SECTION 1 – HUMAN RESOURCES

1 Human Resources Plan Committee Overview

1.1 Mandate and Goals

According to the Act 179 2022, and as stated in the Act 179 IT Consolidation 2022 Preliminary Status Report for the State of Hawai'i Legislature, the mandate and goals of the Governance Structures Committee are to:

- Determine the scope of positions within the IT consolidation effort, factoring in any constraints such as federally funded and special funded positions that cannot be moved.
- Identify each position within the scope of consolidation.
- Analysis of existing staff – staffing levels, job titles, benchmarks, key strengths, gaps and challenges.
- Determine future state roles and functions, standardization of positions, and staffing levels.
- Recommend an approach to filling skill gaps.

1.2 Members and Activities

Human Resources Plan Committee started its work on January 20, 2023. The committee members and participants consisted of IT professionals, a Planning Program Manager, and an Administrative Services Officer.

Member	Department	State Role
Tracy Ban	Budget and Finance	Administrative Services Officer
Amy Saito	Transportation	IT Professional
Robert Sequeira	Transportation	IT Professional
David Keane	Human Resources Development	IT Professional
Lila Loos	Land and Natural Resources	IT Professional
Derek Sodetani	Accounting and Gen. Services	IT Professional
Wade Kamikawa	Business, Econ. Dev. and Tourism	IT Professional
Mark Choi	Human Services	IT Professional
Garret Murayama	Attorney General	IT Professional
Lena Wang	Transportation	IT Professional
Stuart Okumura	Attorney General	IT Professional
Arthur Buto	Business, Econ. Dev. and Tourism	Planning Program Manager
Bennett Yap	Labor and Industrial Relations	IT Professional

The work consisted of four main components, conducted roughly in the following order:

- Analysis of existing staff: staffing levels, job titles, benchmarks, and key strengths, gaps and challenges of skill sets;
- Analyze the Provider/Vendor Management Plan, Service Utilization Plan, IT Network Plan, and Sourcing and Procurement Strategy;
- Identify future state roles and functions, staffing levels; and
- Recommended approach to filling skill gaps including recruitment, training and retention and send to Workforce Development committee.

Since the Human Resources Committee was comprised of individuals whose positions might be within the scope of consolidation and/or individuals who are members of collective bargaining, certain work that was deemed HR-confidential could not be performed by the committee members themselves. This was to comply with applicable labor laws, Hawaii Revised Statutes (HRS) §89 and national laws prohibiting collective bargaining members from having employer confidential information affecting their collective bargaining unit. Therefore, the following two deliverables were designated as being

reserved for management:

- Prepare a list of positions that will be in scope of the consolidation; and
- Send position list to Facilities Strategy and Management Plan and Organizational Structure committee facilitators.

2 Definitions, and Relevant Policies and Laws

2.1 Definitions

The Human Resources Plan Committee identified that, although Act 179 referred to the consolidation of "IT Positions", there was no such definition in state government that would assist the Executive Branch with identifying which positions would be within the scope of consolidation. Analysis of positions using the human resources database proved to be extremely difficult and there was a mixture of exempt and civil service positions.

Civil service positions are generally classified with what the state calls "broadband" pay groups – A, B, C, and D – with some additional types of IT civil service positions, and these positions are subject to collective bargaining laws under HRS §§76 and 89. "Exempt" positions refer to positions that are exempt from civil service and excluded from statutory requirements for collective bargaining under HRS §§76 and 89, as defined by §76-16. Exempt positions don't have the same identifiable position title structure as civil service IT positions. They have been created in an *ad hoc* fashion over the years as the needs of the State have developed. Specific duties for exempt positions were reviewed to determine whether they are IT positions or not.

To begin to scope the impact to positions that consolidation may have, the committee approved a definition of what an "IT position" is:

Workers who create or maintain computer applications, systems, and networks

The definition the committee adopted was adapted from the U.S. Bureau of Labor Statistics' definition of IT occupations which includes these broad classifications and duties/functions:

Occupational Classification	Duties/Functions
Computer and Information Research Scientists	Computer and information research scientists design innovative uses for new and existing computing technology.
Computer Network Architects	Computer network architects design and build data communication networks, including local area networks (LANs), wide area networks (WANs), and Intranets.
Computer Programmers	Computer programmers write, modify, and test code and scripts that allow computer software and applications to function properly.
Computer Support Specialists	Computer support specialists maintain computer networks and provide technical help to computer users.
Computer Systems Analysts	Computer systems analysts study an organization's current computer systems and design ways to improve efficiency.
Database Administrators and Architects	Database administrators and architects create or organize systems to store and secure data.
Information Security Analysts	Information security analysts plan and carry out security measures to protect an organization's computer networks and systems.
Network and Computer Systems Administrators	Network and computer systems administrators are responsible for the day-to-day operation of computer networks.
Software Developers, Quality Assurance Analysts, and Testers	Software developers design computer applications or programs. Software quality assurance analysts and testers identify problems with applications or programs and report defects.

Web Developers and Digital Designers	Web developers create and maintain websites. Digital designers develop, create, and test website or interface layout, functions, and navigation for usability.

Table 1. U.S. Bureau of Labor Statistics' IT occupations. Source: https://www.bls.gov/ooh/computer-and-information-technology/home.htm.

2.2 Relevant Laws and Policies

2.2.1 The Merit Principle

HRS §76-1, known as the "merit principle", requires all jurisdictions to select employees "based on their fitness and ability for public employment" and retain employees "based on their demonstrated and appropriate conduct and productive performance." Selection of employees is to be "impartial" and "by means of competitive tests which are fair, objective and practical".

2.2.2 DHRD Policies

The committee considered these DHRD policies:

- 200.001, Position Classification and Compensation System
- 200.002, Basic Policies and Practices in Position Classification
- 1000.001, Exempt Service

2.2.3 CIO's Statutory Authority for Hiring Exempt Workers

HRS §27-43(8) authorizes the Office of Enterprise Technology Services to employ persons exempt from §§76 and 89. The committee discussed the expansion of this provision to include other IT positions because Act 179 included the mandate "assess the feasibility of exempting certain positions from the requirements of chapters 76 and 89, Hawaii Revised Statutes".

3 Analysis of Existing Staff

The committee undertook the analysis of existing IT staff in multiple stages to arrive at the most complete picture possible. DHRD provided the committee an extract of civil service positions and exempt positions. They noted that the exempt positions might or might not be IT positions and that research into specific position duties was necessary to be able to determine if exempt positions were, in fact, IT positions at all. The committee started with a list of 612 positions, and 160 positions were already ETS positions. The list of ETS positions included all job types, including those that would not fall under the definition of an "IT Position" above, including communications, fiscal, procurement, and project/program management types of positions. Additionally, the committee did a comprehensive analysis of key strengths, gaps, and challenges of skill sets in our current workforce.

3.1 Staffing Levels, Job Titles, and Benchmarks

3.1.1 Stage 1: Position research by funding source

First, positions were categorized by funding source, including but not limited to general funded positions, special funded positions, trust funded positions, and positions which were funded by multiple sources. Certain positions were identified as not being 100% general funded. Lists of positions were sent to each department's Administrative Services Officer, Business Management Officer, or Deputy Director (as applicable) to determine if the source of funds for the position were restricted in such a way that the position could not be moved from the department due to limited purpose of the funding. A breakdown of those positions by department are as follows:

Department	Positions that are funded in such a way that the position is restricted to the department
Department of Accounting and General Services	3
Department of Agriculture	1

Department of Attorney General	26
Department of Bus, Economic Dev, and Tourism	6
Department of Budget and Finance	24
Department of Commerce and Consumer Affairs	17
Department of Defense	9
Department of Hawaiian Home Lands	0
Department of Human Services	42
Department of Health	38
Department of Labor and Indus Relations	14
Department of Land and Nat Resources	8
Department of Transportation	73
Grand Total	**261**

Table 2. Non 100% general funded positions by department. July 1, 2022 data with updates and corrections in 2023.

3.1.2 Stage 2: Position research by duties

Second, positions were categorized as being either IT positions or non-IT positions. The human resources committee reviewed positions to determine if they would meet the definition of an "IT Position."

Of the remaining general-funded positions, the committee designated certain positions as not being IT positions as follows:

- Business Analysts (e.g., Eligibility System Business Analysts)
- Project Managers (e.g., Eligibility System Project Manager) and Program Managers (e.g., Siren Modernization)
- System Operators (e.g., Telephone Operators, Airport Info Operators, Duplicating Machine Operators)
- Data Entry
- Geographic Information System (GIS) technical assistants, specialists, etc.
- Graphic Designers
- Non-IT Security Officers (e.g., HIPAA Security Officers)
- Non-IT Data Officers (e.g., Open Data Staff Attorneys)

Positions at the University of Hawaii (2) and Hawaii State Public Libraries (10) and Governor's office (1) were excluded from the list because they were out-of-scope for the Act.

