

2023



Florida Fish and Wildlife Conservation Commission Cloud First Strategic Plan

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## Table of Contents

Executive Summary	2
Cost Savings	2
Scope/Business Objectives and Requirements	2
Historical Overview	2
Current Year Strategy	3
Architectural Overview	3
Backup Methodology	6
Disaster Recovery	7
Data Security	7
Training	8
Contractual Considerations	10
Performance Monitoring	10
Exit Strategy	10
Service Level Agreements	10
Legislative Budget Request	10
Application Modernization Plan	10
Application Modernization Plan Year One Results	11
Application Modernization Ongoing Plan	13

## Executive Summary

Florida Fish and Wildlife Conservation Commission (FWC) completed its efforts to migrate applications from the State Data Center to the cloud. This correlated with the adoption of a cloud first policy and focused on utilizing cloud-computing solutions that minimize or do not require the use of the state data center infrastructure when applicable. FWC was successful in completely migrating all systems and services to the cloud and no longer have any servers in the state data center.

Cloud migrations have provided many benefits including:

- Backups – FWC has direct access to create and maintain backup retention policies and retain snapshots of servers on a rotational daily basis. Restores are timely and easily accessible to the customer.
- Disaster Recovery / Failover – FWC can utilize the utility built into Microsoft Azure with preconfigured routing and bandwidth allocations to respond quickly to outages. This can be utilized for the entire cloud environment.
- Resilient – Migration to the cloud provided ready access to implement a redundant server infrastructure to allow for seamless failover. Additionally, with on premises installation at the State Data Center (SDC), FWC had limited access to our data and infrastructure; through Azure we can access these servers through the Azure portal at any time.
- Security – Migration to Microsoft Azure provides greater control over security. We can restrict traffic on the network and application layers for both private and public access. This allows us to segregate portions of infrastructure and data.
- Scalability – Migration to the cloud provides FWC the option of robust scalability. FWC can increase computer, storage, bandwidth, and security measures at a moment's notice.
- Monitoring – migration to the cloud provides FWC direct visibility into the server infrastructure for real time data analytics and logging.

## Cost Savings

As anticipated, migrations to the cloud are cost-effective. FWC had cost savings of approximately \$374,000 for FY22/23.

## Scope/Business Objectives and Requirements

### Historical Overview

FWC completed documenting the readiness, appropriate strategy and high-level timeline for transition to a cloud-computing service.

The strategic plan requirements were identified by application, specifically the plan identified and documented the readiness, appropriate strategy and high-level timeline for transition to a cloud-computing service based on the *application's* quality, cost and resource requirements.

FWC's plan for year one was to transition primarily single system or application servers. This strategy proved to be successful and was expanded to include other items, including the migration of the entire development environment to the Cloud.

During year two FWC submitted a Legislative Budget Request for the 2021 session to transfer \$483,790.68 in annual recurring funding from the Data Processing Assessment category to the Expenses category to fund the move from the State Data Center to the Cloud. This issue was funded and resulted in a net zero infrastructure cost change.

FWC migrated all user share data comprised of 18TB of data to Microsoft OneDrive, which is included with our O365 subscription. FWC also migrated SharePoint 2010 to Microsoft Azure. These migrations resulted in six decommissioned servers at the State Data Center. Additionally, FWC continued the efforts to migrate FWC's test and production application environments to Microsoft Azure and completed the migration in December 2021.

