

# Washington State Cloud Readiness Report

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Office of the Chief Information Officer  
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## Executive Summary

The Office of the Chief Information Officer (OCIO) was tasked by the Legislature, in [Engrossed Substitute House Bill 1109](#), to conduct a statewide cloud readiness assessment and produce a report on the results. Over a nine-month period, and with the industry expertise of Unisys, the OCIO managed the effort to document the state's existing information technology (IT) assets, determine agencies' readiness to move assets to the cloud and calculate the costs and benefits of doing so. Using recommendations from this assessment and other expert resources, the OCIO developed a plan to leverage the cloud for optimal financial benefit and provide a strategic platform for innovation and the digital transformation of state government services.

### Key Findings

- Estimates are based on migrating 9,000 servers and 3,300 applications to cloud services.
- The recommended 5 year plan achieves an overall 47% return on investment (ROI) – about \$60 million net benefit, on a \$127 million investment.
- ROI is based on an enterprise migration. A decentralized approach could add 30% to time and cost.
- Many agencies and staff are unprepared for cloud migration. The recommended plan addresses these needs.
- The state will adopt a “Cloud-only” strategy, i.e. agencies shall adopt cloud solutions for all new IT systems and move all existing assets that are compatible.

### Key Findings

- Most agency applications appear to be good candidates for migration to cloud services.
- The recommended five-year plan results in an estimated return on investment (ROI) of 47% – about \$60 million net benefit. This is based on migrating 9,000 servers and 3,300 applications, about 80% of in-scope IT assets.
- A five-year investment of up to \$127 million is required to achieve the estimated ROI and deliver the best strategic value to the state. The five-year plan assumes two years to execute planning and preparatory projects and three years for major migration projects.
- Current (FY20) hardware related costs total about \$78 million annually. ROI calculations assume 80%, or about \$62 million, can be shifted to offset cloud migration investments instead of maintaining or replacing end-of-life servers.
- IT staff must be trained to fill skilled cloud positions, but fewer positions are likely needed in the long term. The state's normal annual attrition could work to align the IT workforce with reduced staffing needs and achieve additional savings.

### Potential Challenges

- Total investment needed for Fiscal Year 2022 (FY22) is \$22.5 million to execute all planning and preparatory projects. This includes required initiatives such as workforce training, cybersecurity and network enhancements, and identity management services.
- A central Cloud Services Broker program provides the foundation for cloud migrations and should be established as soon as possible. WaTech could leverage \$1.37 million

from its existing fund balance to jumpstart the program, but an additional \$7.4 million is needed in FY22 for a statewide configuration management database and other tools to discover, analyze and optimize enterprise cloud migrations. These costs are included in the \$22.5 million total estimate for FY22. An additional \$5.6 million is needed annually to cover the Cloud Services Broker program’s ongoing operational costs.

- The decentralized nature of IT operations across state agencies could increase migration time and costs by 30% or more if a coordinated, enterprise approach is not used.
- Many agencies are unprepared for cloud migration and need time and funding to train staff and manage organizational change. This is part of the two-year planning and preparation time needed before large-scale cloud migrations can occur.
- Applications that are not cloud ready will require remediation, or they will remain on-premises until replaced. Remediation costs are unknown and not included in ROI calculations but are identified as an optional project at an assumed cost of \$15.3 million.
- Migrations could extend beyond FY27 because of budget cycles, complexity of migration, impacts to business and staff resources, and potential for application remediation.

## Recommended Projects and Implementation Models

Multiple implementation models were analyzed with net benefits ranging from \$0 to \$97 million over five years. The models with the highest ROI posed the greatest operational risk and offered the least strategic value. The recommended model achieves 47% ROI for a net benefit of \$60 million over five years on a \$127 million investment. The model assumes 9,000 servers and 3,300 applications are migrated to the cloud over a five-year period, including two years to plan and prepare through a set of recommended projects.

These recommended projects are summarized in the following pages and are thoroughly documented in the accompanying report titled, “Unisys Deliverable 3: Statewide Cloud Computing Readiness Assessment”, hereafter called the Unisys report. The report is a 377-page detailed account of the data, analysis and recommendations resulting from the OCIO’s statewide cloud readiness assessment project.

### State Cloud Migration Plan

The final chapter of this document outlines the steps recommended by the OCIO to achieve the desired ROI, and to set the state on the path to a sustainable and strategic cloud environment. The OCIO recommends that a formal “cloud-only” strategy be adopted with supporting policies and standards. Goals are established with targets for migration and savings as well as workforce development and a plan to implement the recommended preparatory and enabling projects is presented.

#### State Cloud Migration Plan Strategic Goals

- After June 30, 2022, all budget requests for new IT systems target cloud solutions.
- Average of 20% (about 650) of eligible applications are migrated from existing on-premises servers to cloud solutions each year from FY23 through FY27.
- 80% of individual cloud migration projects achieve positive ROI within three years following project close.
- 20% of staff positions identified for cloud support roles achieve necessary certifications each year beginning in FY22.
- 10% reduction in SDC annual operations costs by FY27.

## Background

Since 2013, the Washington State Chief Information Officer's recommended direction has been to "think Cloud-First <sup>(1)</sup>." Agencies were encouraged to consider public, private and hybrid cloud solutions before investing in traditional server-based technology.

In recent years, agencies have increasingly invested in cloud solutions. Several agencies, including the state Health Care Authority (HCA) and the Department of Health (DOH), have gone all-in on cloud technology and the One Washington program is working to replace our statewide labyrinth of administrative and financial systems with a modern cloud-based Enterprise Resource Planning (ERP) system. More than 55,000 executive branch employees are in the process of moving to cloud-hosted email and office productivity services and 60% of 2021-23 IT budget requests target cloud solutions.

Although considerable progress has been made, approximately 90% of the state's major business applications remain locked away in aging on-premises servers, hindering the state's progress towards IT modernization and digital transformation. The state needs a comprehensive cloud strategy and migration plan to take advantage of strategic and fiscal opportunities and maximize IT investments.

### ESHB 1109 Requirements include:

- Creating an inventory of state agency assets (i.e. applications and servers), associated service contracts and other relevant information.
- Identifying impacts to state agency staffing resulting from the migration to cloud computing including:
  - Skill gaps between current on-premises computing practices and how cloud services are procured, secured, administered, maintained, and developed.
  - Necessary retraining and ongoing training and development to ensure state agency staff maintain the skills necessary to effectively maintain information security and understand changes to enterprise architectures.
- Identifying additional resources needed (by WaTech) to enable sufficient cloud migration support to state agencies.
- Submitting a report by June 30, 2020\* to the governor and the appropriate committees of the Legislature that summarizes statewide cloud migration readiness and makes recommendations for migration goals.

\* State and vendor resources were severely impacted during the early months of the COVID crisis causing the project to be paused for several months. When the project resumed the report due date was reset to December 31, 2020

## ESHB 1109

Recognizing this issue, the state Legislature in 2019 appropriated funds in the state operating budget, [Engrossed Substitute House Bill 1109, section 152\(9\)](#). The bill directed the OCIO to conduct a statewide cloud computing readiness assessment to prepare for the migration of core services, including ways the state can leverage cloud computing to reduce costs.

The OCIO, part of Washington Technology Solutions, is responsible for preparing and leading the implementation of a strategic direction and enterprise architecture for information technology throughout state government.

<sup>(1)</sup> [FY14-FY17 IT Biennial Report, pg. 31](#)

The OCIO participated in early discussions with legislators during the development of ESHB-1109 to better understand the intent and expectations of the cloud readiness assessment.

