Five-Year IT Roadmap

Governor's Office of Information Technology

Aligning business goals and technology forecasts

July 2019

COLORADO
Governor's Office of Information Technology
Serving people serving Colorado

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Introduction

The Governor's Office of Information Technology (OIT) works in partnership with our customers to create a Five-Year IT Roadmap for each agency we serve. OIT has four primary goals that guide our technology planning to help state agencies receive the most from their technology and related services.

Technology Planning Goals
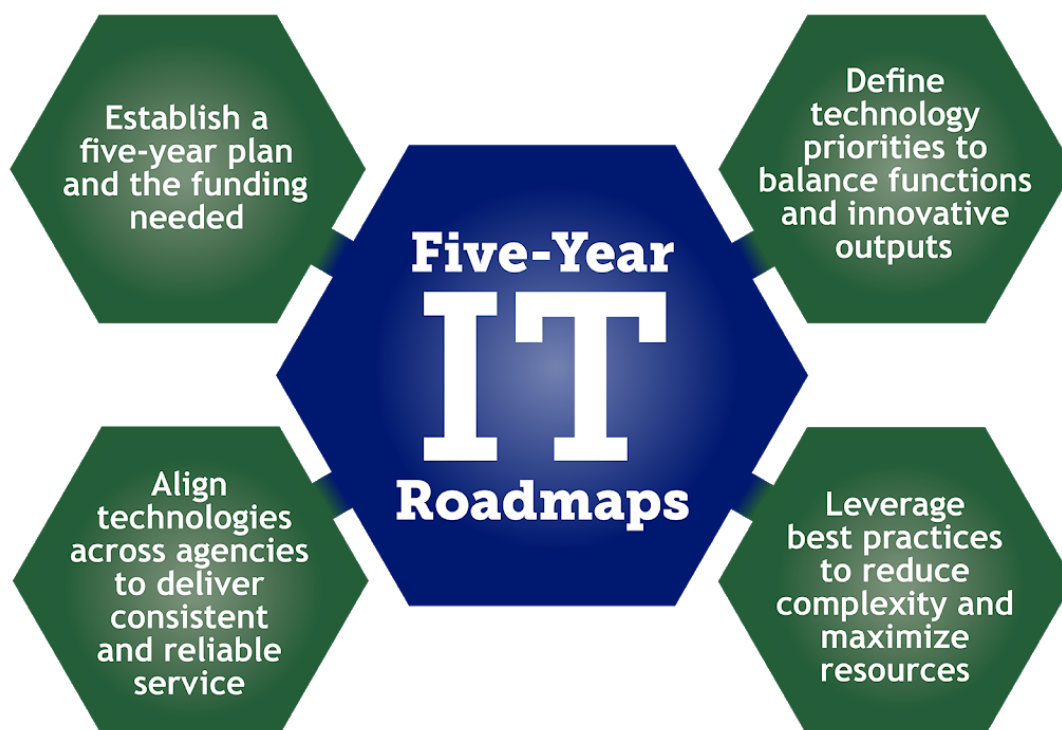
Assumptions

Agency and enterprise initiatives, timelines and costs within this document operate under the following assumptions.

Environment

- Decisions related to major agency initiatives or projects may alter this plan.
- Infrastructure and security will be maintained to meet state and federal compliance.
- OIT is a cloud-first advocate and, therefore, will look to cloud solutioning for all new service needs. OIT will also seek cloud service capabilities for legacy applications/workloads requiring refresh before targeting on-premise utilizations.
- As it relates to this document, the term "enterprise" is used to define high-impact, IT services utilized by multiple OIT customers.

Drivers of Cost and Complexity

- Cost are estimates that are based on an initial quote, vendor information or past initiatives and are subject to change.
- It is estimated that overall IT costs will increase by no less than 3% per year.
- Cost allocation for Decision Items are based on OIT's current Common Policy rates.

Assumed Constants

- Staffing is assumed to remain constant.
- Hardware refresh cycles are assumed to be executed on a four-year lifecycle for desktop computers and a three-year lifecycle for laptops.
- Approximately 20% of the state IT infrastructure is refreshed annually with the intent of completing a full infrastructure refresh every five years. Budget constraints may impact this cycle.

Changes to Roadmap

- This is a living document which will be updated once per year; dependencies, timelines, and cost estimates are subject to change.

Agency Business Objectives

Maximizing technology resources requires that agency business objectives drive technology investments. The objectives below have been identified by the Governor's Office of Information Technology and submitted to the Governor's Office of State Planning and Budgeting (OSPB) to reflect the agency's current top strategic IT priorities.

Objective 1

Increase OIT's organizational efficiency, transparency, and customer satisfaction. Establish a Net Promoter Score baseline to measure OIT customer service by December 31, 2019 and implement a plan to increase that baseline by June 30, 2020.

Key strategies:
1. Assess OIT's scope, capacity, and funding to improve efficiency, transparency, and customer satisfaction. Measured by creating a reform recommendation, obtaining buy-in from the IT steering committee and approved by the governor, and taking action by June 30, 2020.
2. Improve OIT contracting by implementing a new agile contracting and procurement process resulting in a 'reduction of contract issues with vendors' by 5% by June 30, 2020.
3. Develop Strategic Workforce Alignment Plan by September 30, 2019. Fully implement plan by June 30, 2020.
4. Establish a 'project value and performance' measure baseline addressing meeting customer schedule, business outcomes, and budget expectations, and move it from 88% to 91% by June 30, 2020.

Objective 2

Ensure a Secure Colorado by evaluating and improving statewide cybersecurity practices. Measured by increasing the State of Colorado's security metric by 26 points for an increase from 51 to 77 by June 30, 2020.

Key strategies:
1. Enhance the statewide security plan by identifying strengths and vulnerabilities, making necessary modifications, and implementing recommended security controls by June 30, 2020.
2. The BitSight rating will be improved by 50 points for an increase from 550 to 600 by June 30, 2020.
3. The McAfee Compliance score will increase from 60% to 85% by June 30, 2020.
4. 75% of audit findings will be remediated by June 30, 2020.

Objective 3

Expand virtual access to government services anytime and anywhere. Measured by increasing the number of government services virtually accessible to Coloradans by 5 no later than June 30, 2020.