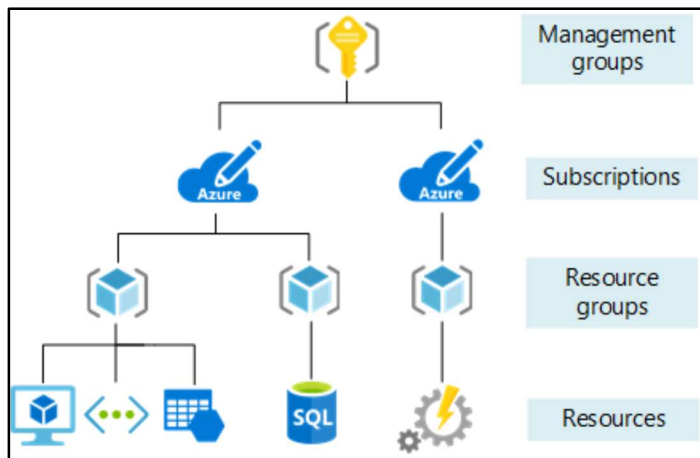
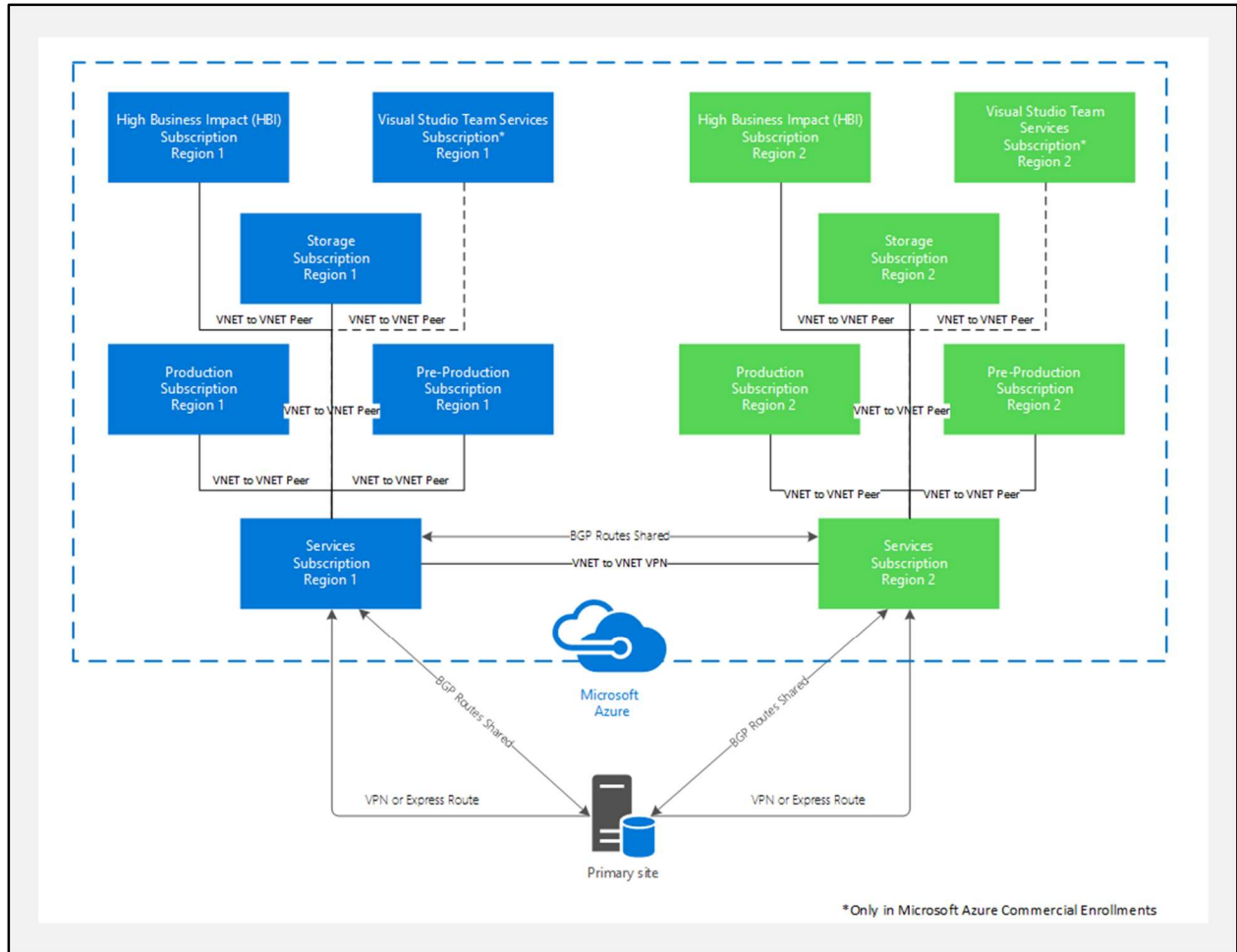
During year three FWC submitted a Legislative Budget Request for the 2022 session to transfer \$219,455.00 in annual recurring funding from the Data Processing Assessment category to the Expenses category to fund the move of Law Enforcement servers from the State Data Center to the Cloud. This issue was funded and resulted in a net zero infrastructure cost change. These were the last applications housed in the State Data Center and they were successfully migrated. This completed our efforts to successfully move from the State Data Center to the cloud.