Cost savings was the primary driver of the bill, along with an overall perception that Washington state government should make better use of cloud technologies to reduce operating overhead. Legislators also wanted to understand the potential impacts to the state's IT workforce as systems are moved from local data centers to cloud solutions.

## Statewide Cloud Readiness Assessment Project

To fulfill the provisions of ESHB-1109, the OCIO established the Statewide Cloud Readiness Assessment project with Jim Weaver, State Chief Information Officer, as the executive sponsor. A multi-agency panel selected Unisys to conduct the assessment, noting the Unisys "Cloud Forte" methodology was well-aligned to the requirements set forth in ESHB-1109. The joint OCIO/Unisys project team began work in July 2019.

### Project Scope and Objectives

The assessment scope was limited to executive branch agencies within the purview of the OCIO, excluding higher education. The OCIO also excluded agencies without significant IT systems because they were unlikely to have hardware or software assets that would result in measurable savings from cloud migration. Seventy-nine agencies reported having IT systems supporting their daily operations, although not all of them participated in every phase of the assessment.

Based on the requirements of ESHB-1109, the objectives of the assessment project were organized into the following work streams:

**IT Asset Inventory and Analysis:** The asset inventory created a physical count of IT hardware and business applications used by in-scope agencies. Assets were defined as commercial and custom-developed software applications, databases used by the applications, servers that housed the applications, and any other hardware that supports or enables agency use of the applications. Agencies self-reported their asset inventories because no centralized IT configuration management database exists. The assessment analyzed the assets and reported on the feasibility of migrating them to cloud solutions.

**IT Contracts Analysis:** This analysis reviewed agency IT contracts to determine if cost-savings opportunities exist in utilizing cloud solutions. The assessment evaluated existing spend patterns using data collected and reported by the Department of Enterprise Services. The analysis also determined where cost savings or cost shifting may occur as agencies migrate to cloud solutions. Contracts were reviewed to determine if there were any barriers to using cloud services related to solution requirements or fees.

**IT Staff Impact Analysis:** The IT staff impact analysis identified current cloud technologies staffing levels and skillsets across agencies and identified gaps that may hinder the adoption of cloud solutions. The assessment used available data on state IT staff metrics with assistance from state Human Resources. Additional supporting information was provided through a survey of agency chief information officers. State data was compared with industry data from organizations of similar size to determine where skills gaps exist. The analysis recommended opportunities for cloud training and certification for IT staff and determines if cloud skills are adequately represented in agency training budgets.

**WaTech Resources to Support Agency Migrations:** WaTech manages core IT services used by all state agencies and will play an important role as agencies migrate to cloud solutions. ESHB-1109 required WaTech to determine what additional resources the agency required to facilitate and support agencies as they migrate to cloud solutions.

**Cost/Benefit Analysis:** To report on the anticipated financial outcome of migrating to cloud solutions, the assessment included a cost/benefit analysis of the data collected. Using industry models and trends, the analysis compared the anticipated costs associated with cloud migration activities against the potential benefits that may be achieved in a post-migration environment. The analysis provides the state of Washington with a path to achieve a favorable ROI.

## Data Collection and Analysis

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### *IT Asset Inventory and Analysis*

All 79 agencies in scope for the cloud readiness assessment were asked to provide the project team with an inventory of their IT assets using a standardized template. Inventory data was collected from 63 agencies who reported operating traditional server-based applications. Agencies without server-based applications and those already fully converted to cloud technology are not reflected in this report. Mainframe and similar legacy-based applications were also generally excluded from consideration. These mainframe systems are already on a path for replacement with new cloud-based applications or are moving to WaTech's new vendor-hosted mainframe as a service that employs a cloud-like OpEx rate model.

The data collected was mostly self-reported by agencies. Six agencies were unable to provide inventories with the level of detail needed so an automated discovery tool was used in those cases to collect the data.

All inventories were processed through Transition Manager, a third-party application licensed to Unisys and used for the purpose of analyzing IT assets in preparation for migration to a new computing environment. Transition Manager analyzed the hardware and software attributes to develop a series of datasets that would be used for further analysis. The datasets revealed the apparent age of the hardware, the operating system and database versions, and connectivity dependencies among systems. The data was recorded in an Excel-based tool that Unisys developed called a Cloud Readiness Checklist.

### **The Cloud Readiness Checklist**

The Cloud Readiness Checklist is a multi-tab spreadsheet with formulas that calculate an application's cloud "fit" score. The checklist looks at multiple data elements from the asset inventories, including the implementation date, number of users and underlying technologies. It combines the information with the analytical data from Transition Manager. Those applications that use virtualized operating systems, modern development languages, relational database platforms and secure connectivity standards generally were deemed to be favorable candidates for cloud migration. Conversely, systems with a high user count, outdated or non-standard technologies, or complex

#### **Good Candidates for Cloud Migration**

- Virtualized servers.
- Modern programming language.
- Modern security architecture.
- Relational database.
- Low external dependencies.
- Low user counts.

interdependencies with other systems were deemed to be high risk and unfavorable candidates for cloud computing.

## Results

Initial analysis of the reported inventory data suggested up to 91% of the assets would be favorable candidates for cloud migration. This was due primarily to the fact that nearly all systems use virtualized technologies and modern security architectures that can be replicated with commercial cloud service environments.

The analysis validates that agencies are generally maintaining their IT systems appropriately and keeping up with evolving technology standards. But the analysis also discovered that 23% of agency hardware (i.e. physical servers and storage) are at or near the end of their useful life. Within seven years, all servers in state inventory will be due for replacement.

In total, the in-scope agencies spent about \$78 million annually on server hardware. This presents an opportunity for agencies to shift workloads and funding to cloud storage and compute platforms as servers reach end of life.

### Opportunity

- 91% of inventoried IT assets are favorable candidates for the cloud.
- Servers will be at end of service life in next 2-7 years.
- Server replacement funds should be shifted to cloud preparation and migration projects.

## Considerations

Analysts had only a limited view of the internal and operational architectures of agency systems and the majority of agencies did not provide data on the age of server hardware. Therefore, much of the analysis was based only on assumptions of an application's performance and security requirements. While initial analysis suggests that 91% of IT assets are favorable candidates for cloud migration, the actual percentage could be significantly less.

The "favorable candidate" list should be considered a starting point for additional analysis. Each application's architecture and operating characteristics must be thoroughly analyzed along with data flows and security requirements before making a definitive recommendation of which applications should be moved to the public cloud and which should remain on-premises or in the WaTech private cloud until remediated or replaced.

## IT Contracts Analysis

The 2019 IT Contracts Report and the 05116 Cloud Solutions master contract information published by the Department of Enterprise Services (DES) was used to establish a baseline for the contracts analysis. Unfortunately, the IT Contracts Report included data from only 61 of the 79 in-scope agencies so the data was treated as a large sample rather than a complete data set.

The report organized the data into multiple categories called "towers," which allowed the project team to focus on the subset of towers that were most relevant to the assessment. The Data Center, IT Compute and Storage towers were the most likely to be impacted by cloud migration as the technologies that would be replaced by cloud services fall within these categories.

Tower	Included Technologies
Data Center	Costs associated with the facility that houses agency assets including power, environmental controls, security, racks and cabling.
IT Compute	Purchase, lease, licensing, maintenance, support, and any third-party administration costs associated with physical and virtual servers.
Storage	Purchase, lease, licensing, maintenance, support, and any third-party administration costs associated with centralized storage (SAN, NAS).