Key strategies:
1. Rollout of release 1 of the myColorado mobile app to include Digital ID and other capabilities by June 30, 2020.
2. Increase broadband access for rural households from 83% to 92% by June 30, 2020.
3. Develop and implement phase one of a Digital Transformation Plan that encompasses emerging technologies, system modernization efforts, and multi-modal unified collaboration strategies (including, as appropriate, data, voice, chat, video, visuals, etc.) to enhance the experience of OIT customers and Coloradans by June 30, 2020. This goal encompasses the increase of virtual access and use of emerging technology to reduce costs, improve consistency and efficiency, and lower energy consumption.
4. Evaluate the landscape of legacy applications and transition five systems to modern architecture that meets mobile, API-driven, cloud, accessibility, and other standards by June 30, 2020.
5. Develop an incubator group to focus on innovation with a goal of at least one pilot innovation project in collaboration with an agency partner completed with case study by June 30, 2020.

Agency Initiative Roadmap

The graph below shows where agency and enterprise objectives fit into the overall five-year roadmap and plan for scheduled completion. The graph contains three sections. The first presents mission critical technology debt which are either agency or enterprise initiatives that are vital to the functioning of government services. The second section presents new solutions which are requested by the agency or initiatives that OIT has identified as a gap in services or solutions, and the third section presents future innovations which are proposed as solutions that will increase state employee efficiency and improve service to Colorado residents and state visitors.

		FY20	FY21	FY22	FY23	FY24
Mission Critical Technology Debt	Application Decommissioning		███	███	███	███
	Application Refresh and Consolidation		███	███	███	███
	CISCO SMARTNet Maintenance	███	███	███		
	Database Monitoring	███	███	███		
	DevOps	███	███	███		
	DTR Microwave Update	███	███	███		
	Enterprise Data Services	███	███			
	PC/Laptop/Workstation Replacement	███	███	███	███	
New Solutions	OIT EcoSystem	███	███			
Future Innovations	Artificial Intelligence (AI), Machine Learning	███	███	███		
	Blockchain	███	███	███		
	Chatbots	███	███	███		

		FY20	FY21	FY22	FY23	FY24
	Database Services - Service-Based Modeling	███	███	███	███	
	Managed Wireless (Meraki)	███	███	███	███	
	Network Connectivity Alternatives (CradlePoint)	███	███	███	███	
	Network Device Security	███	███	███		
	Secured Managed Services	███	███	███	███	
OIT FY21 Concept Paper Submissions	R1 - ITSM System Enhancement Operating	███	███	███	███	
	R2 - Network Continuity	███	███	███		
	R3 - Operating System and Office Productivity Suite Service Growth	███	███	███		
	R4 - Colorado Digital Services	███	███	███		
	R5 - myColorado	███	███	███		
	R6 - OIT Disaster Recovery IT Resource and Program Manager	███	███	███	███	
	R7 - Statewide Data Sharing	███	███	███		

		FY20	FY21	FY22	FY23	FY24
OIT FY21 Concept Paper Submissions	R8 - Technology Advancement & Emergency Fund Spending Authority					
	R9 - Customer-Focused Tools for Billing, Reporting, and Relationship Management					
	R10 - OIT Location Expansion and Workspace Modernization					
	R11 - OIT Workforce Staffing, Learning, and Development					
	R12 - Salesforce Lightning Upgrade					

Agency Initiative Details

Mission-Critical Technology Debt

These initiatives are vital to the functioning of normal government services. Delay in pursuing the initiatives will create a need for future effort and resources that surpass the resources needed if the initiative were carried out proactively.

Application Decommissioning

At OIT, there are two applications recommended for consolidation. This will result in the requirement for Enterprise Applications to process decommission and consolidation plans and obtain agency approval to remove data and decommission servers. This initiative is unfunded and the timeline is FY21-24.

Cisco SMARTNet Maintenance

This agency-funded initiative is the yearly maintenance cost for the SMARTnet contract for the State of Colorado. SMARTnet provides us with extended access to Cisco services, including access to the Cisco Knowledge Base for document and information regarding configuration and support for all our deployed Cisco products as well as the ability to download and use a number of software tools that have been designed to assist OIT in managing our Cisco Network equipment. This initiative is funded and the timeline is FY19-22.

Database Monitoring

Implementing a solution to monitor all state databases will provide OIT with proactive visibility into and analysis of database environments. The solution will provide our customers with a reduction in data loss, preventative measures for failing databases and long-range planning for database storage. To minimize cost, OIT is seeking to utilize existing tools to develop a solution. This initiative is funded and the timeline is FY20-22.

DevSecOps

DevOps affirms a culture of collaboration and achieves efficiencies through harmonization, integration and automation of build, test and deployment process for applications and infrastructure in order to reduce time to market and reduce the number of defects introduced into production. This initiative will:

- Complete source selection and deployment of simplified Continuous Integration / Continuous Delivery toolchain that supports unified and automated process for Java and .NET
- Commence new user onboarding (including conversion of legacy users/execution of migration steps)
- Establish information radiator/dashboard with visibility into pipeline status.
- Ensure Application Security development practices are standardized across all new development efforts

This initiative is partially funded and the timeline is FY19-21.

DTR Microwave Upgrade

The Digital Trunked Radio (DTR) Microwave Upgrade Project will replace the current microwave radio apparatus with upgraded microwave radio hardware and software affecting 220 radio towers, five master sites and 45 dispatch centers located throughout the state.

The existing DTR microwave system is antiquated, and the Public Safety Communications Network (PSCN) is no longer able to acquire parts to maintain or repair it. Industry standards for public safety radio networks requires 99.999% uptime. Any outage, regardless of the duration of downtime, negatively impacts public safety first responders as well as the public who they serve.

With upgraded microwave hardware and software, our public safety customers receive improved reliability when faced with daily threats and also when dealing with disasters where reliability can be no less than 99.999%. This initiative is funded and the timeline is FY20-22.

Enterprise Data Services

Enterprise Integrations - establish and maintain a referential architecture conducive for secure, reliable, highly available, auditable, and reusable exchange of data while attaining sustainability of platforms, processes and people:

- Opening up of data sources through effort dedicated solely through creation of SYS APIs (in execution of State strategy for data sharing and integrations through API Led Connectivity)
- MuleSoft - Runtime migration to CloudHub (Migration Increment 2 - migrating existing non FTI runtimes from on Prem to cloud, upgrading apps from Mule 3.8.4 to 3.9.1)
- MuleSoft - Governance and GDAB Synchronization (establishing business rules governing data / API access)
- MuleSoft - procuring and configuring MQ queueing service
- MuleSoft - procuring (contributing to existing enterprise effort) and configuring Splunk
- MuleSoft Runtime Fabric for on-prem deployment
    - SYS APIs for Non TLS 1.2 data sources
    - CJIS stack
    - FTI
- Mulesoft - FedRamp Cloud
- Automic - Workload Automation - Analytics & AWS based agents; platform upgrade
- MoveIT - AWS Load Balancer & platform upgrade

This initiative is partially funded and the timeline is FY19-21.