### Current Year Strategy

FWC will be evaluating low-code/no-code solutions such as Power Platform, expanding our Customer Relationship Management (CRM) footprint, exploring Azure application services and other Software as a Service (SaaS) and Platform as a Service (PaaS) solutions. Furthermore, we will begin migrating to Azure SQL Managed Instance Database, consolidating application infrastructure into standardize solutions, and upgrade dated technologies.

### Architectural Overview

FWC's infrastructure is separated into 5 Azure virtual networks (Vnet.) These Vnets are broken down into PreProd(Test), Development, Services, Production and storage. Each Vnet is logically segregated from the other. This allows for secure communications from the State of Florida high speed ExpressRoute for FWC traffic. This excludes traffic that is not explicitly allowed by FWC. FWC uses subscription-based policy to provide role access security permissions for management access. The subscription services, network security groups and firewall permissions have allowed to provide granular security and monitoring for access to the FWC virtual environment.



## PEERS

Services – Primary hub and where the FWC VPN/ExpressRoute is terminated.

Production

Pre-Prod

Storage

HBI

## SERVICES

The Services subscription is the only subscription that has connection endpoints for VPNs. All direct network connectivity to your Azure environment will be funneled through the Services subscription. The subscription methodology is laid out in a “hub and spoke” manner, Services is the hub of the hub and spoke model.

This subscription houses servers and services that are to be used by workloads spanning other Azure subscriptions. Examples include:

- Active Directory Controllers
- Domain Name Service (DNS)
- De-Militarized Zone (DMZ) type resources

Platform as a Service (PaaS) services are used to monitor the Azure environment. Examples include:

- Log Analytics
- Azure Automation

## PROD (PRODUCTION)

The Prod subscription is for production servers that would not qualify as HBI, Virtual Desktop Infrastructure (VDI), or Services resources.

PaaS services like Azure App Services will house Test, Development, and Production due to the nature of Deployment Slots.

## PREPROD (PRE-PRODUCTION)

The PreProd subscription houses non-production workloads that need access to an on-prem network. PreProd is separated into Test and Development.

HBI

The HBI subscription is for production workloads that have stricter network security and management access requirements. Access to this data should be limited to those with a direct business need to know. Examples include:

- Health Insurance Portability and Accountability Act (HIPAA)
- PCI – Payment Card Information
- PII – Personally Identifiable Information
- Authentication/Authorization Credentials

## STORAGE

The Storage subscription is utilized for archival or tiered storage.

- Azure backup server for on-prem backups
- Azure Store Simple
- Market place appliances for Azure tiering volumes or archive storage.

FWC's cloud infrastructure and configuration follows Microsoft's best practices as well as those of other reputable third-party entities such as Gartner and Airnet.

## Backup Methodology

FWC implemented a robust backup policy for data that resides in Azure.

### BACKUP FREQUENCY

Daily at 2:00 AM Eastern Standard Time

Instant Restore

Retain instant recovery snapshot(s) for 2 day(s)

### RETENTION RANGE

Retention of daily backup point

Retain backup taken every day at 2:00 AM for 150 Day(s)

Retention of weekly backup point

Retain backup taken every week on Saturday at 2:00 AM for 5 Week(s)

Retention of monthly backup point

Retain backup taken every month on First Sunday at 2:00 AM for 13 Month(s)

Retention of yearly backup point

Retain backup taken every year in January on First Sunday at 2:00 AM for 7 Year(s)

## Disaster Recovery

Migrating to Microsoft Azure has provided a secure and reliable way to perform Disaster Recovery utilizing replication to designated geo-located datacenters across the Microsoft Azure United States data center footprint. This allows for backup jobs, servers, services, and access to be replicated in a one-to-one method, while allowing for seamless failover.

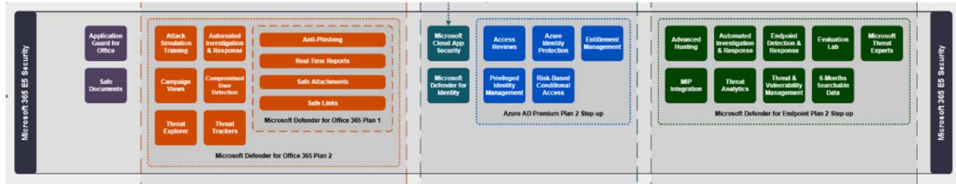
## Data Security

**Data Security**—The Microsoft Cyber Defense Operations Center (CDOC) brings together security response experts from across the company to help protect, detect, and respond 24x7 to security threats against infrastructure and services in real-time. Specific to Florida, Microsoft is currently the only hyper-cloud service provider approved by the Florida Department of Law Enforcement (FDLE) for Criminal Justice Information Services (CJIS) compliance. This is a requirement for FWC.

