Transforming Enterprise Services to the Cloud
Emerging and Innovative Technologies
State of Minnesota
Commissioner Thomas Baden
Project Initiation- June 2016
Target Launch- July 2017

Executive Summary

With the challenge to balance the delivery of IT infrastructure, provide services that add value to the enterprise and keep infrastructure costs in check, the State of Minnesota IT Services (MNIT), explored the benefits of moving their enterprise service delivery to the cloud. These included, increased productivity of application development, improved operational service delivery and substantially reducing infrastructure costs. The MNIT-led cloud enterprise initiative included the implementation of a scalable governance and operational model that enables Minnesota to effectively deliver enterprise cloud services that accelerates adoption and minimizes application risk (i.e., security, migration, cost) and maintains the integrity of enterprise operations (i.e., security, performance, cost management.

MNIT engaged the assistance of AWS Professional Services to guide them through their enterprise cloud services planning and implementation process. AWS used their Cloud Adoption Framework (CAF) to guide MNIT through planning and implementation activities across six perspectives: Business, People, Governance, Platform, Security, and Operations.

MNIT included five agencies in this process to better balance the requirements between operations and applications development. The project included the development of business case analysis, balanced governance policies, detailed security architecture (based on NIST 800-53) and operational standards, detailed enterprise roles and responsibilities, a training and development program aligned to individual learning paths, an automated central billing and cost management process, a streamlined on-boarding process, self-service Cloud service provisioning process, and an automated operational process that is fully integrated with existing on-premises operational tools.

To assist agencies with their migration projects, MNIT engaged AWS Professional Services to support them with developing a migration factory to includes reusable proven tools, templates, and processes that minimized the risk of project failures (i.e., technical, schedule, and cost). MNIT also implemented an enterprise Cloud Center of Excellence (CCoE) organization to provide agencies with ongoing technical assistance, program management, innovation, and proven tools for their migration and development projects.

Through this initiative, MNIT has developed the foundational organization and environment to deliver scalable enterprise cloud services in the most secure (i.e., best practice security architecture), reliable (i.e., automatic enforcement of governance policies and standards), scalable (i.e. self-service provisioning through service catalog), and low risk (i.e., enterprise Cloud Center of Excellence (CCoE) and reusable best practices) way available. MNIT Enterprise Cloud Services is open for business.

Once Minnesota has completed this initiative, inter-agency collaboration will be improved and state governments will have new opportunities to partner together. Researchers and developers will be able to scale up their workloads for testing without having to spend a

significant portion of the budget on physical server space. This will allow them to innovate without a looming infrastructure budget to work around.

In addition to providing an effective and efficient cloud service broker model for the state of Minnesota, MNIT has pioneered a model and implementation practice that can be used by state governments across the country to accelerate their implementation of enterprise Cloud services.

Concept:

Explain the process from genesis to design to implementation.

The state of MN contracted with a WSCA contractor for cloud services to look for ways to complete the consolidation of the state's datacenters, improve service delivery efficiency, and allow for higher value output of data and services to the citizens of Minnesota. Commissioner Baden assembled a committee, led by the Assistant Commissioner for Enterprise Service Delivery, and 3 CBTOs partnering with Minnesota state agencies, to work together with the selected cloud vendor to develop a plan to transform the enterprise service delivery environment to the cloud. The plan was developed through a series of workshops around security, roles and responsibilities, and governance. For implementation, MNIT used Agile to build, pilot, and launch the new environment (targeted July 2017).

Provide background on why the initiative is needed, context for the environment in which you are working and support as to why the initiative is the best solution.

The common cloud strategy for most state governments has been to treat cloud as an extension of their enterprise, or to *augment* their enterprise. This common strategy involves a multi-cloud and on-prem approach with an evaluation of every application. The underlying challenge with this strategy is that the enterprise is taking a project based approach to the cloud vs taking a process based approach to the cloud. With a project based approach, every application and project is subject to the existing legacy governance process for request, approval, and delivery. The result with a project based approach is added complexity and delays to an already lengthy governance process. By taking a process based approach, the state of Minnesota is removing complexity and lengthy delays to delivering services to the agencies by automating the process through cloud templates and self-service catalogs for the agencies. As a result, agency services will be delivered in minutes vs months. Additionally, the state has been challenged in consolidating all of their data centers. With the cloud automation of governance, the remaining data centers can be consolidated without physically moving or procuring hardware.

