



# Transforming Transportation: Excellence in Data Center Modernization

Enterprise IT Management Initiatives  
Data Center Modernization  
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**Washington State  
Department of Transportation**

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## EXECUTIVE SUMMARY

The Washington State Department of Transportation (WSDOT) faced the challenge of modernizing its aging hardware and outdated systems dispersed across multiple data centers and server rooms statewide. To address rising capital costs, dispersed server hardware, and the need for greater resiliency, WSDOT embarked on an all-encompassing cloud modernization project. This initiative successfully migrated the entire mainframe environment, over 451 servers, 368 applications, and 86 database servers from 25+ locations to a robust cloud infrastructure. The project enhanced connectivity, standardized traffic management systems, and modernized telephony, significantly improving disaster recovery, optimization, resiliency, scalability, security, and sustainability.

The comprehensive approach, leveraging Mainframe-as-a-Service (MFaaS), Azure Infrastructure-as-a-Service (IaaS), and various Software-as-a-Service (SaaS) and Platform-as-a-Service (PaaS) engagements, transformed WSDOT's technology landscape. The project not only ensured business continuity and operational efficiency but also introduced a predictable operating expense pricing model, reduced the department's data center footprint, and lowered its carbon footprint. This initiative stands as a model for state agencies, demonstrating the benefits of cloud modernization in enhancing public service delivery and organizational resilience.

## IDEA

WSDOT was faced with a mountain of aging hardware and outdated systems located in three different data centers and dozens of server rooms across the state of Washington. Confronted with rising capital costs, dispersed server hardware, and an inability to meet agency goals for resiliency, WSDOT embarked on an all-encompassing journey of cloud modernization, leaving no part of the agency untouched. The key approach was to build off the Technology Services Division (TSD) Vision, Mission, and Goals to establish the baseline objectives and guiding principles for the project.

What made this project different was how all-encompassing the initiative was across all aspects of WSDOT:

- The entire mainframe environment was moved, along with over 451 servers (physical and virtual), 368 applications, and 86 database servers.
- Migration occurred from over 25 unique locations throughout the state, inclusive of enterprise, local, and payment card industry (PCI) environments.
- Geo-diverse Express Routes connectivity was established from both sides of the state to maximize on-premises to/from cloud latency, availability, and resiliency.
- Four disparate traffic signal management systems were replaced with a centrally managed cloud-based solution that met the needs of impacted regions and provided interdepartmental standardization and cross-agency coverage. Additionally, on-premises intelligent transportation systems in the largest traffic management center are currently being analyzed for future modernization and resiliency improvements.
- The replacement of physical PBX phone systems has begun, with 90% of WSDOT phones actively being migrated to a cloud-based Teams Calling system.

This universal endeavor for state agencies across the country, particularly within the state of Washington, accomplished key technical challenges and met legislative requirements.



**2024 State CIO Top 10**

- Legacy Modernization
- Cloud Services
- Broadband Connectivity



**Washington State Legislature – RCW 43.105.375**

“... state agencies shall locate all existing and new information or telecommunications investments in the state data center or within third-party, commercial cloud computing services.”

**IMPLEMENTATION**

The WSDOT DCM project began with a single step forward during the Covid pandemic, amidst aging data centers, end-of-life hardware, and a significantly increased number of teleworking employees. Despite these challenges and expanding demands, WSDOT TSD needed to meet the agency’s mission.