**Exhibit 1: IT Towers for Contracts Analysis**

## Results

The IT Contracts Report showed the following tower costs for in-scope agency contracts:

Tower	2019	2020	2021	2022
Data Center	\$43,627,168	\$43,420,698	\$35,945,466	\$31,723,674
IT Compute	\$35,453,192	\$24,247,290	\$15,247,954	\$11,587,436
Storage	\$26,476,293	\$23,157,679	\$15,543,109	\$11,901,805
<b>TOTAL</b>	<b>\$105,556,653</b>	<b>\$90,825,667</b>	<b>\$66,736,529</b>	<b>\$55,212,915</b>

**Exhibit 2: IT Tower Costs, 2019-22**

While the tower costs shown do not include every agency in scope for the assessment, the report provides a good baseline for further analysis related to cost savings. The data indicates many of these contracts will expire during the next two years. This presents a good opportunity to evaluate cloud service options rather than renewing or replacing these contracts for additional on-premises hardware.

The 05116 Cloud Solutions master contract provided detailed information for each vendor agreement covered under the contract. The terms and conditions were reviewed for each agreement to determine if anything would prevent agencies from migrating to cloud services while under contract. Analysis confirmed that nearly all contracts covered by the Cloud Solutions master contract would not be affected by increased use of cloud services.

It is worth noting that many agencies reported contracting individually for cloud services outside of those covered by the Cloud Solutions master contract. This is an indication that agencies may not be getting the best pricing from commercial cloud vendors and a more aggregated approach could yield additional savings.

## Considerations

With the limited data available it was not possible to map a direct relationship between each IT asset and its supporting maintenance contracts. The 2019 IT Contracts Report does not include the detail that identifies the costs of individual assets that were purchased or maintained within each contract. Early discussions with agencies indicated it would be a significant effort for them to provide this level of detail within the timeline and resources available to the cloud assessment project. Therefore, summarized data within each IT tower was used to perform the contracts and cost/benefit analysis.

## IT Staff Impacts Analysis

### Method

Baseline data was gathered about current IT staffing, training, and resource allocations for in-scope agencies. This data included information from the 2019 IT Professional Structure (ITPS) job classification study, published State Human Resources data and an agency survey conducted during the assessment. Cloud support and staffing models from Gartner and other industry sources were used to establish a benchmark for IT resource transformation in a post-migration environment.

The analysis looked at both staffing and training. The staffing analysis sought to determine if agencies had sufficiently skilled resources to support cloud migrations and an awareness of how cloud transformation would impact the organization. The training analysis focused on how agencies prioritized cloud training and if there were barriers preventing them from offering more training opportunities to staff.

### Results: Staffing

The ITPS study and other HR data was used to determine the current state of IT staffing among in-scope agencies. It provided information on job titles, job descriptions, classifications, salary structures and the number of IT positions per agency.

A matrix was developed to cross-reference Washington state IT position titles with equivalent private sector IT job titles, as published by Gartner, in order to create a similar basis for the analysis. The state's IT functional areas do not completely align with the functional areas provided by Gartner, so the cross-reference was based on industry experience.

In-scope agencies had a total position count of 66,979, of which 3,352 were IT positions, representing 5% of the total. Gartner benchmark data suggests that IT staff should equate to 3.7% of an organization's total position count in a cloud-centric environment. Applying this benchmark to the universe of in-scope agencies indicates that 2,479 IT positions are needed for a fully cloud-centric environment, suggesting a 26% reduction is possible.

However, it is important to understand that the Gartner benchmark is derived from studies of single organizations – not a decentralized government enterprise like the state of Washington. Duplication of IT positions across agencies is unavoidable. So, while fewer positions may be needed in the long term, meeting the full reduction target suggested by this benchmark is unlikely.

### CIO Survey Results: Staffing Required to Support Cloud Migration

- 87%** Agencies have developed a plan for IT skills modernization to support cloud technologies.
- 40%** Agencies have not evaluated the impact of cloud migration on the organizational culture, structure and resources.
- 85%** Agencies have no plans in place to reorganize staff workloads to support emerging cloud technologies.
- 74%** Agencies expect staffing levels to remain the same or slightly decrease over the next five years.
- 60%** Agencies currently utilizing third-party contractors to support cloud technology deployments.

When comparing IT staffing levels in an on-premises environment to a cloud services environment, some positions will experience a greater degree of change than others. For example, Gartner benchmarks suggest that server administrators managing 30 servers on-premises could reasonably manage up to 10 times more servers residing in cloud services. Conversely, agencies that had no dedicated IT architects may discover the need to have a cloud architecture team to manage technology deployments in the new cloud operating model.

The benchmarks represent a new approach to deploying, managing and supporting technology in a streamlined cloud services environment. While the analysis suggests that there will be a surplus of IT staff as cloud migrations occur, state HR data indicates that the state of Washington experiences about 8% annual turnover in IT positions due to retirement, attrition and other factors. Therefore, as state agencies develop cloud migration strategies and start to realize operational efficiencies, natural turnover will help to maintain balance in the IT staff workloads. Additionally, these efficiencies may carry over to third-party support requirements as the need to utilize contractors may decrease.

### Results: Training

Analysis of the agency survey results provided additional insight to staffing challenges that agencies may face while migrating to a cloud environment. The results indicate while most agencies have some form of skills modernization plan in place to support cloud technologies, there may not be enough awareness of how that transition may impact IT staff and other aspects of the organization. Financial data from the state's Agency Financial Reporting System (AFRS) was used to establish a baseline for current and historical training expenditures. Since IT training is not represented separately from non-IT training, specific cost information was not available for use in the analysis. Gartner reports that the industry benchmark for IT staff training is \$1,544 per IT employee per year. The agency survey provided some insight into how training is funded and prioritized among agencies.

The results indicate that the percentage of agency training budgets targeting cloud skills development is very low and cloud training in general is not prioritized. As the state pivots from on-premises operations, lack of skills is likely to significantly impede the agency's ability to achieve rapid, large-scale migration to cloud services. Agencies will need to ensure that training budgets adequately support widespread cloud training and certifications opportunities for IT staff.

#### Survey: Skills Shortage

**70%** Agencies have no staff that possess cloud certifications with major commercial cloud providers.

**60%** Agencies that allocate less than 10% of the training budget for cloud skills.

#### Survey: Biggest barriers to offering cloud training:

**25%** No barriers to training.

**25%** Avoid business disruption due to unavailable resources.

**19%** Timeliness of applying new skills in the environment.

**18%** Inadequate training budgets.

## WaTech Support for Agency Migrations

WaTech is the state's central technology services agency and currently provides internet, wide area network, security and other services that agencies use to access to cloud services. To date, WaTech has been able to support agencies as they migrate to cloud solutions because activities have been largely in support of individual cloud projects rather than full-scale data center migrations. If multiple large-scale migrations occur simultaneously, WaTech is understaffed in critical cloud-specialized disciplines to provide adequate support to agencies.

The Statewide Cloud Readiness Assessment concluded that WaTech should follow industry best practices in providing centralized cloud support services so the state can achieve maximum strategic and financial value from cloud technologies. To do that, WaTech should transform its cloud support role to become a Cloud Services Broker (CSB). Both Gartner and the National Association of State Chief Information Officers (NASCIO) cite the cloud services brokerage model as a best practice for state government IT.

In a 2019 NASCIO survey of 49 state CIOs, 48% said they planned to downsize their state-owned data centers over the next three years, while 61% said they planned to expand their managed services over the same period. The cloud services broker model introduces an optimized method for agencies to procure and deploy cloud services. Agencies have the flexibility to choose from a standardized catalog of cloud service options while having access to a broad range of implementation and support services. This presents agencies with a streamlined procurement and deployment process, greater efficiency using shared services and the most competitive pricing available.