FWC utilizes Microsoft's robust data security features to provide the following:

- **Identify-based access controls**—Features such as single sign-on and multi-factor authentication are built into Microsoft business products and services to protect information from unauthorized access while making it available to legitimate users whenever and wherever they need it.
- **Multi-tenant cloud environment**—Logical isolation with Azure Active Directory authorization and role-based control, data isolation mechanisms at the storage level, and rigorous physical security. Encryption serves as the last and strongest line of defense. Microsoft utilizes strong, secure encryption protocols to safeguard customer data and help maintain control.
- **Threat Protection**—Exchange Online Protection's deployment across a global network of data centers enables email protection from multi-layered, real-time anti-spam to multi-engine antimalware protection. Microsoft antimalware for Azure cloud services and virtual machines provides real-time protection capability to identify and remove viruses, spyware, and other malicious software.
- **Auditing and logging of security-related events**— Microsoft business services and products provide configurable security auditing and logging options to help identify gaps in security policies and mechanisms and address those gaps to help prevent breaches. FWC is utilizing Microsoft services as follows:
  - centralized monitoring
  - logging
  - analysis systems to provide continuous visibility, timely alerts, and reports to help manage the large volume of information generated by devices and services
- Microsoft 365 E5 security





- Identity
  - Privilege Identity protection
  - Azure Identity Protection
  - Entitlement Management
  - Risk-based conditional access
  - Risky user reporting
- Microsoft Defender for cloud/endpoint
  - Automated investigation and response
  - Endpoint Detection and Response (EDR)
  - Advanced threat analysis and threat hunting
  - Threat and vulnerability management
- Defender for office 365
  - Anti-phishing
  - Safe attachments
  - Safe links
  - Compromised user detection
  - Attack simulation training
- Microsoft Defender for Cloud
  - Manage compliance against critical industry standards
  - Regulatory compliance
  - Threat protection workbooks.
  - Vulnerability detection
  - Security posture and alerts
  - Workload protections and recommendations
  - Vulnerability assessments
  - Adaptive Application control
  - SQL vulnerability assessments
  - Azure inventory management
- Azure Firewall
  - TLS inspections
  - Intrusion detection and prevention system
  - URL filtering

## Training

FWC’s training program for this reporting period was structured around Microsoft’s Enterprise Skills Initiative. This program was tailored to provide skills training specific to each staff member to support

cloud environments and application modernization. FWC will leverage proactive credits that are included in the Microsoft Unified Support contract for application modernization/cloud application workshops to increase the upskilling initiative. See example slides below that represent a training plan for a FWC Data Automation Specialist and an FWC Application Developer:

Upskilling **Data automation** employees at FWC

**Priority 1: Laserfiche Gold certification**

- Getting started with Laserfiche and document capture
- Using and designing Laserfiche forms
- Using quick fields sessions and workflows
- System administration 1 &2

**Priority 2: PPL**

- Power Platform Fundamentals via Training Days in [Learner Experience Portal](#) or [MS Learn](#), [exam](#) available
- [Power Apps + Power Automate- subset of the Power Apps training](#)
- [Integrate SharePoint and Power Automate](#)

**Priority 3: Dax and Advanced Data Analysis**

- [Use Dax in Power BI Desktop](#) available in MS Learn, 2.5 hours
- [DA-100](#) Analyzing Data with Microsoft Power BI, Microsoft Delivered through [Learner Experience Portal](#), [exam](#) available
  - Prereq: MS Azure Data Fundamentals via Training Days in [Learner Experience Portal](#) or [MS Learn](#)

**Priority 4: Teams** – Explore content for relevant competency areas:

- Training Days in [Learner Experience Portal](#) available now:
  - Enable Remote/Hybrid work with MS Teams
  - Building MS Teams Integrations and Workflows

**Priority 5: Security**

[SC-400 Information Protection Administrator](#), instructor led via the [Learner Experience Portal](#)

- Prereq: [SCI Basics](#), [Azure Basics](#), [M365 Basics](#)