PC/Laptop/Workstation Replacement

OIT needs to develop a refresh lifecycle that will annually replace 20% of its PC/laptop/workstation inventory that is at its manufacturer's end-of-support lifecycle. This replacement schedule will keep the state's technology current and under warranty, which ensures continued support for this critical component. Our staff and customers will experience increased IT system performance with decreases in downtime, outages and lost connectivity with the added availability to a secure and stable infrastructure. Refresh request has been submitted for review to the Technology Advancement & Emergency Fund Committee for 25% of our inventory on a yearly basis starting in FY19 and ongoing if funding is secured. This initiative is unfunded and the timeline is FY19-23.

New Solutions

These initiatives provide new yet fundamental service to agencies. Heightened end-user technical expectations are driving service providers to strengthen system functionality. Delay in implementing these new services in the coming years would exacerbate major inefficiencies and significantly impair the state from meeting citizen expectations.

OIT EcoSystem

The OIT Ecosystem is a set of cohesive, integrated tools, processes and policies for OIT to most efficiently and consistently enable technology support and services for state agencies and counties to benefit Colorado residents. The OIT Ecosystem aims to leverage our CA Suite of tools/services to achieve its mission.

- Knowledge Management
- Interactive Voice Response Artificial Intelligence
- Chatbots (Proof of Concept)

This initiative is funded and the timeline is FY19-20.

Future Innovations

The ideas in this section have been proposed as solutions that will allow OIT to grow and discover new and innovative services for state agencies. The solutions in this section will increase state employee efficiency and improve service to Colorado residents and state visitors. These ideas are either unfunded or funded through Decision Item funding. We may see these as new projects in the future.

Artificial Intelligence (AI), Machine Learning

The myColorado mobile application envisions the integration of AI and machine learning to further enhance the user experience on the mobile platform. Planning and cost estimation will occur in FY19 and ongoing. This initiative is unfunded and the timeline is FY20-23.

Blockchain

The myColorado mobile application is evaluating blockchain as part of its next phased roll out in FY19-20. This initiative is unfunded and the timeline is FY20-23.

Chatbots

OIT Service Desk is evaluating chatbots as part of our Ecosystem Roadmap Strategy in FY19. This initiative is unfunded and the timeline is FY20-23.

Database Services - Service-Based Modeling

OIT wants to transform Database Services Common Policy rates to a tiered model: Bronze, Silver and Gold. Bronze represents the base rate while Silver and Gold represent increases due to additional service/support functionality offered. This initiative is unfunded and the timeline is FY20-23.

Managed Wireless (Meraki)

Proof of concept for managed wireless is in process to provide a cloud-based managed service solution to augment the Enterprise Wireless solution at remote locations not connected to the CSN. This initiative is unfunded and the timeline is FY19-23.

Network Connectivity Alternatives (CradlePoint)

Proof of concept for network connectivity alternatives is in process to provide connectivity options to agencies for redundancy and/or alternative connection. This initiative is unfunded and the timeline is FY19-23.

Network Device Security

Network Services is working to identify network device vulnerabilities and remediation across all agencies. This initiative is unfunded and the timeline is FY20-22.

Secured Managed Services

As the demand on our internal security teams continues to expand, OIT is evaluating the use of Managed Services/Security as a Service to augment our teams and enhance the State of Colorado and agency security operations and protection. This initiative is unfunded and the timeline is FY19-23.

OIT FY21 Concept Paper Submissions

OIT has submitted the following requests for funding review; we will not know if these initiatives will be moving forward until later in FY20.

R1 - ITSM System Enhancement Operating

This initiative requests Reappropriated Funds and 0.0 FTE in FY 2020-21 and beyond to support the purchase of licenses and ongoing maintenance for the upgraded and enhanced IT Service Management (ITSM) suite. This integrated tool will improve customer experience through a single hub for all customer needs and inquiries, faster processing with automated workflow, and better IT data with on demand analysis. This unfunded initiative impacts all agencies and the timeline is FY20-23.

R2 - Network Continuity

This initiative reflects an ongoing effort to support the growth in the CSN circuits service. This funding will allow customers to take advantage of the redundancy and expansion capability now available through additional service providers. OIT will utilize additional service providers for network availability, redundancy, and other services to expand and improve the current CSN service provided. This will allow OIT to continue providing network connectivity in almost all areas across the state and serve the people of Colorado. The following list outlines what will be provided with the addition of new providers:

- Allow for an option of redundancy on the state network
- Eliminate outage time caused by Internet Service Provider (ISP) service interruption
- Reduce lost worker productivity at departments caused by lost connections
- Reduce safety risk caused by interruption to the critical and essential applications
- Reduce customer frustration from loss of access to system or application
- Improve Coloradans experience with state services

This unfunded initiative impacts all agencies and the timeline is FY20-22.

R3 - Operating System and Office Productivity Suite Service Growth

This initiative reflects the increased service demand from OIT customers for operating system and office productivity suite licensing. This will allow OIT to have more spending authority to management Microsoft Enterprise License Agreement for these operating system and office productivity suite licenses across the state. This unfunded initiative impacts all agencies and the timeline is FY20-22.

R4 - Colorado Digital Service

This initiative is to onboard Colorado Digital Service (CDS) enriches Colorado's technology ecosystem by providing a pipeline of top technology talent incentivized by a sense of civic duty and focused on solving problems and building citizen-facing digital services benefitting Coloradans. CDS engineers, designers and product managers will be state employees (term limited) collaborating with Colorado's career state employees to participate in procurement and other sensitive discussions. The CDS focuses their efforts on high impact, citizen-facing services and modernization priorities. The "digital tour of duty" hiring model provides an avenue for the best tech talent in Colorado to serve the State for a 1-2 year term-limited period enriching the existing OIT and agency teams. This partially funded initiative impacts all agencies and the timeline is FY19-22.

R5 - myColorado

This initiative is to obtain funding and 13.3 FTE to operationalize the myColorado mobile application, and support the Governors' new vision which is to develop and begin socializing a myColorado digital ID mobile driver license (mDL) that meets the REAL ID Act standards. This unfunded initiative impacts all agencies and the timeline is FY20-22.

R6 - OIT Disaster Recovery IT Resource and Program Manager

The initiative is to obtain funding and 4.0 FTE to support the development of IT Disaster Recovery plans for approximately 148 essential and critical applications and ensure business continuity across departments. This unfunded initiative impacts all agencies and the timeline is FY20-23.

R7 - Statewide Data Sharing

This initiative is to obtain funding and FTE to support staff and tools within OIT to improve standard and systematic data management, governance, and sharing across state departments. These resources will ultimately address the issues of leveraging state data, improving data sharing, and expanding open data through additional staff and tools that will allow OIT to build upon what is currently being implemented. This unfunded initiative impacts all agencies and the timeline is FY20-22.