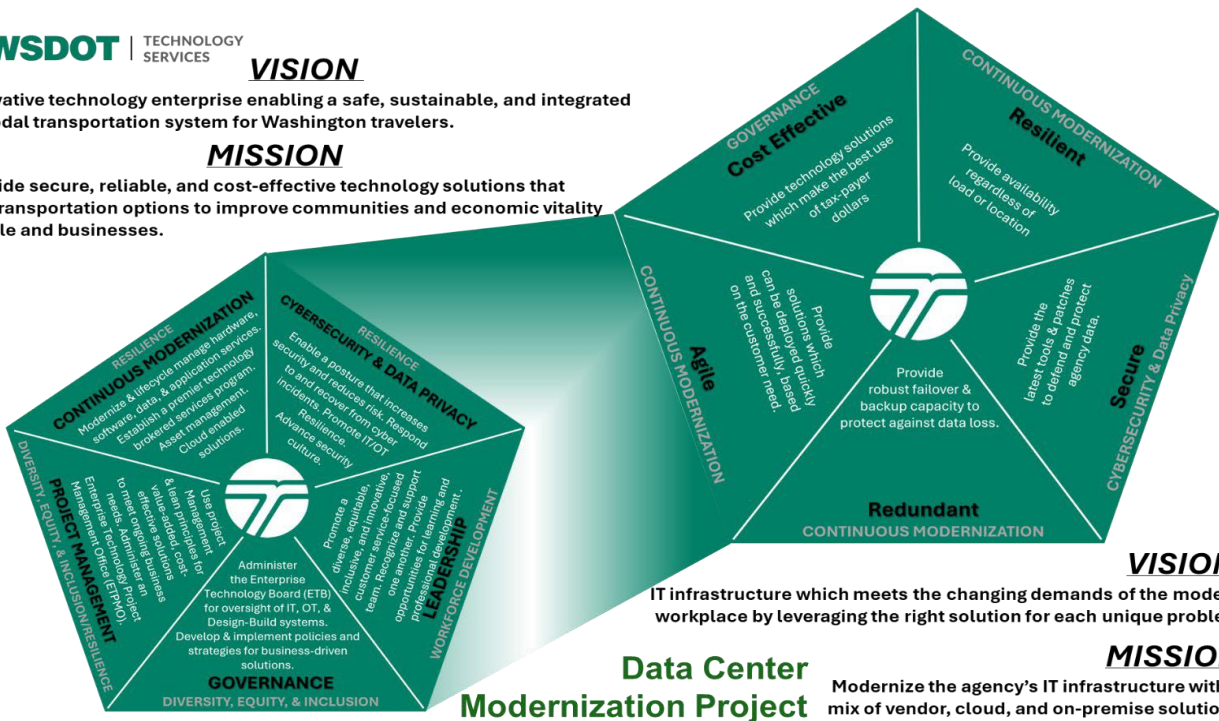


**VISION**

An innovative technology enterprise enabling a safe, sustainable, and integrated multimodal transportation system for Washington travelers.

**MISSION**

We provide secure, reliable, and cost-effective technology solutions that enable transportation options to improve communities and economic vitality for people and businesses.



**VISION**  
IT infrastructure which meets the changing demands of the modern workplace by leveraging the right solution for each unique problem

**MISSION**  
Modernize the agency’s IT infrastructure with a mix of vendor, cloud, and on-premise solutions

The first step was to develop the framework and governance process required for a project of this magnitude. WSDOT took an enterprise view, considering all hardware lifecycle replacements and software upgrades or implementations through the lenses of modernization, resiliency, availability, scalability, and accessibility. This approach was indoctrinated at the Enterprise Technology Project Management Office (PMO) and among all technical teams throughout the state through a campaign of