To support this model, WaTech will need to undergo a cloud skills modernization effort. Analysis showed that additional staff will need to be hired or allocated and all cloud support staff will need to be trained and certified in the cloud offerings of Amazon, Microsoft, and Google. WaTech currently uses third-party contractors when specialized cloud expertise is required. It is possible that increased staffing and skill levels will reduce the need for contractors, but these savings may largely be offset by the associated staffing costs.

The projects required to transform WaTech for the cloud services brokerage role are identified in the table below as GOV-2 Establish Cloud Services Broker, plus supporting sub-projects identified as EA-1A, EA-1B, and EA-1C. This is the foundational set of projects required to implement the broker model as a WaTech program and to outfit the program with the tools necessary to carry out the broker mission. The total investment for this effort is estimated at \$25.5M over three years with an initial investment of \$8.75M.

### Cloud Services Brokerage (CSB)

CSB is an IT role and business model in which a company or other entity adds value to one or more (public or private) cloud services on behalf of one or more consumers of that service via three primary roles including aggregation, integration and customization brokerage.

(Source: Gartner)

Project Number	Project	Project Duration	Proj. Hours (Mthly)	Project Hours (Total)	Project Cost	3 yr. Run-Time Cost	Total Cost
GOV-2	Establish Cloud Services Broker and CCOE	7	3,840	16,520	\$1,370,680	\$5,773,720	\$7,144,400
EA-1A	Enterprise Application and Infrastructure Configuration Management System (CMS)	9	4,660	21,540	\$2,321,880	\$4,531,200	\$6,853,080
EA-1B	Cloud Financial Management System	9	7,650	40,670	\$2,333,020	\$4,091,580	\$6,424,600
EA-1C	Cloud Management Platform	9	2,280	16,480	\$2,727,980	\$2,356,270	\$5,084,250
<b>TOTALS</b>		<b>34</b>	<b>18,430</b>	<b>95,210</b>	<b>\$8,753,560</b>	<b>\$16,752,770</b>	<b>\$25,506,330</b>

**Exhibit 3: Projects Required to Implement the Cloud Service Broker Program in WaTech**

## Cost/Benefit Analysis

The ROI for cloud investments can be difficult to measure as some of the greatest gains from adopting a cloud services model are not financial in nature. Business agility, scalability, quicker deployment cycles and improved capacity utilization will drive operational efficiencies, but they may not be reflected in an agency’s bottom line.

Some cost savings are readily identifiable, such as the end-of-life decommissioning of on-premises hardware and replacing it with equivalent cloud-based infrastructure as a service (IaaS) compute environments. However, some cloud migrations may show no cost savings at all. According to an article published by ISG <sup>(2)</sup>, “For IaaS services, ROI will vary tremendously depending on the size and type of workload going to the cloud. If you’re bursting a high-performance computing application to the cloud during the two days per month when you need to double its compute capacity, your payback could be significant. Meanwhile, applications with relatively steady use may have modest returns or none at all.”

Another risk factor impacting cloud services ROI is the architecture of the applications and systems as they exist in an on-premises environment. Cost/benefit models usually do not account for system complexity, number of interfaces, development framework, or inter-system dependencies in its normal daily operation. A September 2020 article from McKinsey <sup>(3)</sup> states “the thousands of applications a large enterprise might have built over the past three decades need remediation or re-architecting to run efficiently, securely, and resiliently in the cloud. In some cases, companies have found existing applications cost more to run in the cloud before remediation. Required investments often result in an unexciting ROI for cloud migration.”

<sup>(2)</sup> [Cloud's ROI is More Than a Numbers Game](#)

<sup>(3)</sup> [How CIOs and CTOs can accelerate digital transformations through cloud platforms](#)

A transition from a Capital Expenditure (CapEx) to an Operational Expenditure (OpEx) financing model offers opportunities for cost savings and positive ROI. The cloud's "pay as you go" methodology helps to right-size new technology investments by ensuring that agencies only pay for capacity and services they need. For example, agencies typically procure hardware that is configured for the worst-case operating conditions. This results in purchasing extra processing power, memory and storage to handle the most demanding usage conditions, even if those conditions never materialize. With OpEx, agencies purchase the capacity they need with the ability to scale up or down as demand dictates without the long-term commitment and operational overhead of CapEx investments.

The Statewide Cloud Readiness Assessment project uncovered several opportunities for broad cost savings resulting from migration to commercial cloud computing. However, the scale of measurable benefit these opportunities afford is highly dependent on the degree of preparatory actions taken. The analysis and financial opportunities are presented in each of the sections that follow.

## IT Assets

A migration to cloud services reduces the need for ongoing server hardware purchases. With the majority of agency applications residing within virtual servers, there should be little dependency on the use of on-premises physical servers to run the applications. In most instances, agencies can procure the equivalent infrastructure as a service (IaaS) from commercial cloud vendors and migrate entire virtual servers to the cloud. This reduces the need to purchase and maintain physical servers in an on-premises data center environment. The migration from hardware to cloud services also introduces the shift from a CapEx to an OpEx cost model.

The asset analysis determined that in-scope agencies operate 11,275 virtual servers installed on 5,867 physical servers. Of those, 91% were determined to be good candidates for cloud migration. A target of 9,000 virtual servers (80%) was used – a more typical success rate seen in case studies – at a common cloud server rate of \$188.99 per month for that number of servers. This example rate was based on a three-year contracted price with Microsoft Azure and was the current price published at the time of the analysis.

A comparison was made with 80% (\$62.4 million) of the amount agencies spent in FY2020 on server hardware with the estimated monthly cost of \$188.99 per cloud server. Included in the calculation are costs associated with all nine recommended projects summarized in the Recommended Projects section and detailed in Appendix J of the Unisys report. Adjusting for the 9,000-server scope, the analysis shows a five-year ROI of 47% and a net benefit of \$60 million.

An optional tenth project, (EA-9) Portfolio Rationalization & Cloud Optimization, is not included in the ROI calculations. It is expected that some amount of optimization will be necessary to move applications, but that is already factored into the migration estimates. The optional EA-9 project is recommended to achieve maximum business and strategic benefit from the cloud, but it is not required to achieve the expected ROI. Those systems that require extensive remediation will have to be assessed on a case-by-case basis and may simply remain on-premises until replacement becomes financially viable.

<b>47% ROI, \$60M Net Benefit, by Moving 9000 Virtual Servers to Cloud Computing Services</b>					
	<b>Transition 24-36 mo.</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Total</b>
80% of FY20 Server Hardware Costs		\$62,385,632	\$62,385,632	\$62,385,632	\$187,156,896
Future Cloud Services Compute Environments		(\$20,410,920)	(\$20,410,920)	(\$20,410,920)	(\$61,232,760)
9 Recommended Cloud Migration Projects & Run-time costs	(\$44,347,590)	(\$7,173,097)	(\$7,173,097)	(\$7,173,097)	(\$65,866,881)
<b>Benefit</b>	(\$44,347,590)	\$34,801,615	\$34,801,615	\$34,801,615	<b>\$60,057,255</b>
<b>ROI</b>					<b>47%</b>

**Exhibit 4: ROI Calculations for the Recommended Migration Scenario**

The calculation above represents the recommended scenario that achieves a reasonable net benefit and ROI with moving 9,000 servers, or 80% of total IT assets. Moving additional servers to the cloud will improve these numbers. This approach establishes an optimized model to invest in future training, optimizing processes, and technology innovations with tools to maximize cloud service benefits.

