Oregon-Montana Disaster Recovery Phase 1 & 2

Oregon Department of Administrative Services
Enterprise Technology Services

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Executive Summary

The State of Oregon Enterprise Technology Services (ETS) has utilized a third party vendor for all disaster recovery (DR) services since 2008. Additional contracts had to be in place to create tape backups which were stored offsite and maintained for use in case of a disaster. During or after a disaster, staff had to pick up the tapes and fly to a location provided by the vendor, to begin the process of configuring servers and restoring data. In addition, these contracts had very limited periods of time available for actually testing disaster recovery plans.

In November 2012, the State of Oregon and the State of Montana entered into an inter-agency agreement in which Oregon leases rack space from Montana, for the purpose of installing hardware to be used by Oregon in the event of a disaster. ETS established data connections with telephone service providers between locations, and extended networks to the Montana data center. This allowed ETS staff to remotely manage infrastructure, with limited physical interactions from Montana data center staff.

The first phase of hardware installation provided for backups to be stored via disk instead of tapes. This eliminated the costs associated with purchasing tapes, storing them offsite, and shipping them from site to site. Now, if ETS needs to repair or restore a server in the Oregon data center, staff can immediately access the backup copies in Montana and perform the required work quickly and easily, in comparison to the old process of recalling backup tapes located offsite. Each day ETS replicates 10TB (terabytes) of data to Montana and maintains a total of 1 PB (petabyte) of backup data. This new process has eliminated costs related to the handling and management of 12,000 physical tapes and associated hardware.

As part of this project, ETS staff contracted for the purchase and installation of mainframe hardware which includes a standby mainframe, operating system disks, and a virtual tape system for both system and data replication management. Hardware was purchased and delivered in June 2013 and as of November 2013, all mainframe data and operating systems are being replicated in real time from Oregon to Montana. This results in virtually no loss of data or functionality for the Salem, Oregon mainframe. The third party DR services used before this project were very costly and had a limited ability to perform testing, that usually did not prove to be successful. Through this project, recovery times have been reduced from an estimated 10 days to roughly 4-6 hours, and lost transactions over a 48 hour period are now virtually non-existent.

Phase 2 of this project was the installation/configuration of UNIX hardware in Montana. This additional platform now provides the capacity for restoring all AIX applications.

ETS now has a disaster recovery strategy for two out of four platforms that does not rely on third party vendors and did not require capital investments in buildings, maintenance, or staffing. Overall, this project provided a much more affordable solution compared to other traditional DR options. In addition, it has improved Oregon's ability to meet our customer's business needs for available applications, and provides a disaster recovery strategy that is sustainable, efficient, improves recovery time objectives, and reduces data loss.

Description of the Project

The Business Problem

The State of Oregon has historically relied on third party vendors for disaster recovery, including tape backups, offsite storage, and hardware capacity. This meant managing multiple contracts, monthly charges for services and tracking shipments. The process of performing system backups each night was very costly due to the cost of the physical tapes, the tape library, offsite storage, and the length of time required to complete the recovery efforts. DR testing in the past was very expensive and required ETS staff to travel to an offsite location established by the vendor, to perform the recovery activities. Often, for a number of technical reasons, DR tests failed to fully recover all systems because of the limited timeline for the tests and availability of the infrastructure from the vendor. Other traditional disaster recovery options that were considered during this project included constructing, maintaining, and staffing a second data center within the state. This option however was very cost prohibitive as it would require an extensive capital investment and long term maintenance.

Description of the Solution

During a Western Regional Conference of the National Association of State Technology Directors, managers from different states were discussing the topic of disaster recovery and the costs associated with third party vendors. From those relationships and discussions at the conference, further conversations evolved between Oregon and Montana to discuss alternatives to the third party DR solutions and the costs associated with building and maintaining a 2nd data center within each state. Further exploration led to the identification of mutually beneficial advantages to using existing infrastructure that each state already owned and maintained. In November 2012, the State of Oregon and the State of Montana entered into an inter-governmental agreement for the lease of rack space to Oregon in the Montana data center, for the purpose of developing infrastructure for use in disaster recovery activities. Phase 1 of the ETS Disaster Recovery infrastructure development included the following:

- Communication links between Oregon and Montana;
- Extension of the networks between sites to allow for remote management of the infrastructure to be installed;
- Purchase of Hardware: delivered, installed, and configured to establish nightly backups of critical operating systems and application data*; (These backups accessible remotely, increased the speed of restoring physical devices in Oregon.)*
- Mainframe hardware purchase, installation, and configuration.

After communications were established, ETS staff began the work required to extend the management networks to the devices installed in the Montana data center, and allow for the remote operation of the devices. The connection to the backup systems and storage allowed for the Oregon nightly backups to be stored on the Montana

infrastructure, and eliminated the need for the older tape backup technology. Now, ETS staff have instant access to any backup files that are remotely stored in Montana.

Mainframe applications are a core part of Oregon agency business. Applications include functions such as statewide accounting, payroll and human resource management, just to name a few. It became a priority for the state to improve recovery capabilities in the event of a disaster. To meet this need, ETS staff and our vendor provider Sirius Computer Solutions purchased, delivered, installed, and configured all the hardware necessary to have a standby mainframe in place should the Salem, Oregon mainframe ever be out of operation for any reason. To increase our recovery capabilities, hardware was delivered and installed by June 2013 to allow for real time data replication between Oregon and Montana. As application data is written, or operating system changes are made in Oregon those changes are replicated to Montana in real time. In the event of a disaster today, ETS staff can activate the standby mainframe and perform system automations to restore all mainframe applications with data in a matter of hours. These processes and activities have been tested. Mainframe hardware was fully configured and data began to be replicated in November 2013.