Describe the evolution and elements of the initiative (solution architecture), such as:

How was this initiative selected as the solution?

This program was selected as part of an initiative to migrate the State of Minnesota's IT infrastructure from on premises model to primarily leveraging cloud services. The initiative was initiated by the Minnesota Chief Information Officer (CIO) and lead by the Assistant Commissioner and Chief Operations Officer (COO) over enterprise services in partnership with the Chief Business Technology Officers (CBTO) from 3 Minnesota state agencies. In preparation for the migration, the state took part in workshops that spanned several weeks and covered governance, security, roles and responsibilities, access management, billing and procurement, budgeting, reporting, and compliance. Through the deep dives in the workshops, the team

developed a plan to automate as many of the aspects of the enterprise as possible through cloud formation code.

Is the initiative part of a larger project?

Yes, the overarching initiative was to reduce the enterprise datacenter footprint from their current number of 27 to 6. To secure the systems moving in through the Governance and Security controls, and to Modernize major Business systems that are at or near "end of life"

What project management approach was taken?

Agile

Significance:

Define the scope of the initiative and beneficiaries/stakeholder groups.

The scope is to modernize the state enterprise architecture in the cloud. Immediate beneficiaries will be the state agencies starting with the Departments of Human Services, Public Safety, Health, DEED, and MNGeo. Future beneficiaries will be local governments in the state of Minnesota, as they will be able to leverage the same self-service automated framework that Enterprise Services has put in place.

Highlight what makes the initiative innovative and distinct from similar projects.

The state of Minnesota is the first state to automate the entire shared services delivery model with code in the cloud. It is a foundational transformation of the enterprise. Enterprise Services will have automated visibility, security, and control – while the agencies will have the agility to delivery higher value services to the citizens of Minnesota. This initiative will also shift the balance of IT from maintenance of infrastructure to innovation through application development and delivery.

Outline what successful implementation looks like and why that is important. What change will the initiative have on the nominating agency, the state, constituents?

Successful implementation is a fully automated governance environment where the agencies can consume products through self-service and begin developing their applications in a matter of minutes (compared to weeks or months). Enterprise Services will have complete visibility and control of the foundational environment, and the agencies will have complete visibility and control of their virtual data centers within the foundational environment. Enterprise Services will have complete assurance that whatever the agency launches within their virtual data centers – the automated controls (that where agreed to by the Governance Group) are in place

to enforce governance and security 100% of the time. The importance to the agencies is they now have the ability and agility to innovate, develop, test, and deliver higher value services to the constituents at a much faster rate.

Describe how the initiative fits into the larger picture: policy, strategy and goal alignment with gubernatorial priorities; IT strategic plans; enterprise architecture; agency business plans, goals and strategies; state and federal mandates; and/or NASCIO's 2016 state CIO priorities.

This initiative addresses Nine of NASCIO's Top Ten Strategies, Management Processes and Solutions
1. Security and Risk Management: *governance; budget and resource requirements; security frameworks; data protection; training and awareness; insider threats; third party security practices as outsourcing increases; determining what constitutes "due care" or "reasonable"*
All of the security policies are defined in code by the security team and automatically implemented across the entire enterprise as services are launched by the agencies. All budgeting and spend is monitored real time with alerts established to automatically notify management of any potential overruns.
2. Consolidation/Optimization: *centralizing, consolidating services, operations, resources, infrastructure, data centers, communications and marketing "enterprise" thinking, identifying and dealing with barriers*
Automating in the cloud provides the state with a clear path to complete our consolidation effort of the state's data centers.
3. Cloud Services: *cloud strategy; proper selection of service and deployment models; scalable and elastic IT-enabled capabilities provided "as a service" using internet technologies; governance; service management; service catalogs; platform; infrastructure; security; privacy; data ownership*
Cloud formation templates, self-service catalogs, automated governance, automated security policies, virtual private clouds (Data Centers) for the agencies, change management, auto scaling and infrastructure are all at the heart of the initiative.
4. Budget, Cost Control, Fiscal Management: *managing budget reduction; strategies for savings; reducing or avoiding costs; dealing with inadequate funding and budget constraints*
As the state migrates into the cloud, there will be significant opportunities to reduce utility spend by purchasing reserved instances of compute at a discounted rate. With real time billing and detailed usage information, the state will have the data to make decisions about which areas of the enterprise that could be addressed to reduce costs or achieve savings.
5. Legacy modernization: *enhancing; renovating; replacing; legacy platforms and applications; business process improvement*
This initiative will allow the state to move legacy applications over to the cloud where modernization tools will help to update or replace the legacy applications much faster and without maintaining/replacing old hardware.