### IT Staffing

Following the transition from on-premises IT operations to the widespread use of cloud computing services, agencies may find that increased efficiencies in cloud technologies require fewer IT staff to support operations. This report does not advocate for a reduction in IT staff across agencies, but it may be possible to realize additional savings by using the natural attrition rate to balance the IT workforce. Unfortunately, the amount of savings is very difficult to estimate.

Unisys, through a review of publicly available data, determined the state averages 10% annual employee turnover for all positions and assumed this average would hold true for IT staff as well. Therefore, the Unisys report suggests a best-case scenario whereby the state could realize an additional net savings up to \$56 million by leaving all these vacancies unfilled.

However, after Unisys completed their report, the OCIO asked the Office of Financial Management, State Human Resources Division, for more information. They provided very detailed data that showed average annual turnover for classified IT positions is just under 8%. Using this number, savings up to \$44 million may be possible by not filling vacancies as they occur over time.

It must be noted, however, that even this level of savings is not likely as agencies fill vacancies with the skilled staff needed to embrace the innovation and transformation opportunities of the cloud. Most CIOs report no FTE reductions are anticipated by moving to the cloud.

## IT Maintenance Contracts

Analysis showed that the in-scope agencies spend an average of \$62 million per year for IT hardware assets with annual maintenance costs for both hardware and software running at about 15% of the original purchase price – roughly \$9 million per year. Those maintenance costs present a significant potential for cost savings as agencies migrate to cloud services and continue the shift from a CapEx cost model to an OpEx cost model.

## WaTech Private Cloud Service

WaTech offers a private cloud service known as the Washington State Cloud. This is a managed service that caters primarily to small and medium sized agencies with limited IT staff. Because of this, most private cloud customers elect the full-support option which, along with WaTech hardware and staffing costs, pushes per server rates substantially higher than rates advertised by commercial public cloud providers.

The private cloud fills a specific business need for agencies requiring higher levels of support or for applications that cannot operate efficiently or securely in a public cloud environment. It is not intended to compete with commercial public cloud services on a large scale. However, the analysis showed that if there was a significant increase in agencies using the WaTech private cloud, WaTech would need to increase staffing and training to support the additional demand.

Other analysis conducted for IT assets and contract data suggests that the private cloud may benefit by migrating from on-premises hardware to public cloud infrastructure. While this may offer savings on future hardware purchases and associated maintenance, it overlooks many of the business and technical reasons customers have for choosing the private cloud.

While not specifically addressed in the Unisys report, WaTech may achieve savings by moving from CapEx to a cloud-like OpEx cost model for private cloud hardware. This maintains the option for agencies that need the service while providing lower operating costs and service rates for customer agencies.

## Recommended projects

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The Statewide Cloud Readiness Assessment recommends nine major projects organized around three themes: Enterprise Architecture (EA); Governance (GOV); and Workforce (WF). Eight of the projects prepare the technical environments and organizations for cloud migration. The ninth is an umbrella program to oversee the actual cloud migration initiatives. The tenth project is the optional EA-9 Portfolio Rationalization and Optimization effort. The OCIO endorses this approach to prepare, manage, and support a large-scale multi-agency cloud migration.

The projects shown in the table below work together to support the state's cloud strategy and provide optimal strategic value. The projects are listed in priority order with the first two being the most important. While it is possible to implement some or none of the others, doing so would introduce additional risk and reduce the long-term sustainability and strategic value of the state's cloud environment.

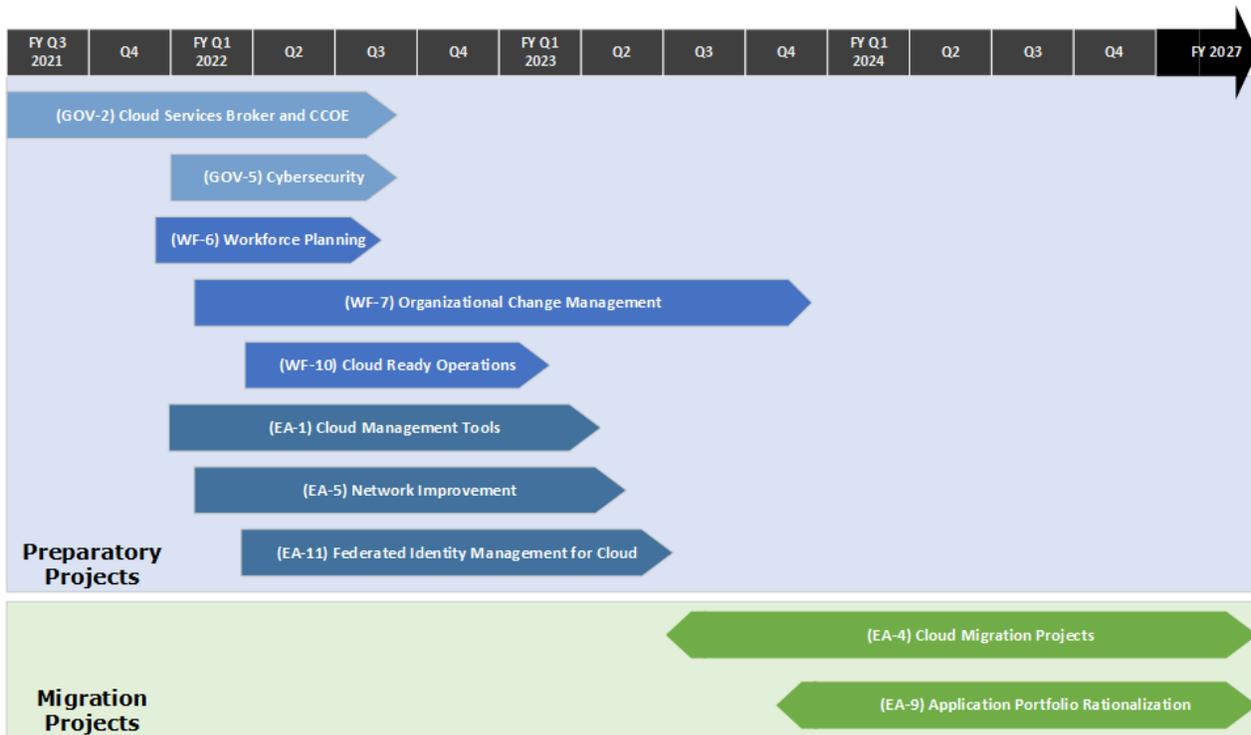
The OCIO recommends executing all the projects identified in the table below beginning with (GOV-2) Establish Cloud Services Broker. Many of these projects will be implemented in parallel. Refer to the sequence chart that follows the table for more detail.

