Arizona State Retirement System PIJ Presentation

Cloud Migration

Arizona State Retirement System

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Agency Vision

For the benefit of our members, the Arizona State Retirement System will be a top performing benefit plan administrator with a solid reputation and sustainable plan design

Agency Mission

Arizona's Revised Statutes § 38-712 outlines the purpose of the ASRS:

- Provide an incentive in the recruitment and retention of employees of the highest possible quality.
- Contribute toward providing a total compensation package that is generally equivalent to comparable employment in other public and private organizations in this state.
- Provide a retirement system that encourages employees to remain in service for periods of time that will provide public employers with the full benefit of the training and experience gained by the employees.
- Provide an orderly method of promoting and maintaining a high level of service to the public through an equitable separation procedure.
- Provide a base retirement benefit that is less than one hundred per cent of a member's postretirement income requirements, recognizing that personal savings and social security also contribute toward total post-retirement income requirements.

Project Introduction

Problem Statement:

This move to the cloud meets the state's Cloud First Policy directive, with an approved extension to June 30, 2022. ASRS intends to achieve greater flexibility in scaling/right sizing compute, memory, storage, network capacity by moving all IT operations to the cloud. The ASRS also seeks to improve its security posture through network segmentation, tightly controlled administrative access, and creation of a base, cloud foundation that allows for future security enhancements not currently available/in place with existing, on-premises infrastructure. The agency also must be ready to conduct critical business functions using the AWS disaster recovery site should a disaster occur and staff must be able to work remotely in that event.

Objectives and Success Criteria:

1. Meet or exceed the State of Arizona deadline to migrate data center (servers, storage, applications hosted in data center) enterprise operations to the cloud
   Success Criteria: Migration completed by approved extension date (currently June 30, 2022)
2. Where feasible utilize infrastructure and routing established by the State of Arizona to achieve alignment and security
   Success Criteria: Standard egress/ingress connectivity outside of AWS environment shall run through State of Arizona core network
3. Cloud migrated applications and data will allow staff to meet the same strategic objectives as pre-migration
   Success Criteria: Cloud migration did not negatively impact staff ability to meet strategic objectives as demonstrated through internal survey comments and senior management feedback
4. Cloud migrated applications and data will meet established availability objectives
   Success Criteria: Meet TSD strategic plan KPIs related to availability
5. ASRS cloud operations are entirely supported by TSD FTE staff without reliance on external professional services by October 2022
   Success Criteria: Successful migration of last 50% of migration with little to no assistance from an external vendor
6. Disaster recovery capabilities in the cloud meet ASRS's recovery time objectives (RTO)/recovery point objectives (RPO) for critical applications
   Success Criteria: Satisfies Continuity of Operations (COOP) recovery time objectives and no loss of data beyond established RPOs (currently 1 hour for database and disk drives)

Project Scope

In Scope:

1. Migrate all Phoenix data center hosted systems not required to remain on-premises for operational purposes
2. Build infrastructure in accordance with AWS well-architected framework and compliant with CIS benchmarks
3. Develop a Network Design End Goal to improve security and prepare ASRS for future initiatives; deliver improvements within the boundaries of available project schedule time and resource availability
    a. Segment servers/services so different controls can be applied separately to different segments. Limit and/or prohibit communication between segments.
4. Configure Active Directory to accommodate AWS cloud environment
5. Maintain compliance with expansion of MFA throughout the organization
6. Establish point-in-time backups in accordance with current RPO and retention requirements. Includes changes in backup software and provisions for "air-gapping" backups in the absence of physical tape media and offsite storage (previous method).
7. Establish disaster recovery solution in compliance with ASRS' RPO/RTO requirements
8. Decommission/terminate VMC upon completion of AWS migration and disaster recovery testing therein
9. Establish procedures and/or automation and train staff for building, running and decommissioning ASRS operations in AWS
10. Configure/implement operational monitoring and alerting
11. Configure/implement cost monitoring and alerting
12. Security information is delivered to the appropriate system
13. Encrypt all data at rest
14. Migrate all oracle databases on Oracle/Sun hardware into AWS
15. Follow Oracle Migration licensing plan worked out by the Database Manager
16. Develop method to test and ensure integrity of migrated systems and data

Out of Scope:

1. Systems/devices required to remain on-premises for operational purposes (ex. domain controller, some firewalls)
2. Migrating workstations
3. Active Directory (AD) clean-up (what is 'in scope' for AD project is out of scope for this project)
4. Managing power/run state of AWS resources to control costs
5. Evaluating/analyzing individual applications for alternate cloud-hosting models. e.g., PaaS, SaaS
6. Encrypting data in transmission within trusted networks and between internal systems

Project Milestones

Milestones:

Milestone 1: Architectural design completed

Milestone 2: Build out AWS per design

Milestone 3: Migration wave plan completed

Milestone 4: Pilot migration (single host systems) completed

Milestone 5: Initial system migrations completed with vendor assistance

Milestone 6: Balance of system migrations completed by ASRS staff

Milestone 7: Functional disaster recovery testing successfully completed

Milestone 8: Testing of backups successful

Milestone 9: Phoenix decommissioned

Milestone 10: Final payments to vendors according to the Statement of Work

Proposed Solution

Procurement

- Partner engagement (Slalom) to assist in project planning, milestone planning and migration of some workloads to the AWS Cloud
  The ASRS issued an RFQ for partner services with firms currently under state contract, and chose Slalom over two other bidders for their reputation, flexibility and industry knowledge

- AWS Engagement (before and during migration)

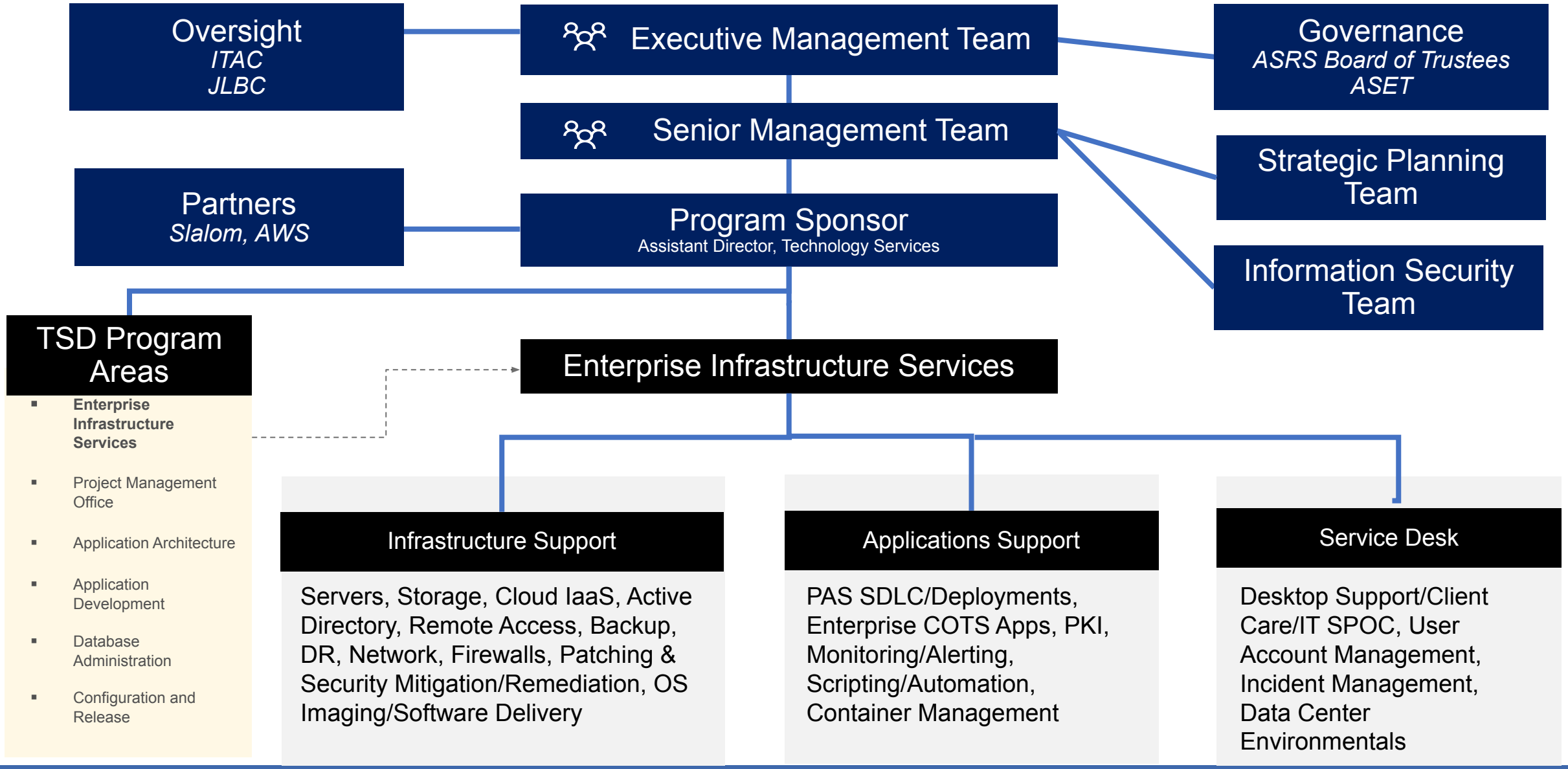
Migration Strategy

- Re-hosting PLUS
  “Lift-tinker-and-shift” all current operations with some key improvements in network architecture and/or design to take advantage of some tangible benefits of moving to the cloud