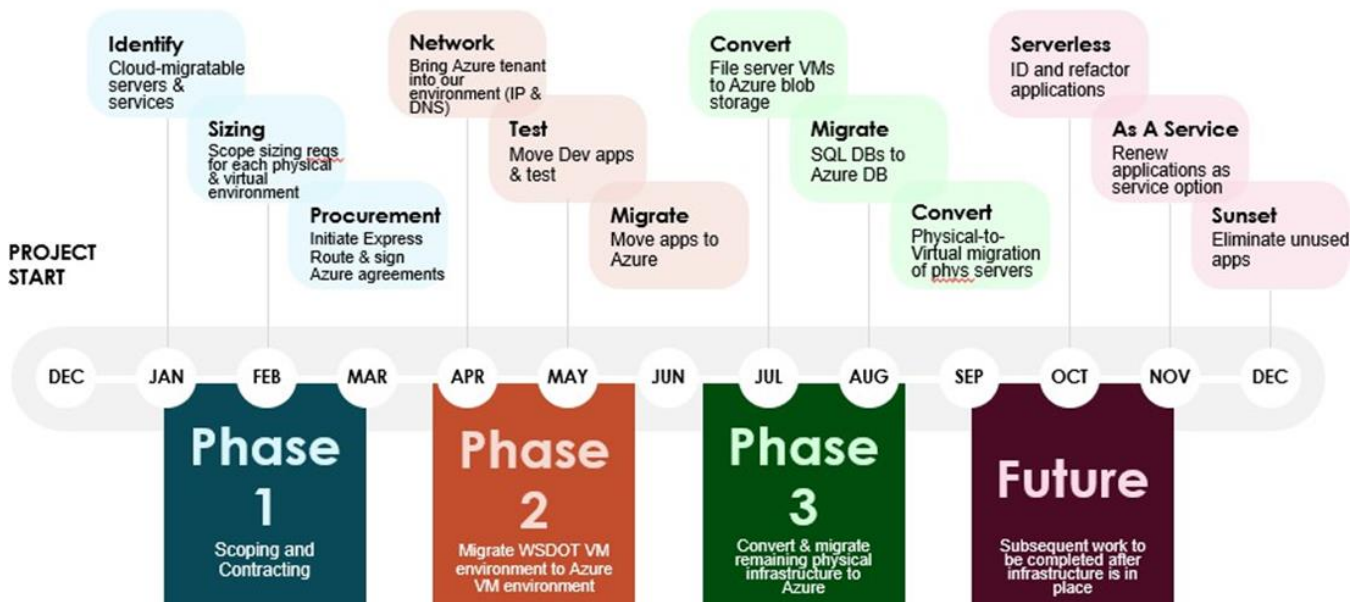


awareness and information. The initial major workload involved analyzing, scoping, and migrating all mainframe hardware and applications to a cloud provider, known as Mainframe-as-a-Service (MFaaS). Following the successful MFaaS completion, planning, analysis, and execution of an all-encompassing Azure Infrastructure-as-a-Service (IaaS) migration to Azure VMS commenced. With MFaaS and Azure IaaS making productive progress, additional strategic workloads for statewide signals management and telephony modernization came into focus with Software-as-a-Service (SaaS) and Platform-as-a-Service (PaaS) engagements, respectively.

Given the complexity of competing efforts, diverse technical skillsets required, and the disparity of involved technologies, a series of overlapping cascading waterfall project management plans were leveraged. This was combined with a hybrid agile approach at the tactical level to handle waves of targeted systems and services to be migrated over one-to-two-week windows. Below is an example of the Azure IaaS migration project management methodology.

## Data Center Migration Roadmap

Azure Virtualization & Migration



This required a new mindset and approach to tackling problems and challenges. Resiliency and modernization became the rallying cries to push forward. Urgency, necessity, capability, and trust meshed to forge a collaborative synergy between WSDOT TSD, executive leadership, business unit managers, and Washington Technology Solutions (WaTech) oversight partners. A DCM Steering Committee, chaired by the agency CIO and the Deputy Secretary of Transportation, provided governance and executive leadership for technology decisions, funding, and guidance every step of the way. This governance was intertwined with critical oversight and partnership with key leaders at WaTech through bi-weekly meetings to review statuses, milestones, budgets, and accomplishments.



Success was not possible without key engagement from technical experts among strategic partners such as Ensono (MFaaS), Microsoft and Presidio (Azure IaaS), Q-Free (Signals SaaS), and Microsoft (Telecom PaaS). Most importantly, the efforts of over 40 WSDOT TSD technicians and approximately 7,700 WSDOT employees were crucial in pushing the project forward and accomplishing the agency mission daily.

Organizational awareness and buy-in were fostered through the DCM Steering Committee’s leadership, timely organizational change management messages from the Deputy Secretary, and countless direct messages and collaboration between technical staff and business unit leaders.