Upskilling **Custom Application & Software** employees at FWC

**Priority 1: Azure Developer**

- AZ-204 Developing Solutions for Microsoft Azure, exam available (Microsoft Delivered via the [Learner Experience Portal](#))
- AZ-400: Get started on a DevOps transformation journey, exam available (Microsoft Delivered via the [Learner Experience Portal](#))
- AZ-900: Microsoft Azure Fundamentals, exam available (Microsoft Delivered via the [Learner Experience Portal](#))

**Priority 2: Modernization and Security in Azure**

- Secure your cloud applications in Azure, (Microsoft Delivered via the [Learner Experience Portal](#))
- Build web apps with ASPNET Core for beginners, (Microsoft Delivered via the [Learner Experience Portal](#))
- Create microservices with .NET and ASPNET Core, (Microsoft Delivered via the [Learner Experience Portal](#))
- Microsoft Azure Virtual Training Day: Modernize [.Net](#) Apps

**Priority 3: Blazor and Maui**

- Build web applications with [Blazor](#), (Microsoft Delivered via the [Learner Experience Portal](#))
- Build mobile and desktop apps with .NET MAUI, (Microsoft Delivered via the [Learner Experience Portal](#))

**Priority 4: Power BI and Power Automate**

- Power BI: [Consume Data with Power BI](#)
- [Power Apps + Power Automate- subset of the Power Apps training](#)

## Contractual Considerations

### Performance Monitoring

FWC leverages the Azure Monitor services with all services/applications migrated and deployed to the Microsoft Cloud. Services include:

- Detect and diagnose issues across applications and dependencies with Application Insights.
- Correlate infrastructure issues with Azure Monitor for VMs and Azure Monitor for Containers.
- Drill into your monitoring data with Log Analytics for troubleshooting and deep diagnostics.
- Support operations at scale with smart alerts and automated actions.
- Create visualizations with Azure dashboards and workbooks.

### Exit Strategy

FWC has full rights to migrate to and from the Microsoft Cloud as needed without penalties. FWC ensured proper planning is in place to execute such strategy if/when it is needed.

### Service Level Agreements

All service level agreements are provided Microsoft per service as described here:

- at least 99.9% availability of the Azure Active Directory Basic and Premium services
- at least 99.9% of Azure Active Directory Domain Services
- Applications running in a customer subscription will be available 99.95% of the time

### Legislative Budget Request

FWC did not submit a legislative budget request for FY23/24 for cloud migrations as that work has been completed.

FWC did not submit a legislative budget request for FY23/24 for application modernization as we were gathering functional requirements and investigating other funding sources.

## Application Modernization Plan

When FWC formalized our plan to move to the cloud, we were faced with a decision point on modernizing our application pre-migration or post-migration. To expediate our migration from the state data center, we elected to modernize our applications post-migration. As we have completed migrating all servers and systems to the cloud, we have moved on to our next phase modernizing our applications.

As FWC started the application modernization process the initial analysis determined that of the 155 applications being maintained 72 would require modernization. We anticipated Phase One of the modernization plan would take two years to complete.

During the first year of Phase One, we targeted moving 21 applications to DevOps and performing other modernization activities on eight other applications as detailed in the plan below. We completed moving 25 applications to DevOps and retired one application.

It was during this year, we decided to modify our approach and began to evaluate low-code/no-code solutions such as Power Platform, expanding our Customer Relationship Management (CRM) footprint, exploring Azure application services and other Software as a Service (SaaS) and Platform as a Service (PaaS) solutions.

#### [Application Modernization Plan Year One Results](#)

The following pages reflect the results our year one Application Modernization Plan.

