

BUSINESS CONTINUITY AND DISASTER RECOVERY ACROSS GOVERNMENT BOUNDARIES

EXECUTIVE SUMMARY

The State of Utah's Department of Technology Services (DTS), Division of Enterprise Technology (DET), working in collaboration with the Utah Education Network (UEN), embarked on two major projects three years ago to increase data availability and to provide backup Internet access for its customers in the event of a disaster. Many DTS customers at the time did not have comprehensive business continuity plans and were uncertain how to implement what plans they had with limited resources and technical support. In addition to the challenges faced by State agencies, cities, counties, school districts and even universities were faced with a growing reliance on critical information systems that did not have such plans in place. The growth in electronic data from 1990 to 2005 was phenomenal and meant that paper-based systems were no longer an option for many of these entities, especially when responding to an emergency. By collaborating with these local entities, the State of Utah was able to produce a much greater benefit for its citizens with no increase in cost to state government. Today, a number of city and county governments host their critical backups and mirrored applications in the State's data center.

The first project involved establishing alternate Internet access to DET's disaster recovery facility, located in Richfield, Utah. This project's primary goal was to provide an alternate Internet path from the State's primary ISPs, located in Salt Lake City, should the primary path fail. Both DET and UEN recognized the danger of having a single point of failure for Internet access, since Salt Lake sits on a major earthquake fault line. DET and UEN both recognize that Internet access would be critical to life saving services in the event of a natural disaster. DET, working in collaboration with UEN, was able to make this a reality, as UEN contracted with Broadwing Communications to bring Internet services through Nevada into DET's Richfield disaster recovery facility.

The second project involved increasing the network bandwidth capabilities between DET's Salt Lake and Richfield data centers. At the beginning of this project, State data was backed up and stored on tape at DET's Richfield facility via redundant and highly reliable microwave paths. In order to implement new backup technology, such as data replication, that would significantly reduce the recovery point objective of these agency online business services, DET would need to increase network capacity to meet this requirement. Again, DET, working in collaboration and cooperation with UEN, was able to obtain a fibre path between UEN's Eccles Broadcast Center and the Richfield data center.

These two projects were completed in January 2006, and many state and local agencies have already begun taking advantage of the ability to increase data availability and Internet accessibility for their customers.

Richfield Data Center



DESCRIPTION OF PROJECT

Descriptions of the Business Problem

The State of Utah Department of Technology Services (DTS), Division of Enterprise Technology (DET), maintains two data centers for high availability and disaster recover of critical business systems for State agencies. The primary facility is located in Salt Lake City, while the alternate facility is located approximately 180 miles to the south, in Richfield, Utah. Both facilities have been built to earthquake standards.

The University of Utah maintains the Utah Education Network (UEN) in Salt Lake City. The State receives its Internet service from UEN. UEN maintained vendor contracts with two separate Internet Service Providers (ISPs) for redundancy, failover, and high availability. While UEN maintains multiple ISP connections into its facility, it remained a single point of failure because these ISPs all enter the State from UEN's Eccles Broadcast Center. Should a disaster occur that takes out that facility, internet access would be lost.

Salt Lake City sits along the Wasatch Fault Line. Seismologists estimate that there is an 8.5% chance that an earthquake of a 7.0 magnitude could occur in and around the Salt Lake valley anytime within the next fifty years.

The State of Utah has invested significantly in providing online government services for its citizens. With over 660 online, interactive services, the business of Utah state government is increasingly dependent on the reliability of its data infrastructure and network connections. A growing number of business services, such as On the Spot, which enables real time issuance of vehicle stickers, the online public safety inspection system, and the hunting and fishing business application are used by several thousand business outlets throughout the state, many of which are open 24 hours a day, seven days a week. If an earthquake were to occur in the Salt Lake area, the probability is high that Internet services, along with many other vital services, would be severed.

DET recognized that since the majority of these services are Web based, data restoration to IT equipment in Richfield would be insufficient to provide access to critical business systems without the Internet.

Purpose and Objectives

The goals of this project are simply stated:

- Improve the reliability of network and database services to state agencies.
- Ensure access by citizens and businesses to critical state services at ALL times, including during emergencies.
- Facilitate the shared use of the State's alternate data center.

Solution Description

The State of Utah built an alternate data center in 1998. Although this data center was equipped with redundant power, mainframe platforms, and many other traditional systems, it was not capable of meeting the more current needs of most state agencies with systems oriented increasingly toward the delivery of online business and citizen services. These new requirements included real-time mirroring of server farms, increased bandwidth, and improved database reliability.

Three years ago, DET working in cooperation and collaboration with UEN, embarked on two major projects to provide increased Internet access and data availability of its critical online services. The first major project was to provide an alternate Internet connection into Richfield that could operate independently from Salt Lake City. The second major project was to increase the network bandwidth between Salt Lake City and Richfield, from an OC-3 microwave connection to an OC-48 Fibre link.