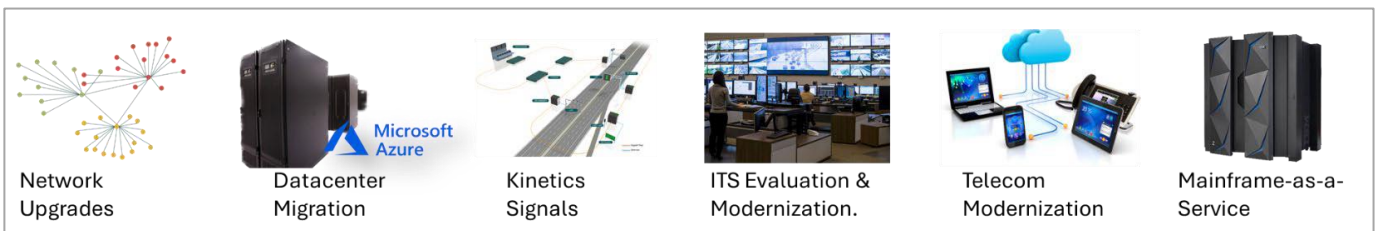
What was unique and significant about the DCM accomplishment was the absence of a singular approach to solving legacy problems or converting these to cloud migrations that best met the WSDOT mission. This endeavor required network engineers, server administrators, application developers, mainframe specialists, database administrators, signals experts, project managers, and telecommunications professionals to collaborate and determine the best solutions—whether software, platform, or infrastructure-based cloud services.

**Transitioning to cloud-based server infrastructure - what you need to know:**

“We continue to make progress towards our Strategic Plan goal of becoming a resilient agency. For the last few years, one key area of focus has been modernizing our data centers. Our IT team is diligently working on this project and has made great strides in upgrading our technology and hardware ... Last year, after over 35 years of owning and maintaining our mainframe computer and support systems in the HQ building at Maple Park in Olympia, our IT team successfully moved all operations to the cloud. Our next step is to make a similar transition for much of our remaining server, data storage, and backup equipment... In just a few months, we will have a more reliable and secure modernized data center, helping us become a more resilient agency.”

**WSDOT Deputy Secretary of Transportation**

**IMPACT**



The DCM project has led to improved disaster recovery, optimization, resiliency, scalability, security, and sustainability, ensuring business continuity for WSDOT employees, and enabling the department to complete technology core functions for Washington State citizens and travelers. Leveraging third-party cloud providers has resulted in the modernization of the department's data center environment, improving the agency's ability to defend against cyberattacks, increasing system availability, mitigating aging systems, improving business processes, and adding additional business continuity and disaster recovery capabilities. The project has also improved deployment times and scalability of systems while removing the financial risk of owning and maintaining physical server systems.

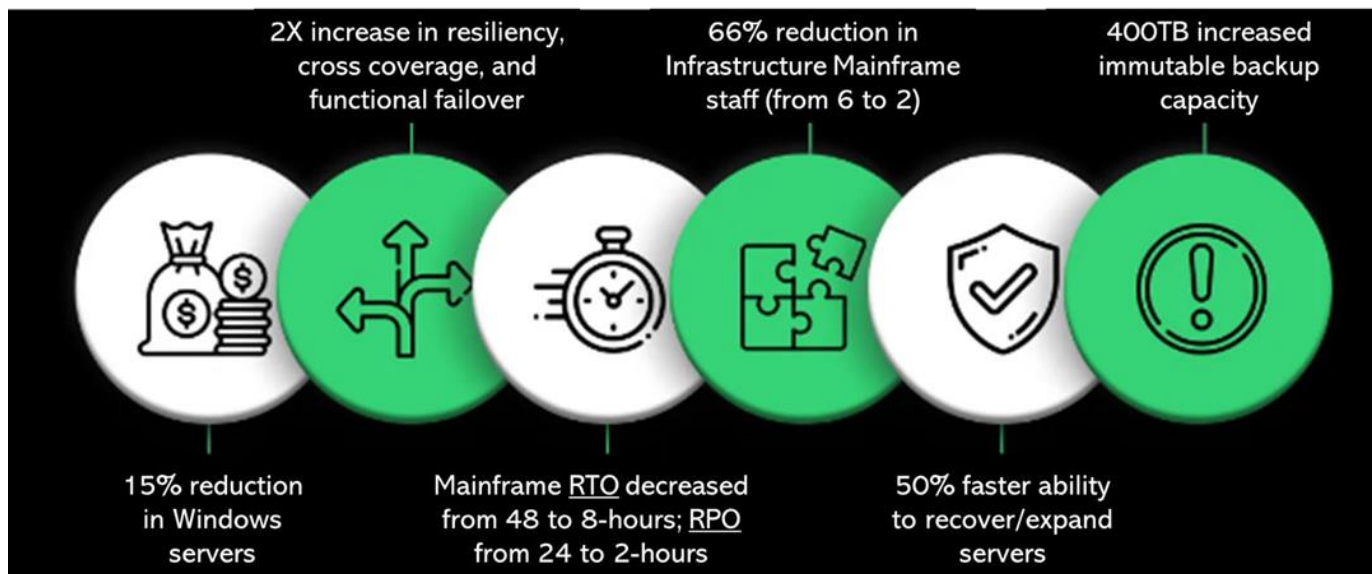
Financially, cloud-migrated systems allow for a predictable, recurring operating-expense pricing model that eliminates maintenance costs and large capital expenditures. This pricing model ensures the agency can more accurately predict technology infrastructure expenditures and level out the budget without



