# MOVING COLORADO TO THE CLOUD
## A BUSINESS CASE

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## CHALLENGES:

In 2008 Colorado's Governor's Office of Information Technology (OIT) began to consolidate the IT systems spread across 17 Executive Branch agencies. Through system standardization, OIT intends to achieve cost savings, reduce the complexity of administering multiple platforms, and improve service delivery. Prior to this transformation, the delivery of information and communication technology in Colorado state government had been provisioned in an agency-by-agency manner, which resulted in the state owning and operating more than 40 data centers, 15 disparate networks, over 400 line-of-business systems, and 1,800 servers, including 122 servers dedicated to provisioning email services on different versions of Lotus Notes, Microsoft Exchange, and Novell GroupWise. Many of these are aging and sorely in need of replacement. Sixteen of the seventeen agencies are not eDiscovery compliant and half of them do not have adequate disaster recovery capabilities, putting data and services at risk. This silo'ed environment was not sustainable especially in light of the budget reductions Colorado is enduring.

| Challenges: |
|---|
| Budget Reductions |
| Increasing Demand for Citizen Services |
| 17Siloed Executive Branch Agencies |
| 40 Data Centers |
| High Risk Legacy Systems |
| Mixed Levels of Security |
| Unsustainable Infrastructure |

Local governments in Colorado are not faring much better and neither areK-12 schools or higher education institutions. Severe budget cuts across the board have become the catalyst for changing the way governments interact. Michael Locatis, Colorado's State Chief Information Officer, OIT Executive Director, and former CIO of the City and County of Denver, saw an opportunity to share resources across jurisdictional boundaries and began driving a shared services initiative using cloud computing.

## CLOUD OPPORTUNITY:

Cloud computing is a natural fit for Colorado state government because it enables hosting of non-core competencies: servers, storage, web services, maintenance, and security. Users can quickly obtain as much computation and storage resources as needed while only paying for the precise amount utilized. Cloud computing will also enable Colorado's state information technology enterprise – as well as counties, municipalities, and school districts – to more effectively manage resources by leasing cheaper on-demand hardware and utilizing its flexibility to dynamically meet peak demand without investing capital in on-premise resources.

Cloud computing offers Colorado the opportunity to achieve:

- A net reduction in infrastructure and facilities
- Improved agility to meet changing demands
- Improved system availability and, therefore, improved customer service
- Improved security and disaster recovery
- A sustainable delivery model

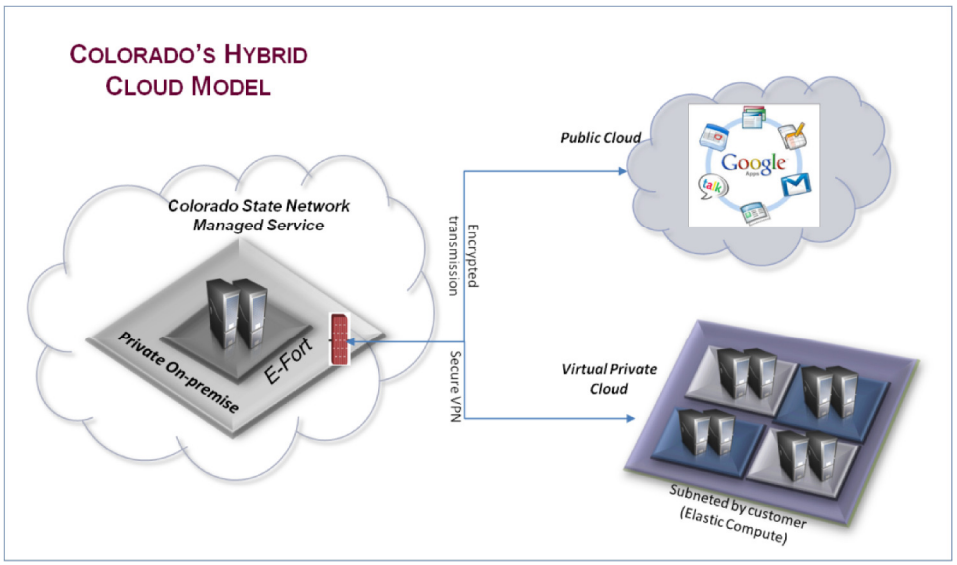
## ADOPTING A HYBRID CLOUD MODEL:

The following hybrid approach will best suit Colorado's diverse business requirements and security needs:

- Private Cloud for line-of-business/highly secure data & systems;
- Virtual Private Cloud for archival storage/disaster recovery, Software as a Service, or Platform as a Service; and
- Public Cloud for commodity computing, email, office productivity applications, collaboration tools, and websites.