Implementation of Internet service in Richfield would provide Internet access to either location in the event of a disaster through the BGP routing protocol, which establishes rules on network devices that allows the system to reroute traffic to an alternate path when a loss of network connectivity is detected. In essence, through the BGP routing protocol, if the Salt Lake Internet connection were to go down, access to the Internet would be routed to Richfield. Once services were restored, the Internet traffic would automatically fallback to Salt Lake as the primary Internet access point.

Installing an OC-48 would give DTS the capability to deploy backup and recovery strategies needed to support asynchronous or synchronous data replication between these two facilities for disaster recovery. In addition, installing this Fibre connection between Salt Lake City and Richfield would provide the State with alternate communication paths in the event of a manmade or natural disaster, thus increasing the reliability and availability of the network.

ACS Contracts to Use Richfield Data Center

In 2006, the University of Utah, contracted to use the alternative data center to complete their business continuity plans

- 24 x 7 availability of all facility resources (power, A/C, security, etc.)
- ACS will be made aware of ALL facility maintenance activities well in advance of their occurrence.
- Environmental conditions will remain within specifications for ACS hardware (we will monitor remotely).
- ACS will be provided 5 access cards – all staff must have background checks before access is granted.
- Printers, sealers, and all printing supplies will be securely stored on-site at the Richfield site.
- Office space will be available, as need arises, for limited numbers of University staff to work during an emergency.
- We will employ an “emergency center in a box” approach for system access.

Length of Time in Operation

These two projects have been completed for over a year and a half and provide a core infrastructure that is now being relied upon by dozens of state and local agencies.

SIGNIFICANCE TO IMPROVED GOVERNMENT OPERATION

Working with UEN, DET was able to install a Fibre link between the University’s Snow College South campus and the Richfield disaster recovery facility while UEN worked with a carrier from California to bring Internet access through Nevada, into their Snow College campus. Through the BGP routing protocol, DET set up rules on the State’s network devices that would allow the system to detect a loss of Internet access in Salt Lake City and then route that traffic through Richfield so that Internet access could still be maintained. The system was also designed so that it would fall back to Salt Lake City as the primary Internet access point once Internet access in Salt Lake City was restored.

The significance of increasing the bandwidth between Salt Lake City and Richfield provides the State with two important capabilities. First, it enables DTS to deploy backup and recovery strategies needed to support asynchronous or synchronous data replication between these two facilities for disaster recovery. This is important to lower the recovery point objective (RPO) time so that, in the event of a disaster, services can be rebuilt with a smaller time window of lost data. Secondly, DET currently maintains two OC-3 diverse microwave paths as its primary means of transport between the State Office Building and Richfield. While this bandwidth met previous needs, utilization is constantly rising and prohibited implementation of the newer technologies mentioned above. Adding an OC-48 network pipe between Salt Lake City and Richfield not only allows implementation of these newer technologies, but it also allows movement of the State's primary means of transport from microwave to Fibre, with use of microwave as a backup disaster recovery solution. This provides redundant, diverse paths between the northern and southern part of the State. Reliability and availability increase significantly because of this move.

Reliability and Timeliness

By providing a network and data center infrastructure, that is both fast and reliable, DTS has enabled agencies to confidently proceed with the implementation of many new projects that improve the efficiency of government operations and add value to citizens and businesses. Several of those are described in this document. Agencies have been able to focus more resources on developing these services because they now confide in a more unified business continuity strategy that is supported by the infrastructure put in place through this initiative.

PUBLIC VALUE OF THE PROJECT

With the advent of a true alternate ISP at the State's disaster recovery facility, and with the increase in bandwidth, in the past eighteen months there has been an increased interest in the use of the Richfield data center. A year ago, the University of Utah Health Sciences Center contracted with DET for 20 rack spaces in Richfield. The Department of Public Safety has completed a major project to replicate their criminal justice, highway patrol, and driver's license databases to Richfield. In 2007, Public Safety implemented a new online service called Validate which allows banks and credit unions to verify driver's license information in real time. This service validates information against the mirrored database in the alternate data center without impacting the original production database. The Automated Geographic Reference Center has also completed a similar program to move its critical database to Richfield. The Utah Notification Information System database (UNIS), which maintains an alert notification contact system for the State in the event of an emergency has set up a replicated failover site in Richfield. The implementation of this project has supported the growth of online services from 200 in 2004 to over 660 today.

Stakeholder Participation

In addition to the State agencies mentioned above, DTS is seeing a huge interest by many of Utah's higher educational institutions to move their business continuity operations to Richfield. Such schools as the Salt Lake Community College, Utah State University, the Davis County School District, and the University of Utah are all making plans to fund business continuity at the Richfield facility. Because UEN provides gigabit connectivity to all schools and universities, this partnership now provides access for all of these entities to the alternate data center and gives them an extremely cost-effective alternative for business continuity.