Phase 2 of this project was the installation/configuration of an IBM P770 in Montana. AIX systems run critical applications for agencies including the Oregon Employment Department, Department of Human Services, Oregon Health Authority, and Department of Corrections. This additional platform now provides the capacity for restoring all AIX applications. Production LPARS were configured and are ready for drivers and data restoration in the event of a disaster. Data restoration would occur from the CommVault backups taken each night. This installation was completed and tested in February 2014.

This solution was chosen over more traditional disaster recovery methods due to its cost effective and collaborative approach to managing state IT resources. By utilizing a relationship with another state that already has and maintains a physical data center, Oregon benefits by not having to make those investments in physical infrastructure. Montana also benefits by receiving income from previously unused space on its data center floor. These mutual benefits are further enhanced by the opportunity to share infrastructure for common systems.

Issue Context

Phases 1 and 2 of the Oregon Disaster Recovery implementation is part of a multi-phase project under priorities established by ETS in their Strategic Plan, and is part of the development of disaster recovery services. ETS customers are updated on projects via a Customer Utility Board to provide input on ETS long range plans and rate development strategies. So far, ETS has established DR recovery capabilities for two of our four major platforms. ETS management is committed to providing a robust and redundant infrastructure capable of meeting customers' business needs. The commitment comes in response to a desire to provide the services internally rather than continue to rely on third party vendors for disaster recovery solutions, as well as the need to provide better recovery solutions that support our customer's business

applications. Future efforts underway in 2015 will complete installation of capacity for the final two platforms that ETS operates, iSeries and Windows/Linux systems.

Significance of the Project

Disaster Recovery in Oregon has always relied on physical tapes, staff traveling to remote locations, third party vendor hardware, and post event networking. All of these factors resulted in a very costly, labor intensive, and time consuming recovery strategy for critical infrastructure identified by ETS customers. With the development of the Montana partnership and resulting infrastructure investment, Oregon is now much better positioned to provide our customers with a recovery strategy that is sustainable, efficient, improves recovery time objectives, and reduces data loss. This means critical information is backed up and available to staff and critical mainframe systems are now able to be restored in hours instead of days or possibly weeks. All mainframe and AIX customers now benefit from this improved functionality without any change in their application requirements.

Restoration of single device failures is now possible through electronic access to the backups located on disk in Montana. This has eliminated the need to retrieve physical tapes from offsite storage and has increased the recovery time for these single device failure events.

Mainframe customers include the Statewide Financial Management System, Oregon State Payroll System, Position and Personnel Database, the Child Support Program, and others, that now benefit from the real time replication of mainframe applications data to Montana. This process results in virtually no lost transactions and since the infrastructure in Montana is accessible remotely, recovery of the Mainframe applications can occur in just a matter of hours.

Having capacity provisioned in Montana for our AIX environment, ensures prompt restoration of critical services used by many key state agencies. By using the data from the backups which are also located in Montana, we have eliminated the delay in waiting for tape delivery for service recovery.

Benefits of the Project

Project Impact

This project addressed many of the challenges ETS staff have faced when following earlier disaster recovery strategies. This new relationship with Montana is beneficial because of the physical distance between the locations. In the event of a general or natural disaster (flood, earthquake, etc.) in one location, it is very improbable that the impact will affect the other location. This approach therefore provides a very low risk that both sites would be unavailable at the same time.

In addition, it also gives Oregon the opportunity to provide a service to a new customer, by enabling services for Montana to also be hosted on infrastructure owned and maintained by Oregon, as part of the exchange for access to the Montana data center.

By implementing Phase 1 infrastructure, Oregon has improved its access to backups for all hosted infrastructure located at the Oregon data center, and reduced the time needed to recover Mainframe applications during a disaster.

- The State of Oregon currently replicates roughly 10 TB of backup data to Montana daily, with a current total of 1 PB of data stored in Montana backups.
- Because of the change in technology, ETS has been able to eliminate 12,000 physical tapes from their backup process and associated hardware.
- Before this project, recovery time estimated for the Oregon Mainframe was 10 days with 48 hours of lost transactions. After the Montana hardware was installed, Oregon can now restore Mainframe operations within 4-6 hours with virtually non-existent data loss.

Through the implementation of Phase 2 with the installation/configuration of an IBM P770 in Montana, this additional platform now provides the capacity for restoring all AIX applications for a wide range of agencies.

This project aligns not only with the priorities of the State of Oregon Enterprise Technology Services, but also with the 2015 NASCIO State CIO Priority Strategies, Management Processes and Solutions #9, and Priority Technologies, Applications and Tools #5, for Disaster Recovery/Business Continuity.

Our ability to quickly restore services for critical applications was the catalyst driving our decision to improve our disaster recovery strategy.

Future Plans

This new relationship with Montana has opened doors that will allow each state to consider options in the future that potentially include being able to provide services to each other, using a common set of infrastructure. For example, when one state needs to perform a lifecycle replacement activity, we can now discuss options for purchasing services from each other instead of maintaining different sets of infrastructure. Through this relationship between the two states, Oregon can provide options and support for agencies with applications on a variety of platforms.

The State of Oregon is currently planning to continue this development of infrastructure in Montana for additional platforms, and to provide better disaster recovery services to our customers. Additional projects are already underway for installation of iSeries and Windows /Linux servers. In addition to the benefits achieved through this current project, future projects will continue to increase our capacity and recovery abilities, as we work toward and plan to continuously meet customer needs now and in the future.