After the non-IT positions were removed from the list, 149 general-funded IT positions remained. These positions were classified by the committee as IT positions and verified by department Administrative Services Officers, Business Management Officers, or Deputy Directors (as applicable).

Department	Number of General-Funded IT Positions as of 7/1/2022
Department of Accounting and General Services	12[1]
Department of Agriculture	2
Department of Attorney General	17
Department of Bus, Economic Dev, and Tourism	4
Department of Budget and Finance	4
Department of Commerce and Consumer Affairs	0[2]
Department of Defense	4
Department of Hawaiian Home Lands	1
Department of Human Services	22
Department of Human Resources Development	1

Department of Health	41
Department of Labor and Indus Relations	1
Department of Land and Nat Resources	6
Department of Law Enforcement	0
Department of Corrections and Rehabilitation	10
Department of Taxation	24[3]
Department of Transportation	0[4]
Grand Total	**149**

Table 4. General Funded IT Position Counts by Department

[1] Does not include ETS IT positions.

[2] All IT positions in Department of Commerce and Consumer Affairs are special funded. Source of funds dictates that the funding cannot be used by another department/agency.

[3] There were 31 positions in Department of Taxation as of 7/1/2022 however only 24 were funded.

[4] All IT positions in Department of Transportation are special funded. Source of funds dictates that the funding cannot be used by another department/agency.

3.1.3 Conclusions on current staffing levels

Once IT consolidation occurs, it will be important that post-consolidation department staffing levels are appropriate to support departments' needs where services have not been centralized.

To determine the appropriateness of current staffing levels, the committee decided to use an industry standard benchmark – a ratio of 2.71% IT Positions to IT Users. IT Users are the number of active employees in each department. The 2.7% ratio is an industry standard benchmark compiled from 8,781 respondents representing 211 organizations across industry segments using data from April 2019 through March 2021, and furnished to the State of Hawaii by the professional IT consultants at Info-Tech Research Group, who ETS contracts with.

Department	Number of Active Employee (IT Users)	Number of G-Funded IT Positions	Ratio of Employees to G-Funded IT Positions	DELTA against 2.71% Industry Standard Benchmark of IT Positions to IT Users
	Source: HIP April 2023	*Department Validation*		*InfoTech Research Group*
Department of Accounting and General Services (excluding ETS)	480[1]	12	2.50%	-0.20%
Department of Agriculture	241	3	1.24%	-1.46%
Department of Attorney General	643	17	2.64%	-0.06%
Department of Bus, Economic Dev, and Tourism	310	4	1.29%	-1.41%
Department of Budget and Finance	339	4	1.18%	-1.52%
Department of Commerce and Consumer Affairs	439	0[2]	0.00%	N/A
Department of Defense	372	4	1.08%	-1.62%
Department of Hawaiian Home Lands	121	1	0.83%	-1.87%
Department of Health	2447	54	2.21%	-0.49%
Department of Human Resources Development	64	1	1.56%	-1.14%
Department of Human Services	1676	22	1.31%	-1.39%
Department of Labor and Indus Relations	514	5	0.97%	-1.73%
Department of Land and Nat Resources	786	6	0.76%	-1.94%
Department of Public Safety	2222	10	0.45%	-2.25%
Department of Taxation	322	24[3]	7.45%	4.75%
Department of Transportation	2229	0[4]	0.00%	N/A

[1] Active employee count for Accounting and General Services does not include ETS employees; ETS employees receive their IT services from other ETS personnel.

[2] All IT positions in Department of Commerce and Consumer Affairs are special funded; source of funds dictates that the funding cannot be used by another department/agency.

[3] There were 31 positions in Department of Taxation as of 7/1/2022 however only 24 of the positions were funded.

[4] All IT positions in Department of Transportation are special funded; source of funds dictates that the funding cannot be used by another department/agency.

Table 5. Analysis of department IT staffing levels before consolidation.

The committee concluded that almost all departments are currently understaffed in IT support according to the ratio of their general-funded IT positions to IT Users, as evidenced by the negative numbers in the Delta column. [It was further noted that two departments – Commerce and Consumer Affairs and Transportation -- have no general-funded IT positions, which skews the results for those departments.]

Speaking generally, any loss of positions for most departments without at least a proportional reduction in work burden would be detrimental to departments and would result in further deprecation of service levels to employees/IT users. Therefore, ETS and the committee believe that the risk of reducing the effectiveness State IT services to meet the mandate of Act 179 is high.

3.2 Key Strengths, Gaps, and Challenges of Skill Sets in Current IT Workforce

3.2.1 Executive Branch Survey

The committee conducted a survey on the key strengths, gaps, and challenge of the existing IT Workforce, including eight (8) questions. All departments except for Law Enforcement who doesn't have IT staff, participated in the survey.

- A "strength" indicated a department felt strong in this area of expertise.
- A "gap" indicated a department needed the skill but didn't have the staff with the requisite skills currently.
- A "challenge" indicated that the department had the staff with the skills set, but they'd be hard to replace if they left. The results were as follows.

Results of the survey are included as Appendix A.

3.2.2 ETS Survey of Desired IT Skill Sets

ETS managers were similarly surveyed on the key skill sets they need employees to have to meet the expectations of existing work. The top IT skills and certifications were collected, and then each skill set and type of certification was given a 1-5 rating, with 1 being lowest in importance to 5 being the highest in importance to ETS. The ratings from all surveys were then aggregated into average scores.

Results of the survey are included as Appendix B.

3.2.3 Analysis of ETS' Desired Skill Sets Compared with Executive Branch IT Skill Sets

The IT skill sets in the Executive Branch and the skill sets that ETS managers need in order to be successful have some overlap, but not much. Where ETS rated a skill or certification as high importance and departments also indicated it was a key strength in the current workforce, the committee noted it as such.

- Project and Program Management, including Project Management Professional (PMP), Program Management Professional (PgMP), Disciplined Agile Scrum Master (DASM), and Agile Certified Practitioner (ACP) certifications, ranked high on ETS' list of important skills and certifications. 36% of departments also indicated it was a key strength, but only 27% of departments indicated that they had staff certified or trained in various project management methodologies.
- Cybersecurity was high on ETS' list of important skills and certifications and 27% of departments indicated that it was a strength, and 55% indicated that cybersecurity was a challenge to fill if they lost existing staff. Furthermore, 41% of departments indicated that they have staff certified in cybersecurity or staff who have received training.
- Cloud/Cloud Infrastructure was high on ETS' list of important skills and both Google cloud and Amazon Web Services ranked high among certifications. However, only 14% of departments have staff with Cloud Infrastructure skills with 46% noting that it was a challenge. 14% of departments indicated that they had staff certified/trained in Google Cloud and 27% certified/trained in Amazon Web Services.

- Microsoft, including Microsoft certifications, ranked high on ETS' list of important skills and certifications. 73% of departments also indicated that staff had Microsoft certifications or training.
- Service Management, including IT Infrastructure Library (ITIL) Service Management Certification, ranked high on ETS' list of important skills and certifications. 86% of departments also indicated that it was a key strength, and 14% of departments indicated that it was a challenge because they had the skill but it would be hard to replace if lost. However, only 14% of departments indicated that they had employees that were certified/trained in ITIL Service Management.

4 Other Committees Recommendations Impacts on Human Resources

Several Committees, including Provider/Vendor Management, Service Utilization, IT Network, and Sourcing and Procurement made recommendations, which would have some impacts on IT staffing, from capacity and/or capability perspectives. Depending on the realization of those recommendations, various training activities will be needed to address any skills gaps.

5 Future IT Staff Roles

5.1 Shifting of Roles and Responsibilities (Service Delivery Models and Artificial Intelligence)

IT professionals' roles are shifting towards more strategic and complex problem-solving tasks. Routine and manual tasks such as server provisioning, patching, and network configuration are increasingly automated and provided by vendors. This means moving from performing these tasks to setting up and maintaining the automation workflows and managing vendors performance. Departments' IT staff will have more time to focus on innovation and strategic initiatives that can create value for the department and constituents.

As automation takes over specialized tasks, broader skill sets are needed to understand not only core area of expertise but how to integrate with other systems and technologies. With the predictive capabilities of AI, shift from a reactive stance to a proactive one, to anticipate issues and solve them before they escalate into bigger problems is becoming more feasible.

As vendors and AI systems will manage many more day-to-day operations, departments' IT staff can shift towards a supervisory and managerial role, overseeing operations and vendors, and stepping in to handle exceptions and decision making.

Cross-departmental collaboration for data sharing, system integration, and optimizing business processes is becoming more and more common and both ETS and departments' IT staff will be increasingly working in multidisciplinary teams.

The rapid evolution of technology requires IT professionals to engage in continuous learning, upskilling, and reskilling to stay relevant and to be able to work alongside or oversee AI systems and vendors.