Recommended Projects	Key Opportunities	Benefits
(GOV-2) Enterprise Cloud Service Broker and Cloud Community of Excellence (CCOE).	<ul style="list-style-type: none"> <li>▪ Define criteria for vendor selection.</li> <li>▪ Establish a CCOE for defining best practices and community governance.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Improve procurement, contracting and project management by establishing consistent service levels, cost structures and metrics for cloud adoption.</li> </ul>
(EA-4) Cloud migration projects.	<ul style="list-style-type: none"> <li>▪ Evaluate and plan application migrations.</li> <li>▪ Migrate selected applications to the cloud.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Shift costs to OPEX and on-demand solutions with cost management and governance.</li> <li>▪ Reduce or eliminate agency data centers for cloud services.</li> <li>▪ Support budget and business changes by right-sizing application infrastructure.</li> </ul>
(EA-1) Cloud Management Tools. Includes EA-1A, EA-1B, EA-1C.	<ul style="list-style-type: none"> <li>▪ Establish an application infrastructure inventory management program.</li> <li>▪ Provide shared cloud automation tools.</li> <li>▪ Add continuous cloud financial management across the enterprise.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Track applications and infrastructure to maintain assets more consistently.</li> <li>▪ Identify opportunities to reduce operational costs as applications retire or move to the cloud.</li> </ul>
(GOV-5) Cybersecurity and Risk Management Governance.	<ul style="list-style-type: none"> <li>▪ Security frameworks and data protection.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Manage and provide enterprise standard security services in the cloud using standardized security tools, platforms, and approaches.</li> </ul>
(EA-3) Network Optimization for Cloud Services.	<ul style="list-style-type: none"> <li>▪ Evaluate network bandwidth and data flow changes required to support cloud adoption.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Improve network capacity and resilience for agency locations as applications shift from on-premise to cloud environments</li> <li>▪ Take advantage of available network services to support cloud use.</li> </ul>
(EA-11) Federated Identity Management.	<ul style="list-style-type: none"> <li>▪ Establish cloud-focused federated identity services and platform.</li> <li>▪ Provide a flexible platform to support privileged access management, multi-factor authentication and Active Directory (AD) integration.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provides a single sign-on and integration for cloud services and administrative access.</li> <li>▪ Promotes improved security and user experience by using the state employee's AD ID to access cloud services and applications.</li> </ul>
(WF-6) Workforce Planning Initiative.	<ul style="list-style-type: none"> <li>▪ Skills Management Process.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Investment in training staff and career development.</li> <li>▪ Rebalance IT staff and retirements</li> <li>▪ Reduce External Labor.</li> </ul>
(WF-10) Establish Cloud Ready Operations.	<ul style="list-style-type: none"> <li>▪ Establish agency cloud adoptions and operations team(s).</li> <li>▪ Implement cloud accounts and landing zone environments based on agency requirements.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Use standards, tools, operations based on the agency scale and current needs.</li> <li>▪ Drive cloud adoption through bi-modal operations for cloud and current IT services.</li> </ul>
(WF-7) Organizational Change Management.	<ul style="list-style-type: none"> <li>▪ Develop an organizational change management strategy.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provide the process guidance, communications, and collaboration to support the agencies to maximize the results of cloud adoption.</li> </ul>
<b>OPTIONAL:</b> (EA-9) Portfolio Rationalization & Cloud Optimization	<ul style="list-style-type: none"> <li>▪ Identify application modernization candidates to use available cloud services.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Align application technology use and costs to appropriate cloud services to benefit from the scalability and newer services.</li> </ul>

**Exhibit 5: All Recommended Cloud Preparation and Migration Projects**

The sequence chart below shows the dependencies between the projects and how they should be implemented over time. Note that “GOV-2, Establish the Cloud Services Broker,” begins as soon as possible in FY2021. This is because the functions provided by the Cloud Services Broker program are foundational to cloud migrations and operations. In order to align to the timetable below, \$1.37 million in funding must be invested to establish the Cloud Services Broker program. Delay of this work would push all project timelines out a minimum of seven months.

Ideally, all projects would be implemented, and migrations occur over the course of three to five years. However, EA-4 Cloud Migration Projects, is expected to extend through FY27 because of budget cycles and the amount of preparation required. The optional EA-9 project may extend beyond FY27 depending on funding and the extent of remediation required.



**Exhibit 6: Preparatory and Migration Projects Sequence of Implementation**

This is a notable risk because the de-centralized nature of the IT operations across state agencies, coupled with state and federal funding constraints, are significant risks to large-scale cloud migration and solution adoption. These factors may result in additional preparation time and an increase of up to 30% in costs for agencies to complete their migration projects.

Additionally, demand for centralized services from WaTech to support the migration of nearly 70 agencies may substantially extend the timeline to complete all migrations. Likewise, risk, timelines and cost increase if all agencies do not participate in program governance and collaborate to migrate co-dependent applications.

To help mitigate these and other potential risks identified during the cloud readiness assessment, all recommended projects are necessary. The table below is another view that depicts all the recommended projects, their expected duration and total cost of investment. These costs, with exception of optional EA-9, are included in the ROI calculations in the Cost/Benefit section.

Project Number	Project	Project Duration	Project Hours (Mthly)	Project Hours (Total)	Project Cost	Run-Time Cost	Total Cost
EA-1A	Enterprise Application and Infrastructure Configuration Management System (CMS)	9	4,660	21,540	\$2,321,880	\$4,531,200	\$6,853,080
EA-1B	Cloud Financial Management System	9	7,650	40,670	\$2,333,020	\$4,091,580	\$6,424,600
EA-1C	Cloud Management Platform	9	2,280	16,480	\$2,727,980	\$2,356,270	\$5,084,250
GOV-2	Establish Cloud Service Broker and CCOE	7	3,840	16,520	\$1,370,680	\$5,773,720	\$7,144,400
EA-3	Network Optimization Assessment for Cloud Services	9	3,315	11,720	\$831,160	N/A	\$831,160
EA-4	Cloud Migration Projects	24	32,120	164,560	\$21,874,230	N/A	\$21,874,230
GOV-5	Cybersecurity and Risk Management Governance	6	1,980	11,880	\$923,040	N/A	\$923,040
WF-6	Workforce Planning Initiative	6	2,600	15,600	\$1,438,980	\$1,462,200	\$2,901,180
WF-7	Organizational Change Management	18	4,660	21,540	\$7,070,240	N/A	\$7,070,240
WF-10	Establish Cloud Ready Operations	12	3,730	14,900	\$1,156,700	N/A	\$1,156,700
EA-11	Federated Identity Management - Cloud and Privileged Access	9	3,840	17,040	\$2,121,480	\$3,304,321	\$5,425,801
GOV-8	Cybersecurity and Risk Management - Constituent Identity Standards	3	1,130	3,390	\$178,200	N/A	\$178,200
EA-9	OPTIONAL: Portfolio Rationalization & Cloud Optimization	18	47,960	135,000	\$15,344,360	N/A	\$15,344,360
<b>Total Project Hours</b>		490,840	<b>Required for Transition</b>		\$44,347,590	\$21,519,291	\$65,866,881
<b>Average Hours Per Month</b>		13,634	<b>OPTIONAL-Recommended for Optimization</b>		\$15,344,360	N/A	\$15,344,360
<b>Target Months</b>		36	<b>Total</b>		\$59,691,950	\$21,519,291	\$81,211,241

**Exhibit 7: Investment Required for Cloud Readiness and Migration Projects**

(Note: Table is adapted from Unisys report section 13.5.5 Project Cost Summary. This table includes some minor corrections to cost estimates that are in error in the Unisys report.)

# State Cloud Migration Plan

## Overview

The following plan is derived from findings and recommendations of the Statewide Cloud Readiness Assessment as well as other sources, such as Gartner, McKinsey, Deloitte and NASCIO. These sources agree on most concepts of cloud strategy especially in the key area of motivation for cloud migration. For example, according to the Deloitte Government Trends 2020 report, “Cloud as Innovation Driver,” for the past decade governments have focused on cloud computing as a less expensive way to store data and run applications.

But increasingly, the value proposition of cloud technologies is shifting from just cost savings to greater value. The cloud is an integral part of most digital transformations and in 2019 the National Association of State Chief Information Officers (NASCIO) named cloud the top technology issue facing state CIOs.

