less than five hours per month.



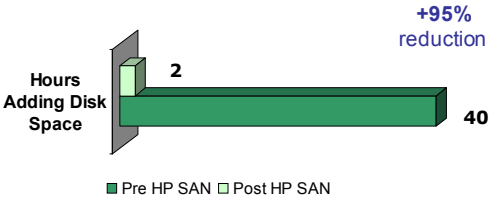
Improved Data Availability

92% reduction in time spent performing data restores—CQU has gone from an average of one hour to less than five minutes per restore with the HP StorageWorks VLS. This provides higher availability while minimizing the need for human resources.



SAN Operational Efficiency

95% reduction in time required to add disk space—With the implementation of HP StorageWorks EVA, CQU has gone from a week long process (including server downtime) to two one-hour reboots.



Faster Recovery

97% reduction in system recovery time—Using the HP StorageWorks EVA, failed nodes are now recovered in fewer than 30 minutes, as compared to the previous 18 hour solution.

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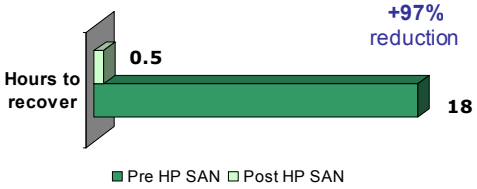

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About the Value Measurement Series

This study is one of a series of investigations into the business value companies have derived from their investment in HP Adaptive Enterprise solutions. It is intended to serve business executives and managers who are evaluating HP Solutions to improve the way they operate their business leveraging technology.

This case study was commissioned by HP, and is based on original research and analysis conducted by Thoughtware Worldwide, LLC., an independent research and consulting firm. Thoughtware Worldwide's research included on-site interviews with members of Central Queensland University's management team and reviews of company financial and planning documents.

For more information about this study, please visit www.ThoughtwareWorldwide.com or contact your local HP office

hp invent

CQU Has the Opportunity to Harvest Additional Value

During the course of the study the CQU team identified a number of additional areas where it could maximize the benefits realized from its HP investment.

- Fully implementing HP RISS will enable CQU to better manage, archive and retrieve all of its application information including unstructured data such as e-mail and video transcripts. HP RISS will also provide CQU with the ability to search and retrieve digital information within seconds, reducing costs associated with complying with regulatory requirements placed on higher education organizations by the Information Standards Legislation while speeding data archive and retrieval.
- Using HP StorageWorks Continuous Access EVA (to provide immediate replication of all data to a hot site), will help CQU achieve its business continuity plan in a more cost effective manner.
- CQU's investment in HP solutions and HP's support of the Oracle Grid Architecture will provide CQU with the opportunity to harvest additional value from this scaling technology.

Summary

In implementing a business continuity and availability solution from HP to grow its on-demand educational infrastructure, CQU can now deliver their programs and provide the high availability and continuous administrative support demanded by their global 24x7 audience. Students have better access to the services they need—from enrollment procedures to course delivery to receipt of final grades—and administrative processes such as payroll have been improved.