5.2 Future IT Staff Roles

Future IT roles and functions at the departments should include a Service Manager role, which would oversee and manage business relationship management, vendor management (including ETS and external vendors), project and maintenance oversight. Future roles and functions at ETS and departments should include:

- **Service Owner** – Oversees service types and or categories, business relations and vendor management. Example: A Chief Information Security Officer (CISO) would be a service owner of cybersecurity related services.
- **Service Manager** – Oversees a group of connected / related services, business relations and vendor management. Example 1: An ETS branch manager would be a service manager of a group of services in his or her domain. Example 2. A department IT coordinator or IT expert would be a Service Manager of a highly business critical Line of Business Application.
- **Chief Data Officer** (larger departments)

- **Data Steward** – Role connecting business and IT, typically from business side, but with enough skills to converse with IT on technicalities of data management.
- **Data Architect**

More specific role listing and role descriptions were not deemed necessary at this stage.

6 Recommended approach to filling skill gaps including recruitment, training and retention

Specialized or unique department specific services remain and are strengthened at the departments, via specialization and training. Departmental IT will have more time to focus on core business support and development activities, instead of tasks which ETS can adopt and handle, better than the departments.

Existing staffing levels at ETS and at the departments are sufficient to execute current tasks, but additional or peak capacity resources are lacking. Operative tasks consume most capacity, and capacity for development-oriented tasks is lacking. Hence, centralizing burden of common tasks and technologies would free resources at the departments to more value adding and development-oriented activities.

Both department and ETS staff will need to be continually trained through standardized training programs, for example in areas of:

- Project and project portfolio management
- Security and compliance
- Procurement and vendor management
- Data management
- Use of Artificial Intelligence.

7 Prepare a list of positions that will be in scope of the consolidation

Based on the collective output of the various Committees, the overall Findings and Recommendations of the IT Consolidation Working Group is driven by a shared services approach, i.e., the Executive Branch will implement consolidation of IT staff, infrastructure, and services, when and where there is business justification (increased efficiency, elimination of redundant processes, improvement in quality of service, and reduction in cost). ETS will continue to work with Departments to assess and analyze the activities supporting this approach. At this this point, however, there are no specific staff positions that have been designated to move or be consolidated.

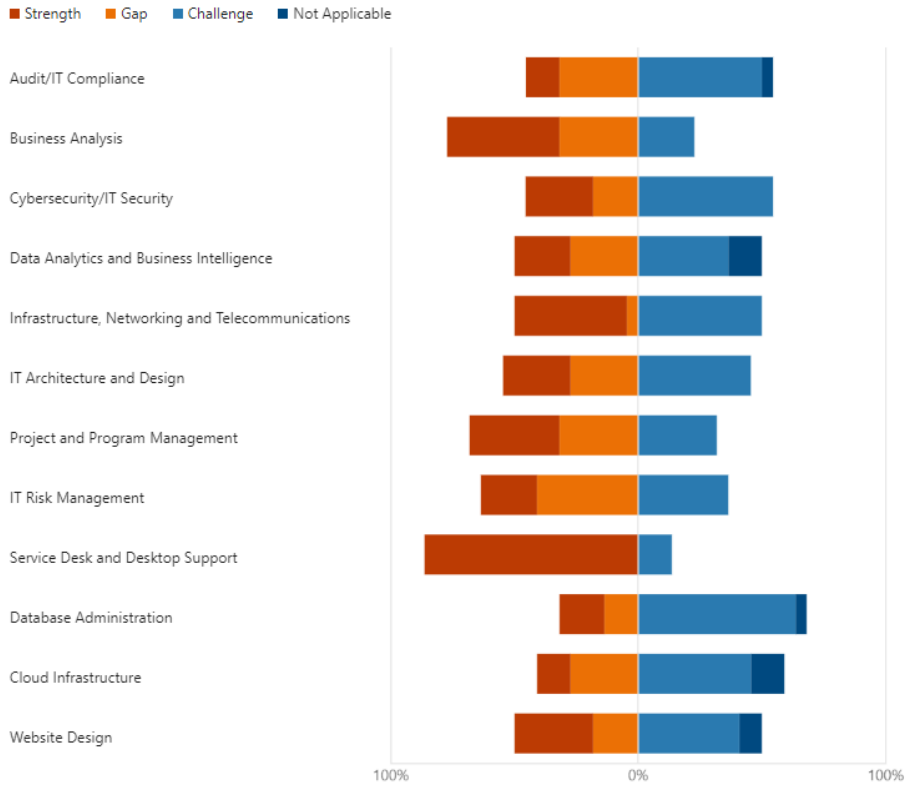
8 Send position list to Facilities Strategy and Management Plan and Organizational Structure Committee facilitators

ETS will continue to work with Departments to assess and analyze the activities supporting this approach. At this this point, however, there are no specific staff positions that have been designated to move or be consolidated.

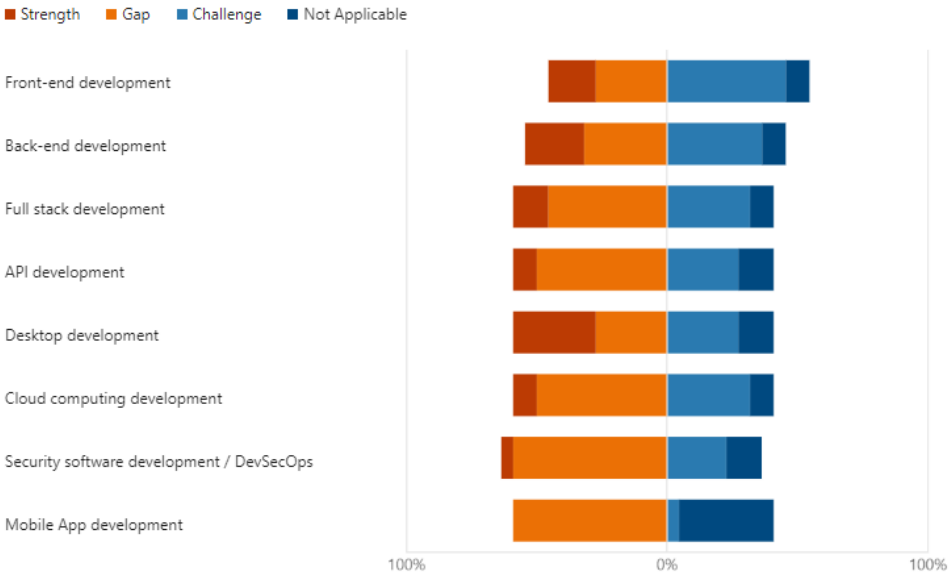
9 List of Appendices

9.1 Appendix A: Department IT Skill Set Survey

Question 1: Please rate whether the IT skills below are a strength, a gap, or a challenge for your organization.



Question 2: Please rate whether the Application Development skills below are a strength, a gap, or a challenge for your organization.



Question 3: Are there other skill sets not listed that you would consider to be STRENGTHS for your organization?

Department	Strengths
DLIR	User interface with website and computer programs.
DCCA	Business domain knowledge/expertise.
ATNY GEN-CSEA	Core CSEA system experience in business and technical design and custom development. Including system design and project management essentials specific to the core CSEA system.
DLNR	The DLNR IT staff designs and manages its various networks, desktop support, more than 30 applications hosted in various cloud computing environments as well as hybrid on prem, and SAAS, while connected to the state NGN. Business and data analytics are performed by division (non-IT) experts.
DBEDT	As an organization not listed would be GIS (strength & challenge) with OPSD. GIS skills are housed within an agency of DBEDT and would be very hard to replace if removed.