Cloud computing is the foundation for emerging technologies that governments are increasingly using such as artificial intelligence, robotic process automation, the Internet of Things, and big data analytics. So, while shifting to cloud may or may not reduce costs, investment in cloud can be justified by the greater value that it can deliver.

The following sections outline recommended goals and a plan to achieve those goals. This plan strives not only to realize savings but also to lay the strategic foundation required to support innovation and emerging technologies. It includes deliberate strategies for managing change and sets the state on a firm path to digital transformation.

### Cloud as Innovation Driver

- Focus on innovation capabilities enabled by the cloud (not just cost savings).
- Introduce cloud-focused policies.
- Break data silos.
- Define the spectrum of identity access management.
- Understand the organizational changes the shift to cloud might demand and make a deliberate change management plan.

*(Source: Deloitte Center for Government Insights)*

## Strategic Goals

- **100%** of budget requests for *new* IT systems target cloud solutions after June 20, 2022.
- An average of **20%**, or about 650, eligible applications are migrated from existing on-premises servers to cloud solutions each year from FY23 through FY27.
- **80%** of individual cloud migration projects achieve positive ROI within three years following project close.
- **20%** of staff positions identified for cloud support roles achieve necessary certifications each year beginning in FY22.
- **10%** reduction in SDC annual operations costs achieved by FY26.

## State IT Strategy and Policy Changes

### Update Cloud Strategy

- The **New** Cloud Strategy is “Cloud-only”, meaning agencies *shall adopt* cloud solutions for all new IT system investments. Existing IT systems shall be migrated to cloud solutions unless doing so imposes an unmanageable challenge, such as business, financial, technical, security or compliance (see updated policy for order of preference).
  - Previously, agencies were encouraged to “think Cloud-first”, meaning they should *consider* cloud solutions before investing in on-premises IT solutions.

### Update State Data Center (SDC) Strategy

- Policy definition of “State Data Center” is expanded to include a cloud-based virtual State Data Center.
- [RCW 43.105.375](#) remains in full effect – “*state agencies shall locate all existing and new servers in the state data center.*” Going forward, agencies are directed to host servers in the new cloud-based virtual State Data Center instead of the physical State Data Center buildings located in Olympia and Quincy.
- After June 30, 2028, agencies will no longer be authorized to operate compute and storage equipment in either the Olympia or Quincy State Data Center buildings without an approved waiver.
- The Olympia SDC will consolidate operations from two data halls into one by December 31, 2026.

### Update State IT Policies

- Policy definition of “State Data Centers” is expanded to include a Virtual State Data Center, centrally enabled and optimized by the WaTech Cloud Broker program. [RCW 43.105.375](#) remains in full effect – “*state agencies shall locate all existing and new servers in the state data center.*”
- All physical compute and storage hardware must be retired, and applications and data moved to cloud-hosted solutions no later than June 30, 2028.
- After June 30, 2022, all new IT initiatives must use cloud solutions. No purchases of physical compute or storage equipment will be approved after June 30, 2022.
- When planning for new solutions or migrating existing systems to cloud solutions, agencies will assess resiliency requirements and acquire appropriate cloud-based services for data protection, high-availability and disaster recovery.
- Agencies will evaluate cloud solutions in the following order of preference:
  - Software as a service (SaaS), if a viable commercial option is available.
  - Virtual State Data Center – Centrally enabled Infrastructure as a Service (IaaS) plus select Platform as a Service (PaaS), and other XaaS (delivery of anything as a service) offerings for hosting compatible commercial off-the-shelf (COTS) software, custom developed software, and legacy applications.

- WA State (Private) Cloud – Infrastructure as a Service (IaaS) for applications with a business case for high performance, low latency, isolation from public clouds, or additional managed support services.
- Proprietary Platform-as-a-Service (PaaS) or managed service providers for applications that require a unique platform that cannot be provided by the Virtual State Data Center or WA State (Private) Cloud.
- By June 30, 2022, agencies will report to the OCIO:
  - A list of all applications with target dates for migration.
  - A list of applications that present an unmanageable challenge to cloud migration with intent to request waivers.
- Agencies will report migration progress to the OCIO as part of the annual certification process.
- Waiver requests will be evaluated on the merits of a documented business or technical challenge that cannot be managed or mitigated by any reasonable means.

## State IT Workforce Strategy

State CIOs report only 30% have staff experienced or certified in cloud support skills. Necessary expertise can be contracted for initial planning and migrations, but cost-effective, long-term support will require a state IT workforce skilled in areas such as cloud architecture, development, security, compliance and operations.

- The State Chief Information Officer, working through the Information Technology Professional Structure (ITPS) governance committee, will jointly lead a statewide IT workforce training and recruitment initiative to increase cloud-related skills of the state workforce. The initiative will:
  - Sponsor the WF-6 Workforce Planning project;
  - Work with agencies to identify new positions and skills required to support cloud adoption and migration; and
  - Work with DES to bring industry-leading, cost-effective cloud certification training programs to state agencies.

## Preparing for Migration

The OCIO endorses the migration approach developed by the Statewide Cloud Readiness Assessment project. Ten major initiatives are recommended and organized around three themes: Enterprise Architecture (EA); Governance (GOV); and Workforce (WF). In order to prepare for, manage, and support a large-scale enterprise migration to the cloud, all projects should be implemented as described in the Recommended Projects section.

A subset of eight planning and preparatory projects are essential to upgrade the security and technical environments and ensure WaTech and other agencies can begin planning for the inevitable operational and organizational changes to come. These projects must be initiated in the first two-year planning and preparation phase in order to meet a five-year migration timeline and achieve the expected ROI benefits. WaTech is the lead agency for all GOV and EA projects and a primary stakeholder in the WF projects.

Preparatory Projects	Key Opportunities	Benefits
(GOV-2) Enterprise Cloud Service Broker and Cloud Community of Excellence (CCOE).	<ul style="list-style-type: none"> <li>Define criteria for vendor selection.</li> <li>Establish a CCOE for defining best practices and community governance.</li> </ul>	<ul style="list-style-type: none"> <li>Improve procurement, contracting, and project management by establishing consistent service levels, cost structures and metrics for cloud adoption.</li> </ul>
(EA-1) Cloud Management Tools. Includes EA-1A, EA-1B, EA-1C.	<ul style="list-style-type: none"> <li>Establish an application infrastructure inventory management program.</li> <li>Provide shared cloud automation tools.</li> <li>Add continuous cloud financial management across the enterprise.</li> </ul>	<ul style="list-style-type: none"> <li>Track applications and infrastructure to maintain assets more consistently.</li> <li>Identify opportunities to reduce operational costs as applications retire or move to the cloud.</li> </ul>
(GOV-5) Cybersecurity and Risk Management Governance.	<ul style="list-style-type: none"> <li>Security frameworks and data protection.</li> </ul>	<ul style="list-style-type: none"> <li>Manage and provide enterprise standard security services in the cloud using standardized security tools, platforms, and approaches.</li> </ul>
(EA-3) Network Optimization for Cloud Services.	<ul style="list-style-type: none"> <li>Evaluate network bandwidth and data flow changes required to support cloud adoption.</li> </ul>	<ul style="list-style-type: none"> <li>Improve network capacity and resilience for agency locations as applications shift from on-premise to cloud environments.</li> <li>Take advantage of available network services to support cloud use.</li> </ul>
(EA-11) Federated Identity Management.	<ul style="list-style-type: none"> <li>Establish cloud-focused federated identity services and platform.</li> <li>Provide a flexible platform to support privileged access management, multi-factor authentication and Active Directory (AD) integration.</li> </ul>	<ul style="list-style-type: none"> <li>Provides a single sign-on and integration for cloud services and administrative access.</li> <li>Promotes improved security and user experience by using state employee AD ID to access cloud services and applications.</li> </ul>
(WF-6) Workforce Planning Initiative.	<ul style="list-style-type: none"> <li>Skills Management Process.</li> </ul>	<ul style="list-style-type: none"> <li>Investment in training staff and career development.</li> <li>Rebalance IT staff and retirements.</li> <li>Reduce external labor.</li> </ul>
(WF-10) Establish Cloud Ready Operations.	<ul style="list-style-type: none"> <li>Establish agency cloud adoptions and operations team(s).</li> <li>Implement cloud accounts and landing zone environments based on agency requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Use standards, tools, operations based on the agency scale and current needs.</li> <li>Drive cloud adoption through bi-modal operations for cloud and current IT services.</li> </ul>
(WF-7) Organizational Change Management.	<ul style="list-style-type: none"> <li>Develop an organizational change management strategy.</li> </ul>	<ul style="list-style-type: none"> <li>Provide the process guidance, communications, and collaboration to support the agencies to maximize the results of cloud adoption.</li> </ul>