R8 - Technology Advancement & Emergency Fund Spending Authority

This initiative is to obtain funding and spending authority in FY 2020-21 and ongoing to support the increased demand for the programs and projects supported by the Technology Advancement and Emergency Fund. This unfunded initiative impacts all agencies and the timeline is FY20-22.

R9 - Customer-Focused Tools for Billing, Reporting, and Relationship Management

This initiative is a Customer Relationship Management (CRM) software and tools for financial planning and customer reporting. OIT will increase customer delight by equipping OIT IT Directors, IT Program and Portfolio Managers, senior leadership, service owners, and the finance office with specific tools that enhance customer interactions at each touchpoint and support financial transparency. The requested funds do not include any FTE. This unfunded initiative impacts all agencies and the timeline is FY20-22.

R10 - OIT Location Expansion and Workspace Modernization

This initiative is to support OIT lease space and location modernization needs. The proposed solution has multiple pieces that, together, ensure OIT is taking a strategic first step towards its long term location and workspace needs. The funds requested will address the items detailed below.

- Implement innovative flexible IT Workspace policies
- Expand to new space in a south metro location (OIT South Campus)
- Expand to new space in a North metro location (OIT North Campus)
- Recapture free space at OIT Pearl Plaza for meeting/conference room spaces

This unfunded initiative impacts all agencies and the timeline is FY20-22.

R11 - OIT Workforce Staffing, Learning, and Development

This initiative requests funding to enhance OIT's workforce staffing, learning, and development training. This will create an OIT workforce that is highly-skilled and can effectively act as subject matter experts for everything related to technology. This unfunded initiative impacts all agencies and the timeline is FY20-22.

R12 - Salesforce Lightning Upgrade

This initiative in requests Reappropriated Funds in FY 2020-21 and FY 2021-22 to upgrade the Salesforce applications to the new platform, Salesforce Lightning. Centralized implementation of this upgrade will increase the efficiency of the upgrade and thereby minimize the required expenditures. This unfunded initiative impacts all agencies and the timeline is FY20-22.
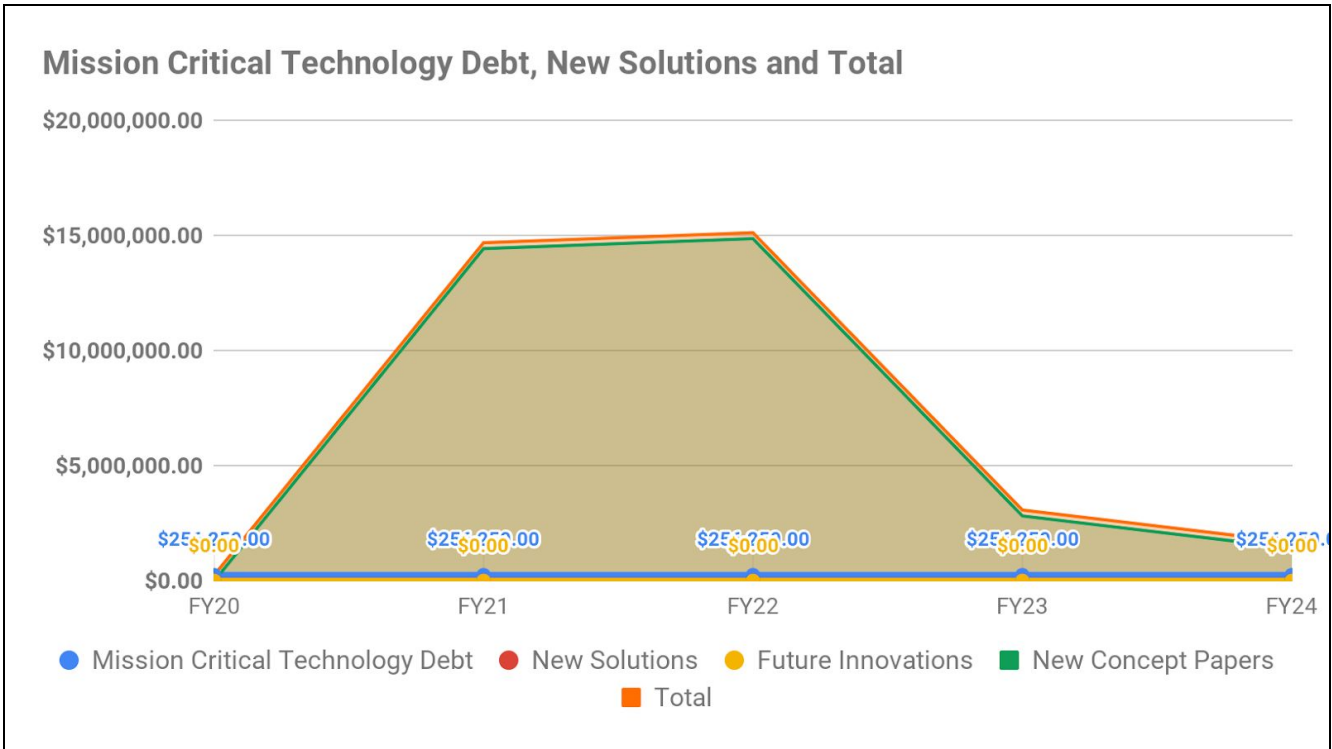
R13 - OIT Long Bill Reorganization

This initiative requests to restructure its Long Bill lines and complete an internal transfer of 5.0 FTE in order to reduce unnecessary complexity, allow for long term trend analysis of major spending categories, increase flexibility needed to support efficient IT service delivery for departments, and align certain FTE in the Long Bill with their current job function. This request is a technical change that does not require any additional funding or FTE.This unfunded initiative impacts all agencies and the timeline is FY20-22.

OIT Unfunded Technology Outlook

The totals below are high-level cost estimates where funding has not been clearly identified. In most cases, for technology initiatives defined as an OIT enterprise initiative, OIT seeks funding through Decision Items. Enterprise initiatives help ensure that the state maintains consistent technology service and is able to take advantage of scalable rates.