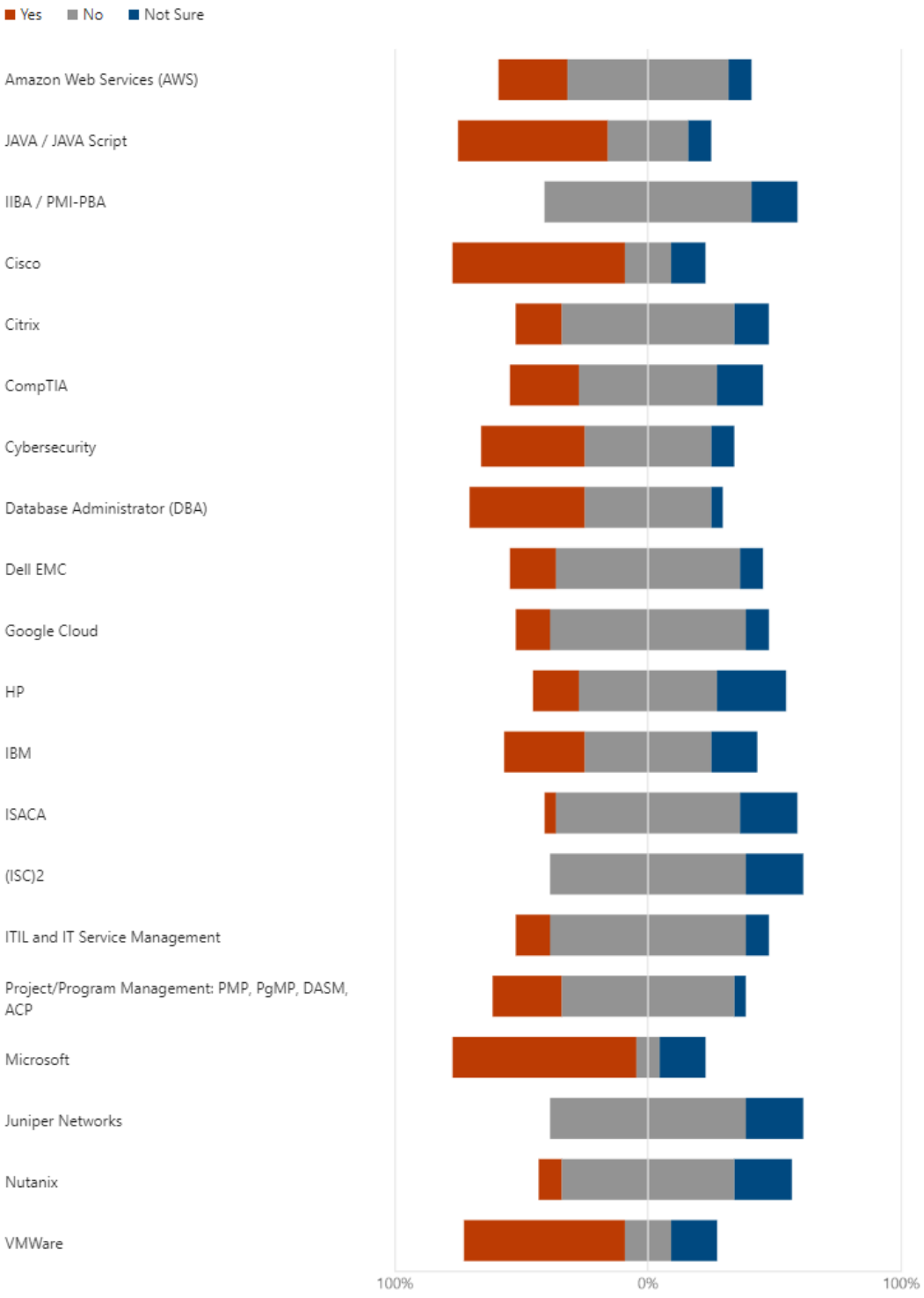
Question 4: Are there other skill sets not listed that you would consider to be GAPS for your organization?

Department	Gaps
DLIR	Procurement of IT services and products.
DCCA	RFP development and processing.
ATNY GEN-CSEA	Procurement specialist for IT initiatives.
DHRD	IT Inventory Management.
DLNR	Services that we would utilize from ETS: 1) There is a great need for website design: organization, intuitive navigation, visual presence, consistent content, consistent user interfaces for ease of interaction, increased forms and payment processes for public and commercial business access. This need may apply to other state websites. 2) Project management is used for applications development and is currently performed by contract. We would require additional staff to perform this function.
DBEDT	The IT office is very small within DBEDT and there are many areas where we rely on vendors and ETS to fill in the holes in our organization's skill sets.

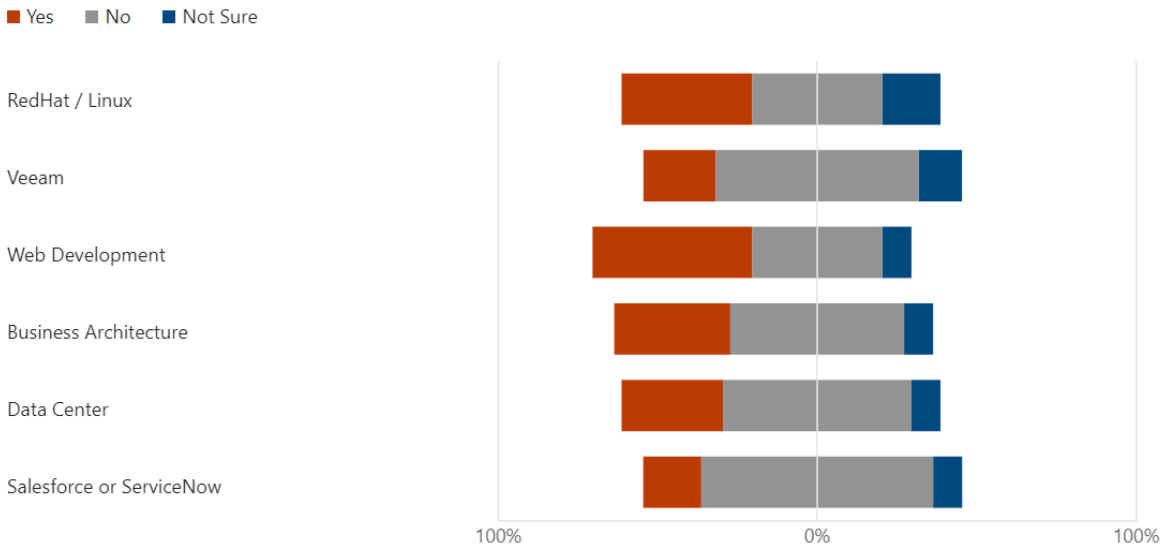
Question 5: Are there other skill sets not listed that you would consider to be CHALLENGES for your organization?

Department	Challenges
DLIR	Coding skills and quality assurance management of IT projects.
DCCA	Procurement and accounting.
ATNY GEN-JJIS	WebSphere Application Server configuration.
DOT AIRPORTS	If having GIS configuration/development skills is considered separately, then that is a Challenge for us.
ATNY GEN-HCJDC	Procurement.
DLNR	A challenge would occur if the IT staff were removed from DLNR. The IT Staff performs applications management (like other agencies, development is contracted), reporting, troubleshooting, and maintenance for applications availability to the public. The DLNR IT is responsible for more than 30 applications, and most are public facing for land review submissions, permits, licenses, leases, etc. and require appropriate IT response times. Both civil and non-civil service positions work as a team and provide backup support. The IT staff has institutional knowledge and response patterns that supports efficient administration of the DLNR's mission to administer and protect the land and natural resources of Hawaii. The application functionality are IT requirements for all IT staff. This is how we can support more than 800 employees across 50 statewide locations in a hybrid telework environment.

Question 6: Identify if your organization has staff with these types of key certifications, OR who have received training in these skills or are well versed in these areas:



Question 7: Identify if your organization has staff with these types of key certifications, OR who have received training in these skills or are well versed in these areas, continued:



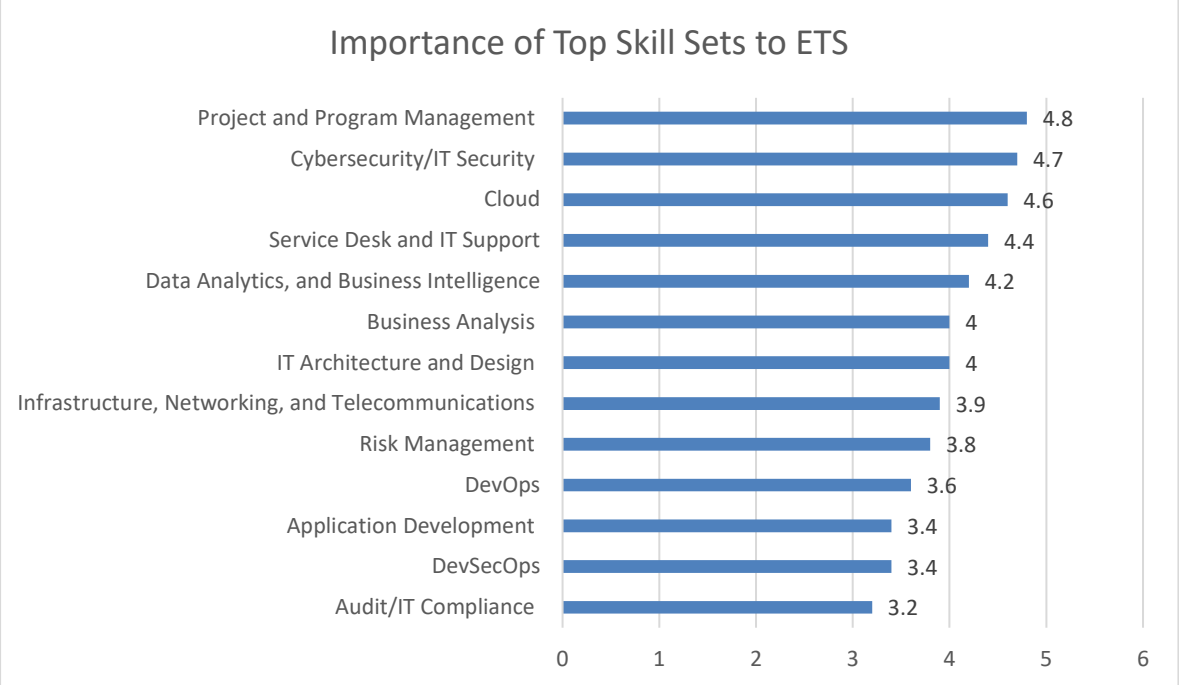
Question 8: Are there other certifications/training not listed that your staff currently possesses?