Florida Fish and Wildlife Conservation Commission Cloud First Strategic Plan

Application	Modernization Requirements	Work Hour Estimates	Year 1 /2?	Original Status	Updated Status
Bear sightings	DevOps	80	1	In Process	Completed
Bobwhite Quail Sightings	DevOps	80	1	In Process	Completed
Chipmunk Sightings	DevOps	80	1	In Process	Completed
FWC Master Theme	DevOps	80	1	In Process	Completed
Google Maps for Enterprise	DevOps	80	1	In Process	Completed
Gopher Tortoise Permit Map	DevOps	80	1	In Process	Completed
Gopher Tortoise Sightings	DevOps	80	1	In Process	Completed
Great Florida Birding & Wildlife Trail - Mapping	DevOps	80	1	In Process	Completed
Panther Sightings	DevOps	80	1	In Process	Completed
Rare Snake Sightings	DevOps	80	1	In Process	Completed
Rare Upland Birds	DevOps	80	1	In Process	Completed
Weasel Sightings	DevOps	80	1	In Process	Completed
Wildlife Alert Application	DevOps	80	1	In Process	Completed
CatchaFloridaMemory.com	DevOps; MVC	80	1	In Process	Completed
Commission Meeting Registration	DevOps; MVC	80	1	In Process	Completed
FishKillReport	DevOps, New theme	120	1	In Process	Completed
FishKillSearch	DevOps, New theme	120	1	In Process	Completed
FishKillUpload	DevOps, New theme	120	1	In Process	Completed
Grass Carp Permitting System	Framework updates and remove Telerik dlls	120	1	In Process	Completed
Public Records Exemption Information System	DevOps	80	1	Complete	Completed
Plant Management Aquatic Reporting System (PMARS 2)	Devops	120	1	Not Started	Completed
Commercial Licensing System (CLS)	Devops	Not on List	Not on List	Not on List	Completed
PermitMe Services	Devops	Not on List	Not on List	Not on List	Completed
Trophy Catch Services	Devops	Not on List	Not on List	Not on List	Completed

Florida Fish and Wildlife Conservation Commission Cloud First Strategic Plan

Application	Modernization Requirements	Work Hour Estimates	Year 1 /2?	Original Status	Updated Status
Herbicide Bank	Devops	Not on List	Not on List	Not on List	Completed
FWC Employee Validator	DevOps	80	1	In Process	Retired
FWC Web Site (MyFWC)	DevOps, Umbraco Upgrade, Potential Usage of App Service instead of VM servers.	320	1	Not Started	Revised Strategy
Invasive Plant Management IPM (Sync Service / Toolbar)	Replace WCF with Rest API, Replace Toolbar with GIS Server web form	824	1	Not Started	Revised Strategy
LMIS Area Managers Tools AMT (Sync Service / Toolbar)	Replace WCF with Rest API, Replace Toolbar with GIS Server web form	824	1	Not Started	Revised Strategy
Object-Based Vegetation Management (OBVM) - Land Management Information System	Theme update needed; WCF removed; responsive; .Net 4.8, Report Services; dll; devops, User Mgmt rules	552	1	Not Started	Revised Strategy
Commercial Fresh/Salt License Public Record Export Process	Update SSIS framework version when CLS moves to GOF	80	1	Not Started	Revised Strategy
Departed Users Automated Access Deactivation	Resolve SharePoint access issues with SSIS	80	1	Not Started	Revised Strategy
Hunter Safety > GOF Daily Export	Rewrite	80	1	Not Started	Revised Strategy
NOAA Recreational License Export-Transfer Process	Automate encryption and sftp process	80	1	Not Started	Revised Strategy

Application Modernization Ongoing Plan

The following pages reflect the continuation of the FWC Application Modernization Plan.

Florida Fish and Wildlife Conservation Commission Cloud First Strategic Plan

Modernization Task	Timeline	Status
Create and test a new SQL Manage Instance to handle all centralized activities previously shared across databases and servers.	Within one year	In Process
Develop a “hub and spoke” approach	Within one year	In Process
Determine schedule to Migrate to Azure SQL Managed Instance Database	Within one year	Not Started
Perform migration to Azure SQL Managed Instance Database	12 - 18 months	Not Started
Complete Proof of Concept for Azure Service – SSO	Within one year	In Process
Replace Web Replication (VV Engine) for Application deployments	12 - 18 months	In Process
Replace hardware dependent solutions with cloud options	12 - 18 months	In Process
Consolidate pdf options into one standard solution	Within one year	Not Started
Upgrade webforms applications	12 - 18 months	In Process
Remove old libraries .NET Core 6.0 / 8.0	12 - 18 months	In Process
Deploy MFA solutions across applications	12 - 18 months	In Process
Convert/transition to Github for code repos	12 - 18 months	Not Started
Determine viability for Power BI to handle enterprise reporting needs	12 - 18 months	In Process
Modernize the LMIS suite of apps to match our Blueprint	12 - 18 months	Not Started
Implement monitoring and audit tools for code repositories	12 - 18 months	Not Started
Implement blob storage for new apps and jobs, where applicable	12 - 18 months	In Process
Evaluate Blazor for modernizing infrastructure	12 - 18 months	In Process
Create standardization between applications	12 - 18 months	Not Started