	FY20	FY21	FY22	FY23	FY24
Mission-Critical Technology Debt	$256,250.00	$256,250.00	$256,250.00	$256,250.00	$256,250.00
New Solutions	$0.00	$0.00	$0.00	$0.00	$0.00
Future Innovations	$0.00	$0.00	$0.00	$0.00	$0.00
New Concept Papers	$0.00	$14,187,926.00	$14,879,516.00	$2,828,946.00	$1,440,057.00
TOTAL	$256,250.00	$14,444,176.00	$15,135,766.00	$3,085,196.00	$1,696,307.00

Mission Critical Technology Debt, New Solutions and Total

Legend: ● Mission Critical Technology Debt ● New Solutions ● Future Innovations ■ New Concept Papers ■ Total

Appendix A: Enterprise Initiative Roadmap

Enterprise initiatives help to ensure that the state maintains consistent technology service and is able to take advantage of scalable rates. These initiatives are part of OIT's overall strategic direction and may be mandated or offered to agencies optionally. This timeline has been included to provide a reference as to how an individual agency's IT Roadmap correlates to OIT's enterprise plan. Descriptions of each initiative can be found in Appendix B.

		FY20	FY21	FY22	FY23	FY24
	Enterprise Initiatives					
Mission Critical Technology Debt	Application Lifecycle Management	■	■	■	■	
	CORE NIST File Transfers	■				
	Clarity PPM (CA PPM or Clarity)	■				
	Enterprise Infrastructure Refresh	■	■	■	■	
	Firewall Upgrades	■				
	HRWorks	■	■	■		
	Mainframe Decommission	■	■	■	■	
	Network & Infrastructure Refresh	■	■	■	■	
	Next Generation Colorado	■	■	■	■	
	OS Server Upgrades	■	■			
	Telecom Enhancements (MIPC)	■	■			
	Two-factor Authentication	■				
	Windows 10 Upgrade	■				
New Solutions	Antivirus Protection Removal	▣	▣	▣	▣	▣
	Content Services Application Consolidation	▣	▣	▣	▣	▣

		FY20	FY21	FY22	FY23	FY24
	Content Services Enterprise Solution Deployment	■	■	■	■	■
	CrowdStrike	■	■	■	■	■
	Desktop Cloud Backup	■	■	■	■	■
	MyColorado	■				
	Privilege Access Management	■				
	Salesforce Platform Org Strategy	■	■	■	■	■
	Salesforce Lightning Migration	■	■	■	■	■
	Salesforce Release & Environment Management	■	■	■	■	■
	Secure Office Print Ecosystem (SOPE)	■				
	Technology Accessibility and Mobile Assessment, Testing and Remediation	■				
Future Innovations	Cloud Access Security Broker	■	■	■	■	■
	Data and Access Governance	■				
	Cloud Access Security	■	■	■	■	■
	East West Traffic Security	■				
	Easy Secure Service Excellence - ESSE		■	■	■	■
	End-to-End Monitoring and Logging	■				
	Identity Analytics and Risk Intelligence	■				
	Server and Deskside Endpoint Management	■				
	Smart Cities Exploration	■	■	■	■	■

Appendix B: Enterprise Initiative Details

This section provides an overview of each Enterprise Roadmap initiative.

Mission-Critical Technology Debt

These initiatives are vital to the functioning of normal government services. Delay in pursuing the initiatives will create a need for future effort and resources that surpass those needed if the initiatives are carried out proactively.

Application Lifecycle Management

With an inventory of 1100+ applications, a key strategy for OIT is to streamline the application footprint. Through the consolidation of existing and new applications onto standard enterprise platforms, OIT can create a simpler and easier end-user experience, reduce the long-term cost of maintaining duplicative applications, and strengthen OIT's support capabilities. Consolidation efforts completed through FY16 were funded through the Eliminate Redundant Applications Decision Item; with the funding of the Service-Oriented Business System Refresh Decision Item, $800,700 will be approved for this program in future years. Allocation of the funds will be under the authority of an agency focused governance team. This funded initiative impacts all agencies and the timeline is FY20-23.

CORE NIST File Transfers

The CORE secure file transfer service provides file transfer services between the State (all agencies, Wells Fargo and other external/higher education institutions) and the CORE financial system. The CORE file transfer service was originally implemented during the CORE project as a temporary service. The service compromises regulatory compliance and security of the assets entrusted and has significant risks from process and personnel perspectives. Although meant to be a secure file transfer server, this asset is also used for archival of data files and the nature of that use compromises both the asset and the content. Data currently on the CORE secure file transfer server needs to be migrated to the properly structured and organized file storage and appropriate archiving and retrieval processes need to be established. If not executed there will be severe impacts to the CORE system and continued audit findings, it will cause a drain on OIT resources needed to support the current solution and perpetuation of risk due to inadequate business processes and inadequate, costly IT solutions supporting those processes. CORE secure file transfer server replacement will require any current department/agency user of CORE to become a consumer of technology platforms (Automic and MoveIT) providing new CORE integration services. This unfunded initiative impacts all agencies and the timeline is FY20.

Clarity PPM (CA PPM or Clarity)

Clarity PPM is a comprehensive project and portfolio management tool in use by OIT and other agency customers to track and report on projects, programs and maintenance activities across the State enterprise. In recognition of this, OIT will begin distributing the costs associated with the tool by user license and type. Invoices are received from the vendor on or about July 1 of each fiscal year. OIT will produce a report of all users on July 1 of each year and based upon license type disburse the expense amongst the agencies of the user community. This initiative impacts all agencies and the timeline is FY20.

Enterprise Infrastructure Refresh

This effort includes refreshing infrastructure support equipment (power, HVAC, UPS systems, etc.) for all agencies in order to ensure service uptime is in accordance with our service level commitments. This unfunded initiative impacts all agencies and the timeline is FY20-23.

Firewall Upgrades

OIT will continue upgrading the disparate agency-specific firewalls to the statewide standard Next Generation Firewall. These firewall upgrades will increase security through web filtering, application inspection, and intrusion protection systems, and we expect to see significant cost savings from an enterprise licensing agreement. Agencies targeted for FY19: OIT-GOV, DNR, DOLA, CDA, DOR, CDHS, CDLE, HCPF, DPA, CDPHE,Treasury/Facility; for FY20: HC, CDPS, DORA. HC has requested that its firewall be migrated earlier than FY20 if possible; depending on availability of resources, OIT will try to meet this request. This funded initiative impacts all agencies and the timeline is FY19-20.

HRWorks

The Department of Personnel & Administration (DPA) and OIT continue their work to develop an enterprise Human Resource Information System (HRWorks). The HRWorks project is a collaborative effort to consolidate approximately 80 disparate, outdated, and redundant systems into a modern, seamless solution that will eventually integrate with CORE, the state's financial system of record. Development of the system is funded through a DPA FY16 Decision Item. At this time the HRWorks project consists of human capital management (HCM), benefits module, payroll, labor allocation and timekeeping. Work is underway to Identify the impact to each agency. Decommissioning of CPPS and related applications will be handled as a separate project. This funded initiative impacts all agencies and the timeline is FY20-22.