Department	Other Certifications/Training
ATNY GEN-CSEA	Treehouse - Chart, N2O, ADABAS to RDMS JCL and JEM training IT management training
DLNR	Research dissertation level.

9.2 Appendix B: ETS Desired IT Skill Set Survey

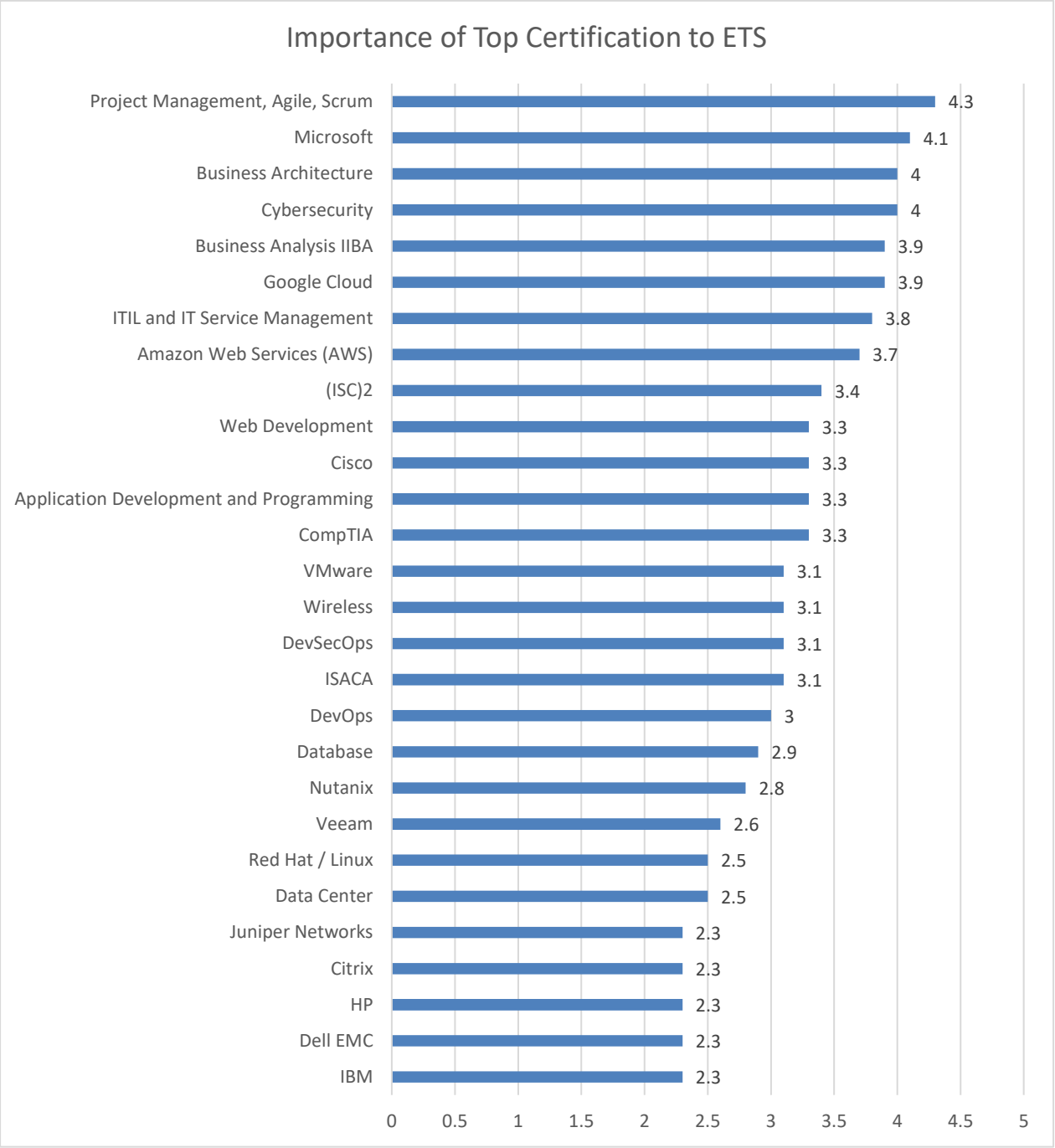
Key Skill Sets

1-5 Importance Score, 5 Being Most Important



Key Certifications

1-5 Importance Score, 5 Being Most Important



9.3 Appendix C: IT Positions Identified for Consolidation

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SECTION 2 – STRATEGIC STEERING AND GOVERNANCE STRUCTURES

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1 IT Strategic Steering & Governance Structures Committee

1.1 Mandate and Goals

The Act 179 IT Consolidation 2022 Preliminary Status Report for the State of Hawai'i Legislature, states the mandate and goals of the Governance Structures Committee as follows:

- Assess HRS, HAR, executive orders, and other ***policies*** and procedures on IT governance, determine if additional changes are necessary to adopt additional centralized shared services, and make formal recommendations if so.
- Review ETS governance structures against any available in sister states, and as necessary, define new ***roles,*** responsibilities, and ***oversight groups*** to provide future state leadership.

1.2 Scoping of Work

The Governance Structures Committee focused its scope on the following:

- Governance artifacts and compliance (laws, executive orders, and also plans, portfolios, standards, procedures, guidelines);
- Roles and organization (responsibilities and accountabilities);
- Oversight groups (governance bodies);
- Key IT governance processes and cyclical events, that are defined by the laws and executive orders; and
- Governance tools, facilitating the processes and enabling the work of the oversight groups.

The focus was both on the state level governance of IT and at the department level. Consistent structures are needed at both levels to allow a holistic, end-to-end governance of IT. State level evaluation and direction setting relies on input from the department level governance processes.

1.3 Members and Activities

The Governance Structures Committee conducted its work between 01/17/23 and 05/05/23. Committee members and participants were:

- Tracy Ban, Department of Budget and Finance
- Wade Kamikawa, Department of Business, Economic Development & Tourism
- David Rodriguez, Department of Taxation
- Phan Sirivattha, Department of Human Services
- Derek Vale, Department of Health
- Bennett Yap, Department of Labor and Industrial Relations
- Juha Kauhanen (facilitator), Office of Enterprise Technology Services

The work consisted of four main components, conducted roughly in the following order:

- Review of IT governance reference models.
- Assessment of the current state of IT governance at the state.
- Review of other states' IT Governance models and practices.
- Develop recommendations, based on standards, current state findings, and tested good practices.

1.3.1 Current State Assessment

Assessment of the current state involved the identification and study of the current governing principles, bodies, artifacts, processes, and tools – as scoped in the previous chapter. Work methods consisted of:

- Committee meetings;
- Review and study of the governance components (Artifacts, bodies, processes, tools);
- IT Consolidation working group survey and two other recent governance surveys; and
- The preliminary report to the Legislature.

1.4 Definitions, Standards, Details of Findings and Recommendations

Definitions, standards around IT Governance, the current state assessment, sister states governance models and details on the committee's recommendations are provided in the Appendix.

2 Observations on the Current State of IT Strategic Steering and Governance

2.1 Common Pain Points

Below table summarizes findings about the general, commonly mentioned issues and pain points with IT because of suboptimal strategic steering and governance.

Domain	Observation
Strategic steering and Investment portfolios	• There is a lack of formal, collective longer-term planning at the departments and agencies; e.g. documented plans and roadmaps that investments (budget and spend requests) should align with; • Lack of understanding of the State IT Strategic Plan and how planning and investment decisions should align; and • Role and impact of the IT Steering Committee at the enterprise level needs to be clearly defined and its role strengthened.
Procurement and vendors	• Capacity and capability for procurement and vendor management tasks; (e.g. requirements gathering, alternatives analysis, RFP preparation, response evaluation, contract negotiations, vendor management compliance, performance during project implementation, maintenance & operations) must be strengthened; • Ability to leverage vendor contracts between the various programs and departments needs improvement; • Pricelists may not always be the most appropriate, and value adding procurement method; • Transparency: HANDS does not show all the solicitations and associated procurement history.
Projects	• Capacity and capability to consistently carry out project management tasks effectively and manage the vendor throughout the projects' life cycles needs to be improved.
IT Services	• Service demand and lifecycle management (identify, define, implement, test, rollout and retiring services) in a consolidated / shared model; and • Service desk, incident and request management model, processes, and responsibilities in a federated model.
Data	• Awareness and understanding of the data assets – what do we have, where and what is the quality; • Understanding of the data and interoperability needs and opportunities; • Mapping of data and data needs is missing; • Statewide common strategic plans and standards & policies; • Dedicated staff to manage data and interoperability; • Both department and central state level governance structure; and • Common tools and platforms (both for analysis and engineering).
Technology architecture	• Statewide common policies and standards, when applicable; • Development and operations process automation; • Common solution and development platforms; • Move to cloud, leverage Artificial Intelligence and Machine Learning.
Workforce	• Staffing shortage and insufficient separation of duties; • Difficulties recruiting and retaining staff and organizational knowledge; and • HR processes are ineffective and inefficient, lack of internal capacity and lack of support capacity from DHRD.