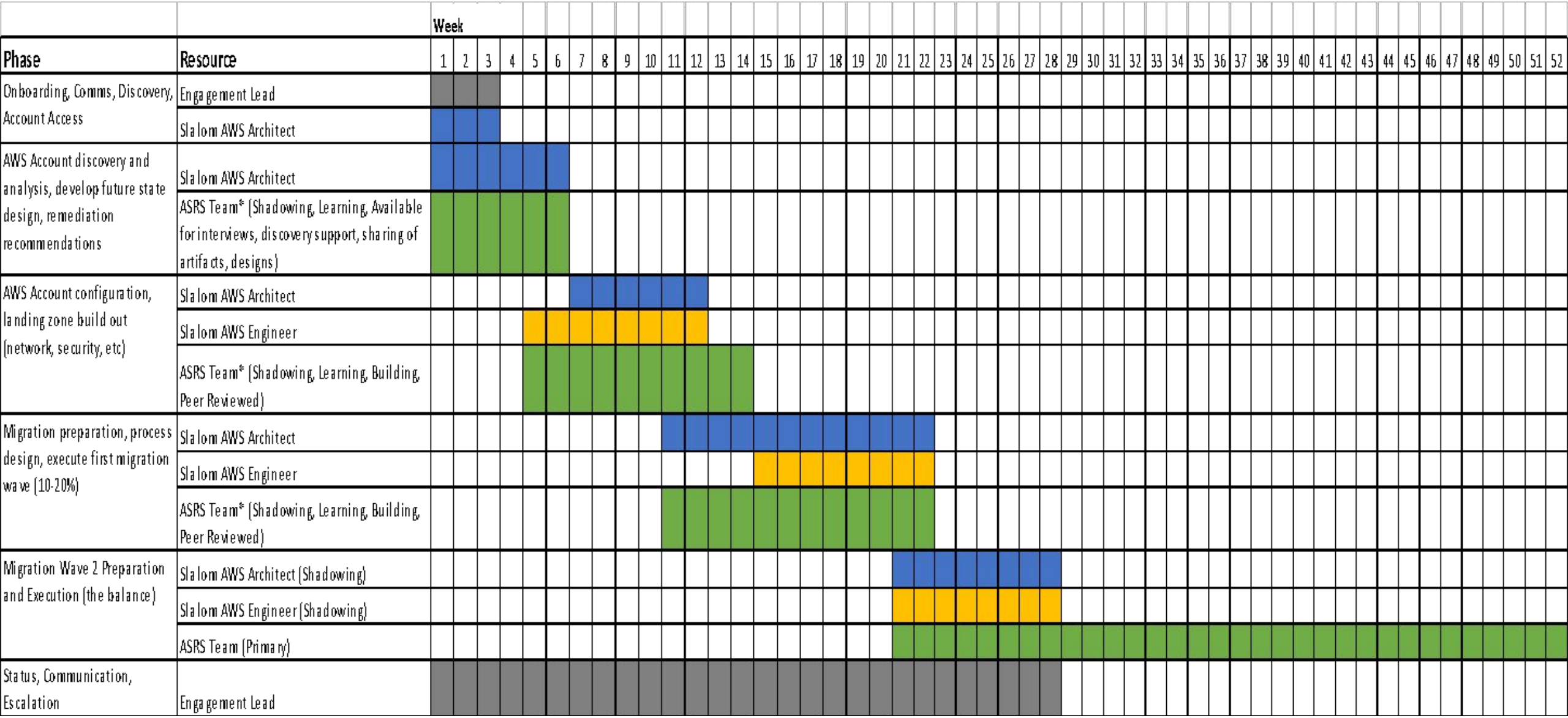
Migration Strategies NOT being considered in 2022

- Re-purchasing
  This option is to completely re-envision the network and applications into a SaaS solution
- Re-factoring / Re-imagining
  This option is to re-architect the design of the current applications using cloud-native features
- Retain (do nothing)

Technology Services Structure – Enterprise Infrastructure



Cloud Migration Project Timeline



Project and Operational Costs

Project Costs by Category	FY22	FY23	FY24	FY25	FY26	Total
Professional & Outside Services (Contractors)	$336,388	-	-	-	-	$336,388
Hardware	$195,480	-	-	-	-	$195,480
Software	-	-	-	-	-	-
Communications	-	-	-	-	-	-
Facilities	-	-	-	-	-	-
License & Maintenance Fees	-	-	-	-	-	-
Other Operational Expenditures	$518,255	$1,159,686	$1,075,646	$1,053,988	$1,032,331	$4,839,906
TOTAL	**$1,050,123**	**$1,159,686**	**$1,075,646**	**$1,053,988**	**$1,032,331**	**$5,371,775**

Financial Impact

Project Development Funding	
Base Budget - Available	$0
Base Budget - To Be Requested	$5,371,775
APF Budget - Available	-
APF Budget - To Be Requested	-
Other Appropriated - Available	-
Other Appropriated - To Be Requested	-
Federal - Available	-
Federal - To Be Requested	-

Total Development Project Funding	
Available Budget	$0
To Be Requested Budget	$5,371,775

Operational Delta	
Current 5-yr on-prem TCO	$3.28M
Proposed 5-yr cloud TCO	$5.37M
5-yr Financial Impact of Cloud Migration	$2.09M

Total Operational Funding - Project	
To Be Requested Budget	$4,839,906

Q & A Session