A growing number of cities, including Sandy City and West Valley City, are using the State operated resource. When asked about the primary driving factors for these moves, the response indicates the ability to have connectivity via the Internet to Web applications and databases in the

event of an emergency, as well as the increased bandwidth capability to initiate viable disaster recovery solutions.

Public Policy Benefits

The shared use of the alternate data center has improved cooperation among different sectors of government. It has also generated more interest in business continuity as agencies now have a cost effective way to meet their objectives.

There is no doubt that the State will see a significant rise in the use of its Richfield data center as more city, county, and State agencies become aware of the enhanced capabilities. In total, the following public policy objectives are supported:

- Providing more reliable government services online,
- Ensuring that government services can be delivered during any type of emergency,
- Cooperating for efficiency between agencies and levels of government,
- Enhancing the productivity of government employees,
- Ensuring that government information is secure, yet accessible.

State and Agency Benefits

In addition to some of the very specific technical benefits to DTS operations mentioned above, these enhancements have benefited customers in the following ways:

- Improved internet access and reliability to state agencies
- Internet service redundancy to all public schools as well as 10 colleges and universities across the State of Utah
- Improved reliability to businesses which rely on access to state online services including:
 - Validate – a service which allows all banks and credit unions to verify drivers license information in real time
 - Hunting and Fishing Licenses – although citizens can purchase these online, many still purchase them from over 400 business outlets who use the State's online service
 - On-the-Spot – real-time issuance of vehicle license tags
 - Public Safety Inspections – Up to 2,000 inspection stations will be using this service to register their inspections online, currently there are over 700. This new online service implemented in June 2006, has reduced service calls to less than 20% from the previously implemented Delphi system.
 - Alcohol Beverage Control – the central system supports 48 outlets statewide.
 - Controlled Substance Database – Access by physicians, pharmacists, and law enforcement to over 28 million records – over 80,000 requests in 2006.
- Improved access by remote users of the state internet. With the improved reliability, departments like Workforce Services are allowing employees working in rural areas of the state to work out of their homes with VPN connections which have reduced the increasing crunch for office space and increased employee satisfaction and productivity.

REALIZED RETURN ON INVESTMENT

Adoption

These enhancements to the network connectivity provided to the alternate data center have resulted in much better use of the facility. New users include:

- University of Utah Hospital
- University of Utah Administrative Computing Services

- Salt Lake City
- Davis School District
- Utah Department of Public Safety
- Utah Department of Alcohol Beverage Control
- Automated Geographic Reference Center (AGRC)
- Sandy City

DTS, which had watched floor space utilization drop to about 20% with the reduction in use of mainframe service, now is considering expansion of the facility.

Savings and Cost Avoidance

The cost to DTS and the State to implement this technology has been relatively minor because of the cooperation and collaboration with UEN to provide the backbone to make this all happen. Ongoing monthly expenses for the alternate ISP and OC-48 connection are less than \$10,000 per month. Additional one time costs to DTS, which included the purchase of network devices that enabled a connection to the Internet and the OC-48 Fibre link, amounted to approximately \$150,000.00. These relatively small expenses are being recovered over a three year period based upon published rates. At the same time, the increased reliability has allowed agencies to deliver new services. Without this option, many entities were uncertain how to meet their growing business continuity needs.

- By making the alternate data center a shared facility, state partners, including school districts, universities, government hospitals, cities, and towns are able to select an option that is already saving millions of dollars. All public schools, libraries, and universities gained immediate broadband access to an offsite, highly-available data center upon completion of this project.
- The partnership between UEN and DTS enables each network to add value to their customers and leverage the strengths of the other partner. Over \$400,000 per year is saved through elimination of redundant network connections.
- The fiber connection to Richfield leveraged an existing contract that UEN already had in place, saving several hundred thousand dollars for the state over a three year period.
- Increased participation in this service has required more internet connectivity. UEN now maintains four separate connections, increasing the total bandwidth and decreasing the potential for major impact to the network due to an outage from any one of the providers.

Return on Investment

As noted above, DET has already seen a return on investment with the huge increase in utilization of the Richfield data center. There has also been a significant improvement in the reliability of critical online services. For example, because Walmart was utilizing the state service to issue hunting and fishing licenses to their customers, they began tracking the reliability of the connection to this service. With the improvements resulting from these upgrades, uptime has gone from about 98% to close to 100% reliability. The investment in an alternate data center in 1998 is finally paying huge dividends. The facility, which was once called a "white elephant", is now the critical centerpiece of a unified business continuity strategy. These two projects have been a huge win for the State, DTS, DET, and the citizens of the State of Utah.