Mainframe Decommission

OIT is working to retire the mainframe and associated applications. Integration and data sets must be identified and planned for migration or retirement. This includes determining agency costs. Agencies that still have applications on the mainframe include the Departments of Human Services, Labor & Employment Personnel & Administration, and Revenue. Additionally, with the state payroll system on the mainframe, all agencies are impacted by this initiative. OIT has identified dependencies amongst other large projects that will prevent the retirement of the mainframe until functionality residing on the mainframe moves to new applications, and will require agency funding to address agency-specific migration and services costs. This funded initiative impacts all agencies and the timeline is FY20-22.

Network & Infrastructure Refreshes

OIT is developing a statewide refresh lifecycle that will annually replace 20% of network and systems infrastructure that is at its manufacturer's end-of-support lifecycle. This will keep the state's technology current and under warranty, which ensures continued support for these critical components. Customers will experience increased IT system performance with decreases in downtime, outages and lost connectivity with the added availability to a secure and stable infrastructure. This is an ongoing effort that will incur some impact to each agency each year. The effort has been funded through the FY16 Infrastructure Refresh Decision Item; however, the funding does not cover all the needed network refreshes, so agencies will need to fund part of the agency-owned network components. The systems infrastructure portion of the refresh initiative includes shared storage and vBlock hosting platforms in the two state data centers. Agencies do not pay additional funding outside the Decision Item budget line for this portion of the refresh effort. This unfunded initiative impacts all agencies and the timeline is FY20-23.

Next Generation Colorado

This is a two-part initiative representing infrastructure and operational improvements as well as data center modernization. Next Generation Colorado is an initiative to develop the automation and operations to support quick service delivery, transparent cost modeling, scalability on-demand, high availability, upgrades and agility of workloads across the enterprise. This effort will also include data center modernization, operational management and hybrid cloud solutioning to span private and public Infrastructure as a Service (IaaS) models. This is a capital-funded initiative from a FY18 Decision Item. Half of the funding was approved for use in FY19 and will support cloud readiness and sustainability, security improvements and data center repairs. The second half of the funding is expected to be approved for use starting in FY20 and will be used to continue our FY19 work as well as automation and service efficiencies. This funded initiative impacts all agencies and the timeline is FY19-23.

OS Server Upgrades

As Windows Servers (2003, 2008 and 2012) reach their end-of-support lifecycles, it is increasingly difficult to find service providers who continue to support these operating systems (OS). To ensure state servers continue to receive appropriate support and reduce risk, OIT will retire and replace all server end-of-support operating systems used by supported agencies. Moving to a newer version will give customers a more secure and supportable OS for their applications. The Enterprise Applications and the Server Admin teams will work together to determine the affected applications in FY19 and migrate the servers to the new OS in FY20 and FY-21. This unfunded initiative affects all agencies and the timeline is FY19-21.

Telecom Enhancements (MIPC)

To keep our phone technology current and consistent, OIT's Telecommunications Team will migrate agencies from their stand alone Cisco VoIP systems to the enterprise Managed IP Communications (MIPC) voice solution. The multi-year initiative is in the planning phase for the four remaining agencies: CDPHE, DNR, DOLA, CDHS/CMHIP. Implementation will occur as the current stand alone Cisco VoIP system approaches end of life in each of the agencies. This unfunded initiative impacts CDHS/CMHIP, CDPHE, DNR, DOLA, DOC and the timeline is FY20-22.

Two-factor Authentication

OIT will enable two-factor authentication (2FA) to add an extra layer of security to the verification process and thus reduce the risk of data breaches and meet data privacy requirements. OIT's internal and statewide access control policies require that access to the state's information systems be restricted to just those who need access to perform their jobs, using the principle of least privilege. The implementation to CDHS, CDPHE, DNR, DOLA will be completed by the end of FY20.

Windows 10 Upgrade

Support for the Windows 7 operating system (OS) expires in January 2020. To ensure there is no lapse in support, OIT will upgrade all Windows 7 computers (desktop and laptop) to Windows 10. This is a multi-year effort that spans 17 agencies and more than 28,000 devices. The Microsoft Enterprise License Agreement will cover the upgrade for all agencies except four that will need to cover the cost of the upgrades: CDHS, CDOC, DNR and HC. This is a funded initiative and has a timeline of FY20.

Enterprise New Solutions

These initiatives provide new yet fundamental service to agencies. Heightened end-user technical expectations are driving service providers to strengthen system functionality. Delay in implementing these new services in the coming years would exacerbate major inefficiencies and significantly impair the state from meeting citizen expectations.

Content Services Application Consolidation

Per the findings from a recent audit, Enterprise Content Services (ECS) will strategically assist agencies in transitioning and migrating away from unsupported, legacy content services applications. The goal is to eliminate redundant agency deployed ECM applications, which will dramatically reduce agency hardware and software costs by leveraging our Enterprise License Agreement with Hyland. Furthermore, this will streamline content management applications and directly support the playbook strategy of "Strengthening Colorado's Technology Landscape". We will continue to move the states legacy and/or unsupported applications to our enterprise content services platform, which will reduce the total number of applications. The EDW application is the immediate focus in FY20-FY22 and is used by 14 agencies today. HP Records Manager deployed at CDPHE will also drive forward in FY21-22. This initiative is unfunded and the timeline is FY20-24.

Content Services Enterprise Solution Deployment

ECS is continuing to develop enterprise solutions that can be leveraged by all agencies - highly standardized with an ability to customize via embedded non-code configuration will dramatically increase time to value. Agencies will directly benefit with improved operational efficiency, document/information sharing, visibility and cloud infrastructure. This effort ties to many of the agency application modernization efforts. Targeting License, Permitting & Inspections, Contract Management, Electronic Requisitions, Employee File Management, and Travel Requests, Approval & Reimbursement solutions. These solutions will improve business processing times and bring complete visibility to each business lifecycle, saving time and money! Content Services enables us to establish these enterprise solutions, which become standardized products offerings in our solutions portfolio. This initiative is based on the assumption that approximately half of the agencies leverage each of the following solutions:

> 1. License, Permitting & Inspections - OIT pilot is underway. Standard service offerings are slated for FY20.
> 2. Contract Management - contract creation through signatories (integrated with DocuSign). OIT project in-flight.
> 3. Electronic Requisitions - complete processing of funding requests with dump into CORE - already live at OIT.
> 4. Employee File Management - focus on capturing and managing HR employee files. OIT and CDOT are in-flight.
> 5. Travel Requests, Approval and Reimbursements - already live at OIT.

This unfunded initiative affects all agencies and the timeline is FY20-24.