6. **Enterprise IT Governance:** *enterprise IT policy and planning; improving IT governance; partnering; inter-jurisdictional collaboration; industry advisory boards; legislative oversight– achieving proper balance; agencies participating as members of a "state enterprise"*
The collaborative effort of the representative agencies with MNIT was essential to defining the line of roles and responsibilities between MNIT and our many partners. This collaboration allows for Enterprise Services to have the control and visibility of the enterprise that they need, while the agencies have the agility and control of the resources that they need to develop and manage their applications.

7. **Data Management and Analytics:** *data governance; data architecture; strategy; business intelligence; predictive analytics; big data; roles and responsibilities*
This initiative will allow the state to build data lakes in the cloud and build automated analytics engines that can be spun up and spun down as necessary without any hardware investment and only pay for the services that were used. The state will also have the ability to automate data governance policies such as moving archive files to much less expensive cold storage.

8. **Enterprise Vision and Roadmap for IT:** *vision and roadmap for IT; recognition by administration that IT is a strategic capability; integrating and influencing strategic planning and visioning with consideration of future IT innovations; aligning with Governor's policy agenda*
Mark Dayton, the Governor of the State of Minnesota has made IT Cybersecurity a high priority including it in the last two budgets. He has also pushed for application modernization to increase the citizen services through mobile and internet as well as to increase the security of these applications. This initiative serves the Governor's priorities to make state government "work at the speed of business" by having the Governance and security in place to make these applications accessible to a wider audience as well as to allow for a more rapid deployment cycle so application can be modernized more quickly and get citizens these services in the way they want as quickly as they need them.

9. **Agile and Incremental Software Delivery:** *iterative design and incremental development of software solutions; allows for design modifications, prototyping and addition of new capabilities as part of the development process*
This initiative will enable developers into a dev/test environment that is identical to the production environment and establish an automated code pipeline. Also, the dev/test environment will be turned off at night to save money.

Impact:

Compare the environment before the initiative was implemented and after it was completed. How is state government *better*?

MNIT will now have the ability to innovate at the rate of the technology industry. Prior to this initiative, state governments lagged years behind the industry in adopting new technologies, and as a result was slow to deliver new services. Because legacy IT resources have been on-

premises and limited to the capacity of the hardware on hand, state governments developed a manual governance process for allocating and managing these resources (or purchasing more). This process was lengthy and often not always followed according to policy. Project and budget cycles revolved around hardware refreshes. 80% to 90% of the resources were consumed with maintaining the current process and systems, and only 10% to 20% of the resources were for innovation. Automating the governance through the cloud will shift the state away from lengthy, unreliable manual processes and hardware refresh cycles toward innovation and higher value service delivery to the citizens of the state. By keeping pace with technology, the state will also become more competitive in recruiting new talent.

Detail the immediate and longer term impact of the initiative. Quantitative and qualitative performance measurements are appropriate here. Address the financial and non-financial reasons why this project was worthy of the investment made.

We expect the immediate impact to be improved efficiencies for the applications that will be moved to the cloud. We have already recognized a greater collaboration between the agencies and Enterprise Services, and expect that to trend upward long term. As the state continues to move into the new cloud environment and the automated governance model becomes the "new normal", we expect to see the state produce higher value services and application at a faster pace without increasing budgets. Over the next two years, we also expect to complete the remaining 80% of our consolidation effort. We also will realize an updated skill set for our IT teams, which will produce higher value output for the citizens of the state.

Describe the benefits and the impact of the benefits for both the nominating agency and constituents, such as services to constituents, operational improvements, security and/or privacy, transparency of government, and transformation of government.

Automation of the enterprise allows for seamless operations, 100% enforcement of security and governance policies. The initiative also allows for the state to transition focus from internal processes and operations to delivering higher value services to the citizens of the state. 100% visibility into the enterprise will allow for massive amounts of data to analyze and provide complete transparency for government accountability.