traditional spikes when equipment needs replacement. By migrating to a cloud-hosted environment, the agency reduces its data center footprint with easily upgraded, offsite data storage, increasing productivity anywhere. Reducing the data center footprint will also decrease electrical power usage and the need for backup generators, contributing to a reduced carbon footprint.

The benefits to citizens, other agencies, and the government include improved performance, high availability of the department's networks and externally facing applications. Cloud-based infrastructure aids in the sustainability and expansion of hybrid and remote work environments, allowing for a more diverse workforce.

Key DCM facts include:



The DCM project will continue decisively with elements related to cloud modernization, resiliency, and cost optimization. Active engagement of dedicated technical staff, business units, and leadership/governance from the DCM Steering Committee and WaTech will ensure these initial investments are built upon to improve modernization, resiliency, scalability, and sustainability.

MFaaS continues in maintenance mode, meeting critical needs as mainframe-based systems are individually migrated to cloud-based SaaS solutions, with eventual decommissioning of MFaaS.

Azure IaaS efforts continue with further migrations to Azure-native solutions, serverless applications, cloud tiering, and Azure Virtual Desktop. Workloads unsuitable for cloud environments will migrate to the State Data Center.

Network resiliency will continue with the configuration of an agency-wide mesh network and partnership with WaTech to implement a geo-diverse internet connection in eastern Washington.

Telecommunications Modernization will proceed with the migration from on-premises PBX systems to MS Teams Voice and the replacement of on-premises call centers with cloud-based PaaS call centers built in Amazon AWS.

Q-Free kinetics SaaS will expand to encompass the remaining two WSDOT regions not yet utilizing the current cloud-based enterprise solution.



Assessment of traffic management center systems will continue with thorough analysis, testing, and partnerships.

*“WSDOT Eastern Region was using central traffic signal control software that had reached end-of-life and updates to features and security were not available. WSDOT worked with Q-Free to upgrade to Kinetic Signals in an incremental approach, such that if any problems were encountered in the upgrade, they would be limited to only a few signals. Upon solving any problems, the software was deployed to more devices. Additionally, the parties worked closely to coordinate login to the software using users’ agency credentials. Weekly meetings with detailed notes kept the project on task with minimal delays.”*

**Traffic Engineer for Operations**

*“I’ve done a little checking on the servers moved yesterday. From what I can see they are working well and overall performing better than before the move.”*

**GIS Administrator**

*“The Mainframe-as-a-Service migration was a success from the perspective of my division, the Accounting and Financial Services. The project and the related impacts were communicated effectively, which enabled me to share the expectations to my employees. Overall, the impacts were minimal to my staff, and the outcome was successful. I consider this project a success story. I am also very pleased with the improvements to our disaster recovery coverage. This is a great improvement and gives me peace of mind in case of an emergency. Great job by all!”*

**Director of Accounting & Financial Services**

*“We were encountering a lot of server issues that needed a network administrator to solve, performance issues, bugs, and all-around bad firmware upgrades with another central system/provider. Our goal was to standardize with the rest of the WSDOT so there could be more collaboration between regions, but we also wanted to cut down on our signal related callouts. Time will tell as it pertains to callouts, but we have been very happy with the access and functionality of a cloud-based server as opposed to the on-prem server of old, it is saving our time and that of our region network administrator. Another huge and as important aspect is that any region can now call other regions with issues or just sharing their lessons learned. It’s a win from a technical aspect and from a cost saving aspect.”*

**Electrical & Electronic Systems Specialist Supervisor**