Crowdstrike Deployment

Deploy Crowdstrike across all agency systems to provide the very best endpoint security and protection from current threats, for the agency. This is a funded initiative and the timeline is FY20 - FY24.

Desktop Cloud Backup

OIT will be providing expanded backup services across the state in the future. This expanded service will now include providing backups of documents and files that are stored on individual laptops and desktops. This is a funded initiative and the timeline is FY20 - FY24.

myColorado

OIT is leading the effort to create a mobile application that will deliver current and future agency services on a modern and mobile platform. The myColorado app will provide residents, visitors and businesses easy and secure access to services via federated identity management for user engagement through a single interface accessible anytime, anywhere. The solution will provide easy integration for agencies wanting to add a service to the app. It will provide users a protected entry point into state services, and once they establish a profile, it will reduce the need to re-enter that data. Phase 1 is the release of the app through the Department of Revenue in FY19 with the initial services of driver license and vehicle registration renewal as well as the ability to store a digital copy of a vehicle insurance card. It will also include the ability for the Governor's office to provide direct communication to app users. Future phases will include the integration of services provided by multiple state agencies. Phase II, could include state services provided by DNR, DOC, DOLA, DPA, CDPS and CDE. The planning efforts are underway which includes determining costs and funding. This is a funded initiative and the timeline is FY20.

Optimization of Endpoint Security

Assess endpoint security tools to ensure the most effective security while minimizing performance impact. This may result in the lessening or removal of the McAfee endpoint agent, and may incorporate additional tools and capabilities to ensure appropriate anti-virus, encryption, and patching. This is a funded initiative and the timeline is FY20 - FY24.

Privilege Access Management (PAM)

This is an effort to implement a least privilege management solution to oversee enterprise password management over privileged credentials, application password management and session logging and server privilege management to ensure administrator and root security and compliance. The benefits are many and include: a dashboard for operations, management and audit reports, an open standards tool that integrates with ITSM, IDM, Active Directory, etc. It also offers automatic discovery of systems with privileged access, automating the creation of role-based access, assisting in role definition/creation, and secure employee exit deprovisioning which currently relies on manual processes that create security risks and the loss of assets. This funded initiative affects every agency and the timeline is FY20.

Salesforce Platform Org Strategy

Defining a Salesforce Org Architectural Strategy to improve business/IT alignment, platform effectiveness and IT cost savings is part of the Salesforce Program strategic initiatives planned to continue transforming how government innovates, maintains and promotes secure cloud-based agile technology platforms in an enterprise model. This approach will account for the OIT enterprise Salesforce support model and application management best practices. This initiative is unfunded and the timeline is FY20-24.

Salesforce Lightning Migration

Continued migration of existing legacy applications to and development of all new applications in Salesforce Lightning (UI) is an effort to maintain the quality of the platform and accessibility to new product features. This is part of the effort to improve business/IT alignment, platform effectiveness, and IT cost savings. It is part of the Salesforce Program strategic initiatives planned to continue transforming how government innovates, maintains and promotes secure cloud-based agile technology platforms in an enterprise model. This initiative is unfunded and the timeline is FY20-24.

Salesforce Release & Environment Management

Salesforce Release & Environment Management practices and tools to govern how changes occur between the platform and various environments is an effort to minimize application issues and protect the integrity of existing applications in the multi-use environment when deployed to production. This initiative is unfunded and the timeline is FY20-24.

Secure Office Print Ecosystem (SOPE)

OIT is working with the Department of Personnel & Administration (DPA) on the Secure Office Print Ecosystem (SOPE) project to secure the state's multifunction printers against hackers. This project involves approximately 656 devices managed by DPA's Multifunction Printer Program, which are distributed in 16 executive branch agencies. As partners of the SOPE project, OIT's security and deskside teams are helping to upgrade firmware and secure the printer platform and its entry points into the state network. OIT is also providing project management services. DPA is incurring all costs associated with this managed print service solution. This unfunded initiative affects all agencies and the timeline is FY20.

Technology Accessibility and Mobile Assessment, Testing and Remediation

OIT has a statutory obligation to work with executive branch agencies to improve technology access for users with disabilities, including those who are blind and/or visually impaired (see C.R.S. 24-85-101 et seq). To fulfill our duty to improve these services, OIT must provide tools, methods and resources to adequately assess, remediate and maintain the systems for their ability to provide proper accessibility (in conformance to industry standards). This initiative will establish project governance, application testing requirements, standards and training to achieve the goals and mandates of this statute. Any changes needed to address accessibility within an agency will be funded by the agency. The initiative is scheduled for assessment in FY19-20 and remediation thereafter.

Enterprise Future Innovations

The ideas in this section have been proposed as solutions that will allow OIT to grow and discover new and innovative services for state agencies. The solutions in this section will increase state employee efficiency and improve service to Colorado residents and state visitors. These ideas are either unfunded or funded through Decision Item funding. We may see these as new projects in the future.

Cloud Access Security Broker

Cloud Access Security is a software functionality that enables automation of manual processes used to govern the use of and protect sensitive state data in the cloud. As cloud computing continues to grow, OIT needs a way to deliver consistent security across multiple clouds and protect everyone using that data, this is outside of on prem data storage. The solution is scheduled to go active in FY20 with ongoing funding each year thereafter. This funded initiative impacts all agencies and the timeline is FY20-24.

Data and Access Governance

This initiative ensures that sensitive, unstructured data is only accessible to approved users. Funding will be used to implement data governance to analyze, approve and fulfill unstructured data access to files, folders, shares across Microsoft NTFS file systems, Network Attached Storage (NAS) devices and SharePoint - on prem storage. The solution is scheduled to go active in FY20 with partial ongoing funding each year thereafter for maintenance. This funded initiative impacts all agencies and the timeline is FY20.

East West Traffic Security

The East West Traffic Security initiative addresses vulnerabilities present within the traffic going to public cloud, traffic between agency-to-agency applications, and traffic from network to servers. These initiatives are the "glue" that helps bind the security infrastructure together, representing agency network upgrades and firewall upgrades and enhancements. They cross the functional infrastructure, Network, Access Control and Security Operations. The solution is scheduled to go active in FY20 with partial ongoing funding each year thereafter for maintenance. This funded initiative impacts all agencies and the timeline is FY20.

Easy Secure Service Excellence - ESSE

The Enterprise Application team is requesting a network solution that will allow all application developers to access the code at any agency in the Executive branch. At this time, firewall rules and servers are set up currently, because each agency has its own network, developers would need remote access to 17 agencies to perform work. This request is being made in hopes that Enterprise Applications will be able to align with Demand Management infrastructure, enabling developers to serve across many domains, working across a multitude of practices. This structure will directly impact the level of service EA is able to provide to the customer. In order for EA to move to a Service Excellence model, this demand must be met. This unfunded initiative impacts all agencies and the timeline is FY21-24.

