

success story



steadying turbulent times
for Continental Airlines –
hp enterprise storage,
superdome and services
help provide IT projects
with a pay-back period
of less than a year



For most of us, taking a plane trip involves finding the best fare, dealing with security, choosing a comfortable seat and hoping someone will be there to pick us up at our final destination. For the airlines, however, a three-hour jaunt from Houston to New York involves much more work: Cost-per-ticket projections, scheduling comparisons, flight planning, maintenance reviews and fuel allocation analyses – just to name a few of the multitude of operations.

Without the benefit of the detailed information provided by such functions, an airline is at a distinct disadvantage. In the currently super-charged aviation industry environment, Continental Airlines decided to accelerate the return on investment for its information technology projects by performing a strategic IT consolidation and infrastructure re-design. It turned to a trusted partner, Hewlett-Packard Company, to provide a proven mission- and business-critical solution.

need to improve return on investment (ROI)

In 2001, Continental started to consider IT consolidation as a means of removing the barrier of physical data center space. However, after the devastating events of September 11, 2001, the airline faced some severe financial issues as passenger-per-flight rates plummeted across the industry. Continental management reacted swiftly by formulating a new philosophy mandating that all approved projects would require a pay-back period of less than one year.

Dan Morales, Managing Director of Financial Systems for Continental Airlines, explained, "The emphasis on a quick ROI changed our philosophy on which systems to consolidate. We repositioned our IT consolidation efforts toward a corporate-wide, enterprise solution that we could use to help lower the ROI period on five applications currently under development."

IT consolidation and a SAN for optimal ROI

Morales' experts sat down with HP pre-sales systems engineers and EDS, an outsource partner in Continental's mid-tier space providing monitoring, backup, recovery and UNIX administration for many systems, to design the infrastructure.

The resulting architecture, deployed in January 2002, comprises a storage area network (SAN) connected to two HP Superdomes; each with 5 partitions with 28 CPUs in one Superdome and 24 CPUs in the other. One serves as a production server, the other as a passive fail-over and development server.

Morales noted, "Many of Continental existing business critical applications were already running in HP-UX. The Superdome provided Continental with an environment that we were familiar with as well as a flexible environment for growth with the use of partitioning. We have a Superdome in each building, about one and a half blocks apart, connected via four MacData Directors to the SAN."

HP MC/Serviceguard is configured between the Superdomes on all but one partition, providing robust fail-over capability. Most importantly, in each building there is an HP Surestore Disk Array xp512 housing production data, and an HP Surestore Virtual Array 7400 for development data, connected to the SAN.

"Our data is critical and the beauty of the Superdome, with its ability to configure multiple partitions, is that it acts as a discrete server within a server and permits each business to remain in control of setting its own operational criteria. All of the different application data is backed up by an HP Surestore Tape Library 20/700 controlled by HP OpenView OmniBack II software.

industry

passenger airline

challenges

- **running out of space in the data center**
- **all approved IT projects require an ROI of less than one year**

solution

- **deploy a SAN with a pair of Superdomes and xp512s as a corporate-wide, enterprise solution to develop projects as well as run production applications and help lower their ROI**

results

- **a one-time cost savings of more than a couple of million dollars and a recurring savings of more than a million dollars per annum**
- **a payback period of less than one year with an ROI of greater than 100%**
- **a 30-50% application performance increase over the legacy environments**
- **expansion of the consolidation since the initial implementation**

We also have HP Surestore Business Copy xp to mirror some applications' production data and to make a third copy from which to perform the backup. We let the businesses determine their data backup requirements."

The consolidation involved several Oracle-based application environments that had previously resided on a mix of HP and Sun servers: The Customer Information System – an in-house developed, comprehensive customer relationship management solution. While it is still in development, the user preference information entered at www.continental.com is stored in its database and is already in production. An Enterprise Time and Attendance application – in production at three of Continental's hubs and is rolling out to the remaining locations during this year. Sale Insight – a sales and revenue tracking application, similar to a datamart, and is used by the sales force and marketing department for decision support. RASCAL – Continental's revenue accounting development project is in production from a sales perspective, but still has a couple more years of development before completion. Finally, the consolidation included the E-Accounting system, which feeds data into RASCAL and closes out ticket agents' stations, much as a cashier's drawer might be closed at the end of the day in a retail situation.