## PRIVATE CLOUD – E-FORT:

Colorado will leverage its existing state of the art data center known as "eFORT" for core line-of-business systems. Citizen data including taxes, Medicaid, driver's licenses, vital records, and law enforcement will remain located in this secure facility.




Colorado's server virtualization strategy can leverage both private and virtual private clouds. While production systems are located at the eFORT, virtualized instances of the server can be stored off-site, increasing disaster recovery capabilities at reduced cost.

## VIRTUAL PRIVATE CLOUD:

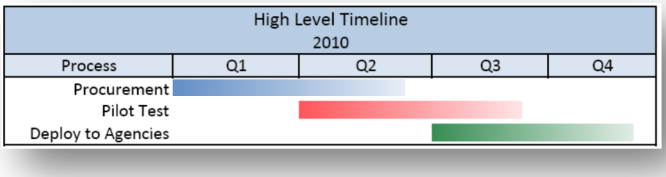
A virtual private cloud (VPC) offers the best of both worlds -- isolated networks are more secure, elastic computing enables agile scalability, and the pay-as-you-go model is much less expensive. VPC services offer strategies for hosting large systems such as ERP, improving disaster recovery capabilities and providing cheap storage and archiving.

Colorado will begin to leverage these types of services as OIT progresses with the consolidation effort.

## PUBLIC CLOUD – EMAIL, COLLABORATION, AND OFFICE PRODUCTIVITY TOOLS:

The public cloud model is best suited for Colorado's shared services model, aggregating demand across jurisdictional lines.

Policy, legislation, and governance models had to be implemented before cloud computing could be embraced. Further, to ensure participation, the cross-jurisdictional shared services model had to be socialized and marketed to the local governments before a Request for Proposals (RFP) could be released. The architecture of the public cloud allowed OIT to leverage an RFP released through the Statewide Internet Portal Authority (SIPA), which resulted in the selection of Tempus Nova to provide Google Apps to all governmental entities in the state of Colorado. Now local, municipal, county, and state governments, as well as educational institutions, can leverage this public cloud offering through SIPA. This fundamental shift in cooperation between governmental agencies permits all who participate to leverage a statewide combined scale.




OIT will initiate a pilot program to test the ability of Google Apps to meet state agency requirements. The pilot will test the migration of email from GroupWise, Lotus Notes, and Exchange, using three different agencies, focusing on security and workflow processing. If the pilot is successful and the cost benefit analysis proves positive, the state plans to deploy Google Apps to all 27,600 Executive Branch employees.

| Google Apps Functionality At a Glance | |
|---|---|
| **Email** | |
| Ease of Use | ↑ |
| Mobility | ↑ |
| Security | ↗ |
| Disaster Recovery | ↑ |
| eDiscovery | ↑ |
| Storage | ↑ |
| | |
| **Office Productivity** | |
| Document Creation/Editing | ✗ |
| Document Sharing | ↑ |
| Document Storage | ↑ |
| Disaster Recovery | ↑ |
| eDiscovery | ↑ |
| | |
| **Collaboration** | |
| Ease of Use | ↑ |
| New functionality | ↑ |

| Legend: | |
|---|---|
| ↑ | Improvement over current Functionality |
| ↗ | Close to Existing Functionality/Trending Up |
| ✗ | Not as robust |

An initial cost-benefit analysis estimated that the state could save **$8 million annually and avoid paying approximately $20 million over the next three years**. Personnel costs are not included in the savings estimates as those resources will be reinvested to support citizen-facing services.

Consolidating the state's 40 data centers is a challenge that can be optimized by reducing the number of servers that must be relocated. Shifting email to the cloud will take 122 servers out of production, thus reducing costs and risk during a move.