2.2 Observations on the Current State of IT Strategic Steering and Governance

Table below provides a summary of the observations across the scoped dimensions of the governance structures.

Dimension	Observations
Organization and roles	• ETS lacks resources for proper governance of IT, particularly in procurement-, project-, and data governance areas. • Departments lack capacity and capability, particularly in procurement, project, vendor, financial and data management areas. • ETS' roles and mandates in evaluative and directive activities such as strategic IT direction (adoption of State IT Strategy), procurement, and benefits realization monitoring are not well established. • Departments' responsibilities and accountabilities are not well established in the areas of IT strategic planning, and investments' benefits realization. • Engagement of both business and IT leadership in evaluative, directive and monitoring activities is not well established. • Concept of IT Service is not very clear and consistently understood, and the role of an IT Service Manager is not established / does not exist. • Consistent, common, dedicated governance and management roles do not exist for data governance and management.
Governing bodies	• There is a lack of formal channels and forums for departments to proactively process common issues and questions at the State level, per domain / subject matter, between departments and with ETS. • Currently the only forum where departments and ETS convene as a group to discuss IT, is the IT Coordination Council (ITCC). This body is a high-level one-way communication channel from ETS to the departments, and lacks means to have a multi-way communication and dialog on domain-specific topics. • Large projects lack common standards for the steering and advisory bodies; what the roles and responsibilities of parties are, and how those parties should engage the projects. • There is a lack of common and consistent standards for governing bodies, reporting within the departments, to B&F, and to ETS. Key areas include in particular strategic investment portfolio management, and data governance. • The Information Technology Steering Committee (ITSC) lacks powers of its own, independent of the CIO. The ITSC is currently defined to be basically an assistant advisory group to the CIO. ITSC's role should be more independent. • Departments have expressed the need to clarify the needs for Project Advisory Council (PAC) where there are prior budget, business leadership, legislative and department IT approvals. • Consistent, common governing bodies are needed for data governance and data management.
Processes	• There is a lack of common and consistent steering and governance processes at the departments, mainly for strategic planning, budgeting, and investment portfolio management. • Limited visibility and opportunity to appropriately review departmental strategic IT with State IT strategic plan. • There is a lack of definitions on common statewide processes for evaluation of new service needs, funding mechanisms and service development & operations. The process for identifying, prioritizing, funding allocation, and managing multi-department and enterprise shared services is not defined. • Procurement processes are lacking, particularly in the areas of how procurement price lists are used in a potentially-risky manner, and for types of complex cases the lists are not intended for. Misuse is mainly due to time and capacity scarcity to handle more rigorous and thorough RFP processes. There is also a lack of transparency in how the price list solicitations are not published (in e.g., HANDS portal). • Project management processes, including IV&V processes are not consistent (high quality results, standardized methods and frameworks, metrics) across the state and large projects. • Consistent, common processes for data governance and management is lacking.
Tools	• Current governance tools are in flux, with the main statewide governance tool (LeanIX) actively customized. Usage of LeanIX has been increasing at the departments recently but is still relatively limited (mostly to Spend Requests). • Departments use office applications, such as Excel, heavily as they lack enterprise tools. • Statewide, and at ETS, different tools are leveraged for IT governance, which are separated and siloed, when looking from an end-to-end perspective. End-to-end value stream visibility, with integrated features, (data and experience) are missing. New tools for end-to-end visibility and transparency are considered and tested at ETS and at the departments. • Current governance tools cannot track the entire enterprise application lifecycle across: strategic planning and budgeting, DDI annual spending, DDI delivery and annual business outcomes metrics, maintenance and operations, and project completion for the entire application lifecycle. • Consistent, common tools are needed for data governance and management.
Artifacts and compliance	• The key law, defining the IT Governance at the state, HRS $ 27-43, is vague is some areas, leaving room for interpretation about the responsibilities and accountabilities of the departments, ETS, CIO, and the ITSC. • The directive addressing investment and project portfolio management (AD 18-03) lacks detail in some key process areas: strategic planning and roadmapping, procurement and contracts, and operations. • Usage of AD 19-03 should be extended to cover all major projects and not just from a data management perspective, but all project and solution management. • Current State IT Strategic Plan is not effective; there is lack of awareness, understanding and adoption. The plan does not in practice steer strategic IT planning at the departments. • There is a lack of documented department-level IT governance principles and strategic IT plans, aligned with departments' business plans and with the State strategic IT plan. • Departments lack consistent policies, standards, and guidelines, and the workforce capacity to improve these for areas such as security and data management. This is to a large degree due to lack of standards and guidelines, provided centrally, by ETS. For those that are in place, adoption needs to be secured / enforced. • There is a lack of data strategies, laws and standards for governance and management of data, (statewide and the departmental level). Currently privacy-related issues are processed in the legislature (SB1178).

3 Recommendations for IT Strategic Steering and Governance

To allow for more efficient and effective strategic steering and IT governance at the State, the Consolidation Working Group recommends changes in the below table as the state is moving to a shared services based, more consolidated IT operating model.

Dimension	Recommendation	Justification and impact
Roles and organization	• Secure more ETS and department level resources for ETS, including IT governance (e.g., procurement-, project-, and data management). • Secure more resources at the departments for IT governance, especially for procurement-, project-, and data management. • Define and adopt the new ETS roles, their counterpart roles at the departments and the processes and governance bodies between the roles clearly. • Define and adopt Service Owner and Service Manager roles at the departments, for Shared Services and those Line of Business Services that require consultation and professional services from ETS. One person may have multiple services to account for. • Define and adopt Service Owner and\ Service Manager roles at ETS, for enterprise Shared Services and those Line of Business Services that require consultation and professional services from ETS. Service Owners would typically be branch managers, and Service Managers can be management of subject matter experts.	Improved processes and outcomes of the processes (desired outcomes, with less risks and need to repeat). Service Manager role assumes responsibility to act as a counterpart for ETS in IT Service Management activities such as service strategy, -demand, -catalog, -design, -level, -performance, and -financial. Need is emphasized by IT consolidation and extending the shared services model.
	• Define and enforce uniform responsibilities and accountabilities for key IT leadership roles at the departments for key processes, such as strategic planning, investment portfolio management, procurement, and major project management.	Improved governance per each governance domain.
	• Ensure that both business leadership (director and program management levels) and IT leadership at the departments are engaged, with accountabilities in the evaluative, directive, and monitoring activities of IT at the strategic level. This means for example that jointly crafted IT strategic plans are in place and that all investments of certain thresholds are jointly and consistently evaluated, instead of in horizontal (IT function / business functions) and vertically (lower and upper layers of the department) siloes.	Business and IT alignment on future roadmaps for IT and wise decisions on fitting and resilient solutions rely on collaboration within the department over siloed approaches.
	• Define and establish dedicated roles for data governance standards, policies, and management, at the State and departmental level. This includes the State Chief Data Officer in ETS.	As per Act 167 of 2022. And in addition to Act 167 on a departmental level.
Governing bodies	• Empower Information Technology Steering Committee to have more independency. • CIO from chairman to a regular member.	Allow the ITSC to be more impactful and ultimately helpful for the State.
	Establish and enforce formal bodies at the departments for IT planning, roadmapping, budgeting and investment management.	IT roadmapping, budgeting and, investment management would be more effective both at the department and at state level.
	Establish new state level IT Governance User Groups for: Strategic Steering and Planning, Shared Services and Solutions, Procurement and Vendor Management, Business and Data Architecture, and Technology and Security. These groups would be open for both business and IT leadership and subject matter experts from all executive branch departments.	There are several areas of IT governance at the state that would benefit from dedicated forums where departments and ETS could collaborate to address the issues and challenges in these areas. Need will be emphasized by IT consolidation and extending the shared services model.
	Establish State Data Task Force.	As per Act 167.
	Define and adopt standards for establishment and use of uniform steering and advisory bodies at major projects.	This would standardize which parties and how those parties should engage the projects, mitigating implementation risks.
	Clarify the purpose and responsibilities of Project Advisory Council (PAC). Refer to Project and Portfolio Management Strategy Committee Recommendations for details.	
	Governing body exceptions and opt-out scenarios are to be defined and agreed. For example, the User Groups are thought to be voluntary.	Allows flexibility for departments when situations and settings call for it.
Processes	Establish and adopt uniform process for strategic IT steering and planning at the departments; Engaged parties, tools, scheduling of forums, inputs, and expected outputs. To be stated in HRS 27-43, detailed in AD 18-03 and associated standards.	This will support IT budgeting and investment management and allow more effective state level coordination.
	• Adopt more rigor onto IT budgeting and investment planning, by using IT strategic plans as reference points and contexts. • Funding principles and allocation process needs to be defined and clarified for shared services and for cross-agency procurements.	Going into Shared Services model, each major change needs to be assessed in its broader context better, within the department and then within the State.
	Adopt more rigor onto procurement governance process for certain types of large cases: Engaged parties, tools, preferred and allowed procurement vehicles, scheduling, inputs, and expected outputs. To be updated in AD 18-03 and ancillary standards.	This will enable better quality results from solution or service procurement.