Morales commented, "The large number of I/O channels on the Superdome has been helpful because each one of the consolidated applications has a high user load. The Customer Information database is accessed by people hitting their preference information at our web site, so the user load swings accordingly. The Time and Attendance application is utilized by every employee in our three major hubs, and that's around 25,000 people. RASCAL typically has 300 users and Sales Insight has around 400 users."

To maintain the high availability for the production environment, Morales contracted with HP Services for Critical Systems Support on the production Superdome and for Foundation Support on the failover/development Superdome. He noted, "Both McData and HP support engineers were working with us when we implemented the Superdome. It went smoothly and I have nothing but good things to say about both companies. During the transition to the Superdome, we have contracted with HP Services to have a support engineer on site 3 days per week for a year to perform all of the systems management aspects. We will continue to have this HP engineer on site until we have set a long-term strategy."

massive cost savings

Morales found that most of the cost savings being realized were due to a reduction in maintenance fees by removing the older systems, as well as reduced manageability fees from EDS because it no longer has to maintain some of the servers in the EDS data center. Additionally, some software licenses associated with several of the legacy servers could be cut. Morales commented, "The consolidation cost savings were large: We had a one-time cost saving of more than a couple of million dollars and a recurring savings of over a million dollars per year. The ROI was based upon the whole solution including cost avoidance of future software costs that would have occurred if each development would occur independently.

Continental has had no issues with the infrastructure performance versus its scalability, "Actually the applications coming onto the Superdome and SAN saw a 30-50 percent performance increase over the legacy hardware, which was better than we had anticipated," said Morales. "We've actually started expanding the scope of the consolidation since the initial implementation. The maintenance request

solution highlights

- **storage area network (SAN)**
- **2 hp Surestore Disk Array xp512s**
- **hp Surestore Disk Array Virtual Array 7400**
- **2 32-way hp Superdomes, with the production environment running the Customer Information System, Enterprise Time and Attendance application, Sales Insight, RASCAL – Continental's revenue accounting development project and the E-Accounting system**
- **4 MacData FC64 Directors**
- **hp MC/Serviceguard**
- **hp Surestore Tape Library 20/700**
- **hp OpenView OmniBack II software**
- **hp Services Critical Systems Support and Foundation Support**
- **dedicated hp Account Support Services on site full-time to perform all of the systems management aspects until a long-term strategy is set**
- **hp Surestore Business Copy xp**

and overhaul tracking system from Continental Express has just been added to the development Superdome with no impact upon the existing applications."

Moving forward, Morales' team is discovering additional benefits that hadn't been previously considered. Morales explained, "We're working on the details right now, but with our SAN and high availability storage devices in place, we're looking at tying in a Network Attached Storage (NAS) "head" (server) to one of the SureStore xp512s, which will enable us to remove quite a few file servers from the infrastructure. This, in turn, removes further management fees and software license costs. We have over 600 file servers, so if we can remove 25-50 it helps reduce our operational costs, plus the NAS will provide faster and more reliable storage."

He concluded, "Our SAN and Superdome environment has put us in a powerful position to reduce the ROI timeline on many critical projects that will help keep Continental flying high in a tough marketplace."

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customer at a glance:



company: Continental Airlines

headquarters: Houston, Texas

founded: 1934

employees: 51,500

2001 revenues: \$9 billion

telephone: (713) 324-5000

URL: www.continental.com

main products: Continental Airlines is the fifth largest airline in the U.S., offering more than 2,200 departures daily to 135 domestic and 89 international destinations. Continental Airlines operates a fleet of 364 jets and its Continental Express flies 83 turboprops and 67 regional jets. Operating major hubs in Newark, Houston and Cleveland, Continental has extensive service throughout the Americas, and to Europe and Asia. Additionally, the company has a strategic global alliance with Northwest Airlines.



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