Trusting email to a private company is a concern that must be confronted during the pilot. Issues concerning encrypted email and data transmission, physical location of storage (within

continental US), HIPPA, and other regulatory requirements all necessitate careful consideration and analysis.

The state's current ability to provide secure transmission of email and documents must also be part of the equation. The state's existing security controls are limited and without sustainable funding, and the vulnerability of systems to cyber-attack is considered high and increasing. Initial risk profile comparisons between cloud computing and maintaining the status quo proves that Google Apps is more secure. The pilot program will vet these assumptions.

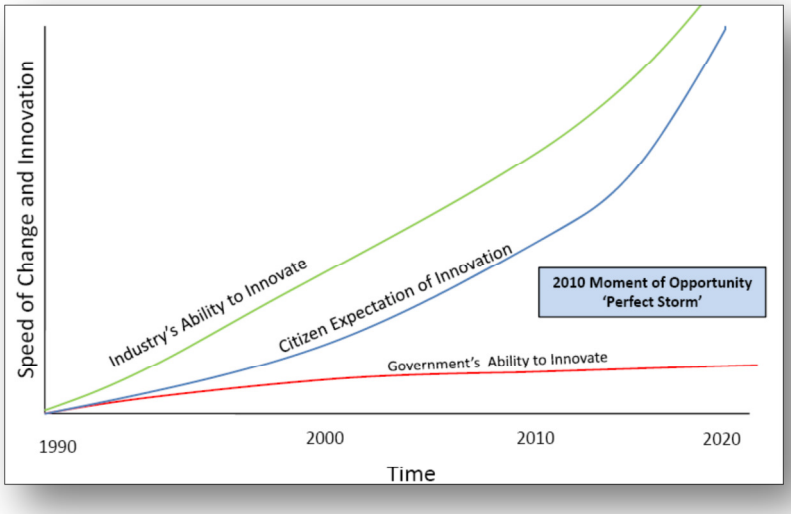
Cloud-based business strategies rely on the provider's ability to keep abreast of the fast-paced cyber security threats facing global e-commerce today. The private sector's ability to keep pace far outweighs the state's. Ensuring that the state's data assets are the top priority for a global private sector company is the challenge the state must address.

The adoption of cloud services will present a significant cultural change for governments. Switching to Google email (Gmail) has been met with surprisingly little resistance. This may be attributed to the large numbers of employees using Gmail or other similar services for their personal email. Switching staff from using Microsoft Office Products to Google Apps tools will be more of a challenge. To mitigate this, agencies will be allowed to keep the Microsoft Office tools already in use; however, the state will not upgrade or purchase new Microsoft software. This strategy buys time for Google to mature their applications and for employees to familiarize themselves with cloud computing.

## SUSTAINABILITY:

Explosive growth of storage requirements is compounding the storage needs for disaster recovery and adding complexity to eDiscovery. Growing the infrastructure to meet these demands is not a sustainable strategy due to the lack of dedicated funding. The ability of cloud providers to dial storage volumes up and down rapidly at very little cost is something the state's current model cannot achieve. Cloud providers bundle these functions as part of their base costs which will allow the state to avoid the future costs associated with storage and disaster recovery.

Colorado does not have a sustainable funding model for upgrading or replacing the information technology infrastructure. Capital projects must be approved through the legislatively-driven annual budgeting process, which takes around 18 months. Traditionally, these requests are easily



denied by officials under the stress of budget reductions. The simple cost model offered by cloud providers is a more sustainable model in that it allows the state to use operating dollars instead of capital funds, which can prove difficult to obtain. Additionally, having a known cost over a five-year period will enable better planning.

## CONCLUSION:

Colorado has set into motion a new model for sharing services across jurisdictional lines, while shifting state priorities from commodity to core business functions to aggressively reduce costs and increase sustainability. The viability of cloud computing for government agencies is being tested worldwide, and market forces are pushing providers to improve their security and functionality. OIT believes the timing is right to pursue this strategy. The perfect storm of budget reductions with the rise of cloud computing as a viable alternative has raised expectations. If OIT's testing proves successful, the estimated cost savings, avoidance of future costs, and improved security complete a solid business case for implementing cloud computing.