	Adopt more rigor and minimum standards for governance structures for certain types of large projects: Engaged parties, tools, preferred/allowed procurement vehicles, scheduling, inputs, and expected outputs. Including agile and hybrid models. To be updated in AD 19-03 or similar-level executive directives and ancillary standards.	This would help mitigate implementation risks, as the best resources across the state could be tapped onto as needed, more fluently.
	Process exceptions, alternatives acceptance, and opt-out scenarios need to be defined and agreed. This goes for all processes.	Allows flexibility for departments when situations and settings call for it.
Tools	Define and decide role of the current IT Governance tool (LeanIX).	Having integrated toolset for IT governance and management would minimize lack of visibility and transparency and process bottlenecks between different parts of ETS and departments' IT, business programs and fiscal functions.
	Assess alternatives, considering end-to-end visibility and features, from strategic planning to operations and service management. An "IT Governance and Management ERP" could be the goal here.	
	Tool exceptions, alternatives acceptance, and opt-out scenarios are to be defined and agreed.	Allows flexibility for departments when situations and settings call for it.
Artifacts and compliance	Establish, promote, and implement standards for strategic IT planning artifacts across agencies. Require strategic IT plans from departments and agencies (as appropriate), while allowing multi-year planning movement towards consolidated IT planning processes.	This will support IT budgeting and investment management and allow more effective state level coordination.
	Update HRS 27-43 to be more specific around the responsibilities and accountabilities of the departments, particularly on strategic planning and benefits realization tracking.	Rigor for strategic planning and investment portfolio management enforced by law, in addition by being incentivized by said activities providing inherent business value when done properly.
	In HRS $ 27-43 or in AD 18-03, mandate both business and IT leaderships involvement on IT governance (strategic planning and steering, investment portfolio management) at the departments.	Business and IT alignment on future roadmaps for IT and wise decisions on fitting and resilient solutions rely on collaboration within the department over siloed approaches.
	Update AD 18-03 to address lack of rigor and standardization on procurement, and contract and operations phases, including benefits realization tracking.	Procurement processes would be less risky and result on better quality outcomes (contracts) and improved benefits realization.
	Clarify and update AD 19-03 to include all major statewide projects. The need is to define, provide resources, and enforce common governance structures and practices for projects passing certain threshold of scope, cost, complexity, and risks. This would expand dimensions from data (focus of AD 19-03) to cover all aspects of governance, during and after the implementation.	Principles for HIP should be adapted and adopted across all large statewide programs.
	Artifact exceptions and opt-out scenarios need to be defined and agreed. This goes for strategic plans, investment portfolios, and standards and guidelines.	Allows flexibility for departments when situations and settings call for it.
	Current State IT Strategic Plan needs to be reviewed and revised. Current Working Groups to be replaced by proposed new governing bodies and the strategic pillars be updated as needed. Departments should be required to have their IT strategic plans and those plans will need to support and align with the state strategic IT plan. Department leads of IT should be accountable for the creation of the plans. Department leads of IT, IT management and business leadership and management, including program leadership should all be accountable for aligning every IT investment (budget and IT spend request) to their departmental IT strategic plan, and subsequently to the state IT strategic plan.	Having a state IT strategic plan provides no value, if it is not actively referenced as a guide for how departments develop their IT (people, processes, and technology). The departments
	Create data strategies, laws and standards for governance and management of data, statewide and departmental level. Currently privacy related issues are processed in the legislature (SB1178).	
	Templates and guidelines for strategic plans are to be refined and adopted, for internal and for external (to the state) purposes.	
	Define and enforce the required standards and guidelines to be used by the departments, including security and data management.	
	Define and establish processes, role-based responsibilities, and tools for tracking compliance.	

APPENDIX - STRATEGIC STEERING AND GOVERNANCE STRUCTURES

Table of Contents

1 Definitions, Standards, and Scope of Work

1.1 Definitions

IT strategic steering and governance is an enabler of stakeholder value. Key activities of strategic steering are to evaluate, direct, and monitor how IT is managed and operated. Figure 1. Depicts the IT governance model, with key activities, inputs, outputs, and relation to management activities.

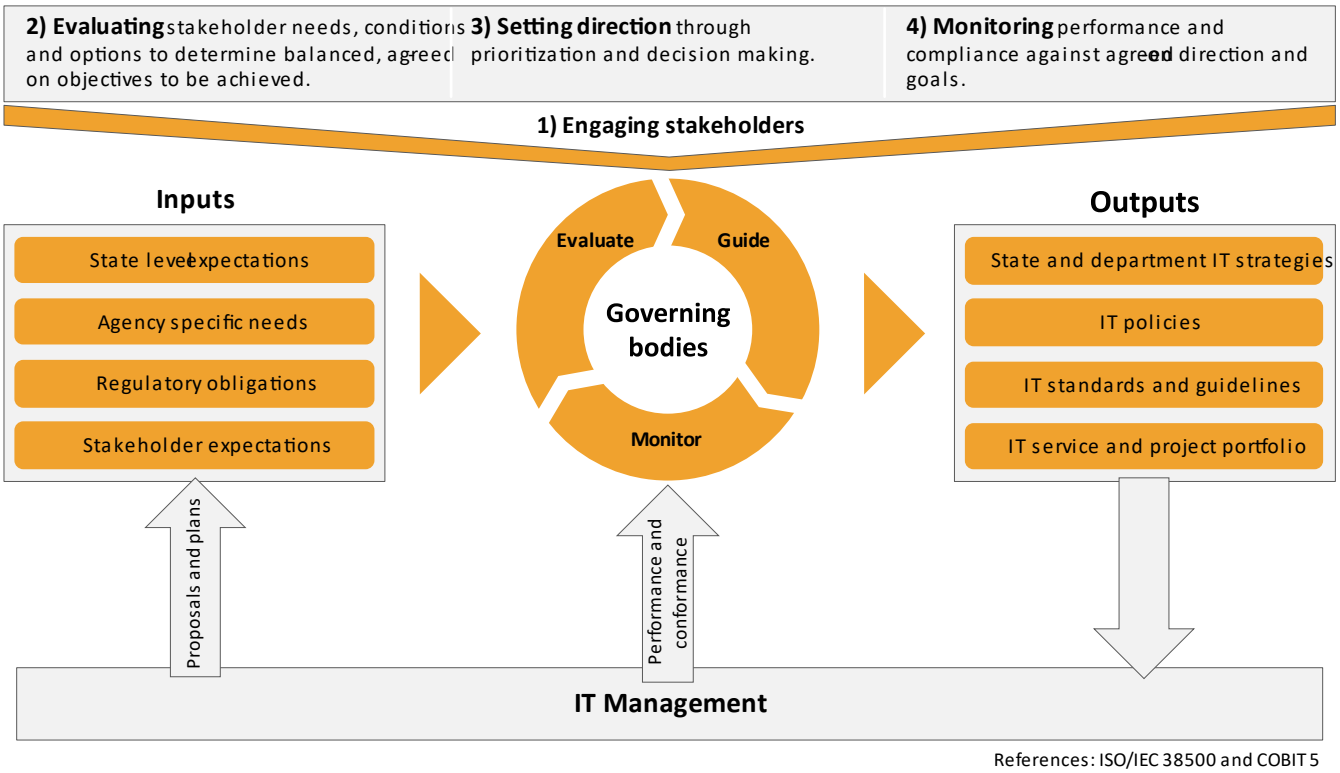


Figure 1. High-level IT Governance Model

Governance and strategic steering are naturally distinct from IT management, as the steering and governance set the principles, policies, and direction which the management then follows and reports to the governance on, when managing the implementation and delivery of IT services.

1.2 Standards

The Governance Structures Committee chose to leverage and align with ISO 38500 and COBIT® as baseline standards for the overall IT Governance framework. ISO/IEC 38500 standard provides principles, definitions, and a model for governing bodies to use when evaluating, directing, and monitoring the use of information technology in their organizations. Cobit® has the key elements introduced in ISO in the background, extending and deepening the practical guidance. Both frameworks are internationally recognized, setting foundations for most IT governance initiatives.