End-to-End Monitoring and Logging

This initiative will increase the annual budget for this particular activity, which enables OIT to have the management platform to automate, manage and patch more endpoints and at a faster pace. Technical training and an incident response retainer are inclusive of this initiative. The anticipated outcome of this initiative is that all agency endpoints would be aligned under a common platform that deploys scripts, patches, and updates for proper security compliance and hardening. In short, agencies can expect to see the number of vulnerable endpoints to be drastically reduced. The solution is scheduled to go active in FY20 with ongoing funding each year thereafter. This funded initiative impacts all agencies and the timeline is FY20.

Identity Analytics and Risk Intelligence

OIT would like to incorporate identity analytics into our security and big data strategy using machine-learning and advanced behavioral analytics that consume and analyze data and will improve our capabilities to detect and respond to risk timely, help with digital change, increase agility and enable higher levels of automation. This funded initiative impacts all agencies and the timeline is FY20.

Server and Deskside Endpoint Management

This initiative will increase the annual budget for this particular activity, which enables OIT to have the platform to automate, manage and patch more endpoints and at a faster pace. Technical training and an incident response retainer are inclusive of this initiative. The anticipated outcome of this initiative is that all agency endpoints would be aligned under a common platform that deploys scripts, patches, and updates for proper security compliance and hardening. In short, agencies can expect to see the number of vulnerable endpoints to be drastically reduced. The solution is scheduled to go active in FY20 with ongoing funding each year thereafter. This funded initiative impacts all agencies and the timeline is FY20.

Smart Cities Exploration

A smart city is a designation given to a locality that incorporates information and communication technologies to enhance the quality and performance of urban services such as energy, transportation and utilities to reduce resource consumption, wastage and overall costs. Traditional smart city projects focused on community internet access, smart lighting, transportation and citizen data sharing. State effort around smart cities would be focused around the coordination of infrastructure and standards to enable smart applications that seamlessly transition as residents transition from one locality to another. This unfunded initiative impacts all agencies and the timeline is FY20-24.

Appendix C: OIT Application Lifecycle Recommendations

The table and chart below show the applications used by OIT, and the lifecycle recommendation for each application. In future years this will be expanded to include the application lifecycle timeline. The definitions for the recommendations below are as follows:

- **Consolidate**: Recommended when more than one application is being used to perform a single process. The multiple applications should be consolidated to perform the process.
- **Decommission**: Recommended for applications that have a definite plan to be decommissioned.
- **Enhance**: Recommended when an application that needs to be upgraded requires a more significant effort to upgrade than a recommendation to sustain.
- **Replace**: Recommended when an application needs to be replaced with a newer application.
- **Re-Platform:** Recommended when an application has the proper functionality but may be written in an outdated language or database and needs to be moved to a better platform.
- **Sustain**: Recommended when an application is functioning properly and does not require a major upgrade or change.
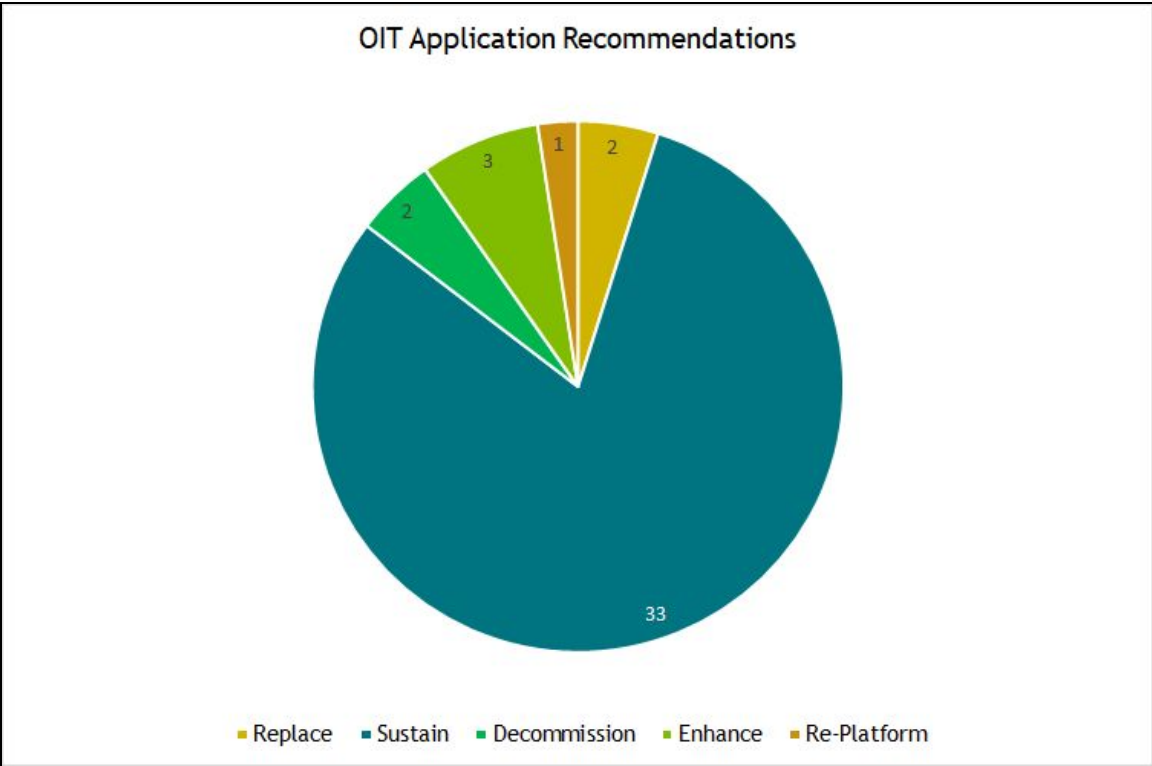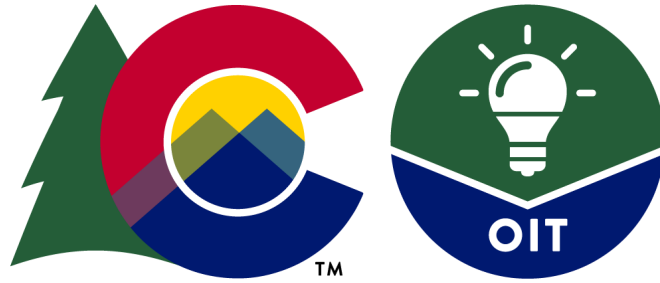
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