**Exhibit 8: Planning and Preparatory Projects**

## Asset and Application Migration

The cloud readiness assessment team conducted a high-level analysis of more than 4,300 applications and concluded that up to 91% are favorable candidates for cloud migration. The projects that address migration activities are shown in the following table and designated EA-4 and EA-9.

Migration Projects	Key Opportunities	Benefits
(EA-4) Cloud migration projects.	<ul style="list-style-type: none"> <li>▪ Evaluate and plan application migrations.</li> <li>▪ Migrate selected applications to the cloud.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Shift costs to OPEX and on-demand solutions with cost management and governance.</li> <li>▪ Reduce or eliminate agency data centers for cloud services.</li> <li>▪ Support budget and business changes by right-sizing application infrastructure.</li> </ul>
<b>OPTIONAL:</b> (EA-9) Portfolio Rationalization & Cloud Optimization	<ul style="list-style-type: none"> <li>▪ Identify application modernization candidates to use available cloud services.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Align application technology use and costs to appropriate cloud services to benefit from the scalability and newer services.</li> </ul>

**Exhibit 9: Cloud Migration Projects**

The EA-4 Cloud Migration project is the main umbrella project that covers evaluation, planning and migration of compatible applications. Many applications will be easy to move, however, others will require more in-depth analysis of system architecture, licensing, run-time characteristics, inter-agency dependencies, data flows and unique characteristics that could impede an application’s cloud performance and drive up costs. Those applications must be identified and then remediated as part of the EA-9 Portfolio Rationalization & Cloud Optimization project. If they are not remediated, then they will remain running in the State Data Center or the WaTech private cloud service until they can be replaced with a native cloud solution.

Agencies will conduct the following activities as part of cloud migrations:

- Work with WaTech to implement a statewide configuration management database and automated discovery tools to identify existing system configurations and assess inter-agency dependencies and impacts of migration (see EA-1A project).
- Assess existing applications for ability to efficiently operate in a cloud environment. Identify those that require in-depth analysis and potential remediation (see EA-4 and EA-9 projects).
- Document a cloud migration plan and schedule for existing applications, considering the end-of-service dates for compute and storage devices. Identify a target cloud platform for each application in order of preference outlined in policy (see EA-4 project).
- Develop a plan to train and/or augment technical staff needed to securely and efficiently manage new cloud environments (see WF-6 project).
- Identify funding needs and develop budget requests as required.
- Participate in enterprise planning and governance activities led by WaTech (see EA-4 project).
- By the dates set forth in policy, provide the OCIO (see EA-4 project):
  - A list of all applications with target dates for migration, prioritizing applications operating on servers nearing end of service life.
  - A list of applications that present unmanageable challenges. Submit waiver requests to the OCIO along with mitigation plans that minimize investments in new server hardware.
  - Annual migration progress reports.

## WaTech Agency Support Strategy

- Establish a WaTech Cloud Services Broker program to optimize cloud operational costs, manage cloud vendor relationships, and assist agencies with cloud migration. The broker program oversees cloud procurement and contract management, vendor management, service level management, and cost optimization. The broker program provides consulting services to agencies in areas such as cloud solution design, automation tools, security, compliance, and migration planning (see GOV-2 and EA-1B projects).
- Establish a Cloud Migration Program office, in coordination with the Cloud Services Broker program. The purpose is to monitor and orchestrate agency cloud migrations to ensure consistency and best practices. This program will coordinate with the WaTech Broker Program to perform migration activities for smaller agencies if required. The program will coordinate with the agencies' cloud migration projects to maintain application dependencies (see EA-4 project).
- Enhance WaTech staffing and skills for large-scale cloud operations. New skills and resources are needed in cloud procurement and contract management, vendor management, service level management, solution design, automation, security and compliance, project management, and consulting (see WF-6 project).
- Implement a statewide configuration management database (CMDB) and automated discovery tools to help identify and document the currently unknown relationships and dependencies between systems and to understand potential impacts of migration. The state needs this detailed information in order to determine best candidates for migration and to minimize security risks and service interruptions to constituents (see EA-1A project).
- Create and enable a virtual State Data Center as an extension of the physical State Data Center. The virtual SDC will provide agencies a standardized environment offering security, compliance, disaster recovery, and efficiency through automated management and cost optimization tools (see EA-1C project).
- Where possible, migrate the Washington State (private) Cloud hardware assets from a CapEx to OpEx model. This will reduce operating expenses and provide better rates to customers (see EA-1C project).
- Lead a statewide cloud migration stakeholder group, the CCOE, to facilitate sharing information and experiences between agencies and to provide WaTech with input on administration of the virtual State Data Center (see GOV-2 project).

## Next Steps: Establish Cloud Services Broker Program at WaTech

The OCIO recommends the state take several steps to capitalize on the full potential of a strategic investment in cloud technology, including formally adopting a “cloud-only” strategy, along with supporting policies and standards.

Policy alone cannot achieve the desired long-term benefits. While experts agree that when properly implemented the cloud can save money, the key phrase is “properly implemented.” Many organizations do not achieve the expected savings because they “lift and shift” their old expensive and outdated systems onto modern cloud servers and expect them to run better and cost less. This is a bad strategy. If such systems are not modified or replaced, then cloud costs will escalate, and the state’s business and customers will suffer.

The plan presented here recommends implementing nine projects, starting with GOV-2 Establish Cloud Services Broker. This is the foundation of a “properly implemented” cloud migration. Not only does the Cloud Services Broker oversee operations of the state’s virtual State Data Center, but it also puts in place the processes and tools to optimize cloud contracts, monitor and automate cloud operations, and keep costs from escalating out of control. Without these processes and tools in place, the state will not see significant savings.

Standing up the Cloud Services Broker program will take time and funding. WaTech needs \$1.37 million in FY2021 to jump start the program so it is operational by July 2021 when the other projects begin, but additional funding will be needed to implement tools and sustain program operations. WaTech could leverage its fund balance for the initial investment, but without it all project timelines would be pushed out a minimum of seven months.

Implementing these recommendations has the potential to result in significant cost savings but equally important it positions the state to deliver superior service to constituents. Moving to the cloud is clearly in the state’s best strategic interest. It is imperative to make smart, strategic investments to enhance the state’s security posture, modernize its IT infrastructure and digitally transform the way government does business.