Governance involves setting and being accountable for the purpose and parameters for the organization. While the governing body retains ultimate accountability for the whole organization (and this document focuses on the accountability for the current and future use of IT by the organization), the practice of governance occurs throughout the organization.

1.3 Recommended IT Operating Model and Governing Principles

1.3.1 Recommended IT Operating Model

The following table outlines the typically referred different IT operating and consolidation options.

Operating model	Description
Coordination: Centralized Planning - Decentralized Execution	Coordination calls for high levels of integration but only some standardization of processes (standardized common processes). Business units (agencies) share one or more of the following: customers, products, suppliers, and partners. The benefits of integration can include integrated customer service, cross-services, and transparency across delivery processes. While key business processes are integrated, business units however have unique operations, often demanding unique capabilities.
Diversification: Decentralized Planning (Governance) - Decentralized Execution	Applies to organizations whose business units (i.e., agencies) have few common customers, suppliers, or ways of doing business. Business units in diversified organizations offer different products and services to different customers, so central management exercises limited control over those business units.
Unification: Centralized Planning - Centralized Execution	When organizational units are tightly integrated around a standardized set of processes, companies benefit from a Unification model. Organizations applying this model find little benefit in business unit autonomy. They maximize efficiencies and customer services by presenting integrated data and driving variability out of business processes.
Hybrid / Federated and Shared Services	This model combines aspects of the 'Coordination' and 'Unification' models, and assumes a set of Shared Services, that are common to all or most of the agencies. Thus, not all execution is decentralized (the common services). Also, the planning is not all centralized, but distributed between central IT and business units (agencies), central IT creating the higher-level policies and strategic plans, for departments to detail their plans around and execute on. In principle, departments retain ownership and resources to manage Line of Business specific systems and data.

ETS recommends a **Hybrid / Federated and Shared Services model**, with elements of centralized planning (e.g., State IT Strategic Plan and state level policies) and execution (common business solutions such as finance or payroll and consulting, common IT operations and infrastructure services) and with decentralized customized business solutions, of which departments remain accountable and responsible.

1.3.2 Governing and Design Principles

The governing and design principles are a set of loose rules used to guide the design and development of the major facets of IT, such as internal organization, internal processes, and vendor management to suite the specific needs and goals.

Principle	Implication
Decision making	We will centralize decision making around the prioritization of projects to ensure that the initiatives driving the most value for the organization are executed.
Fit for purpose	We will build and maintain fit-for-purpose solutions based on business units' unique needs.
Reduction of duplication	We will reduce role and application duplication through centralized management of assets and clearly differentiated roles that allow individuals to focus within key capability areas.
Managed security	We will manage security enterprise-wide and implement compliance and security governance policies.
Reuse > buy > build	We will maximize reuse of existing assets by developing a centralized application portfolio management function and approach.
Managed data	We will create a specialized data office to provide data initiatives with the focus they need to enable our strategy.

1.3.3 State Strategic IT Priorities and Goals

The current Hawai'i IT Strategic Plan identifies seven strategic priorities. These priorities align well with the goals of Act 179. The IT Strategic Plan supports and is an enabler of the Act, and vice versa.

In addition to the IT Strategic Plan, the state CIO and ETS have set the following transformation goals for Hawaii IT:

- Transform ETS – Change role from a service provider to transformation enabler.
- Transform systems – Modernize Major IT Systems for better mission execution.
- Transform identity – Unify digital identity of state constituents and employees.
- Transform experience – Engage interactive automation such as RPA and AI/ML chatbots.
- Transform data – Make data collection, sharing and analysis more efficient and effective.

As the consolidation efforts take shape and progress, the priorities set in the Hawaii IT Strategic Plan and the transformation goals help inform the recommendations of this plan as well as guide the design decisions and prioritization of consolidation initiatives.

2 Details of the Current State Analysis

The findings per governing bodies, artifacts, processes, and tools are presented in the following chapters.

2.1 Governance Bodies / Oversight Groups

Figure 2. depicts the current governing bodies at the state.

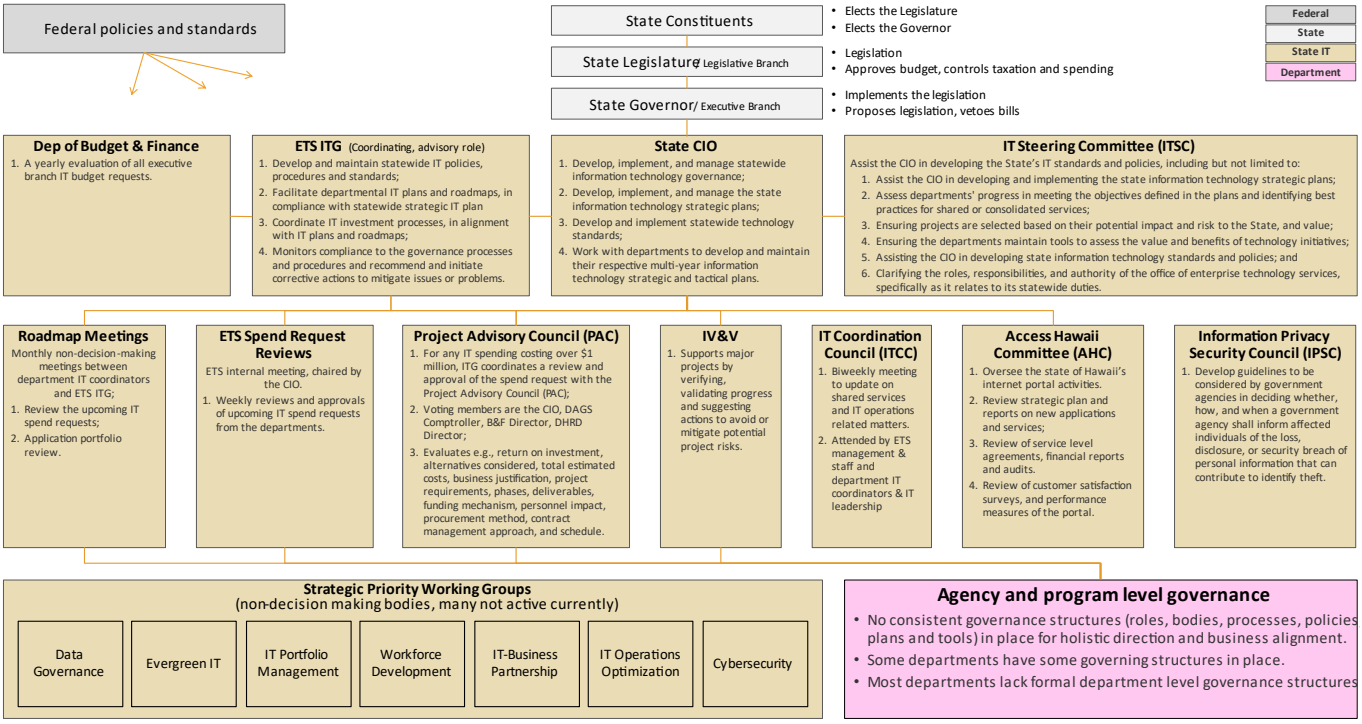


Figure 2. Current IT governance bodies at the state.

One key aspect of IT governance from governing bodies perspective is that at the department level there are no consistent governance structures (roles, bodies, processes, artifacts, plans and tools) in place across the agencies, for holistic direction, planning and business alignment. Some departments have some governing structures in place, but many departments lack formal department level governance structures.

The existing, active, tactical level bodies are heavily focused on investment management aspects of IT Governance, leaving gaps on other areas of IT management, such as technology architectures, vendor and procurement management, data governance, security and risk management and workforce development, as the Strategic Priority Working Groups status is unclear and many of them are not active.

2.1.1 Efficiency and Effectiveness

Below table summarizes the observations during the committee work, from the Working Group Survey, the preliminary report to the legislature and the two recent studies, regarding the key governing roles and governing bodies.

Body / Role	Observation
State CIO and ETS as a whole	• Prevailing perception of the CIO and ETS are of those of a vendor and a service provider, and not so much yet of equal partner to business and a source of innovation and new business value creation.
IT Steering Committee (ITSC)	• Role of ITSC as an active driver and leader of IT is a bit unclear; how does ITSC in practice guide and impact major IT decisions and direction at the state. Is the role a decision making or merely an advisory one? How should the role change and why? What practical responsibilities should ITSC have?
Project Advisory Council (PAC)	• Some departments have expressed some uncertainty and confusion about the role of PAC and need for it. Since the legislature approves departments budget, with agencies' directors' approval and each program consults with their finance team before proposing project for consideration. Departments have thus expressed the need to clarify the purpose and need for PAC and its approval, if there is already budget, business leadership, legislative and department IT approval.
IT Coordination Council (ITCC)	• ITCC was created by ETS / OIMT in 2015 as mechanism to communicate / interact with agencies, and ITCC is not formulated by statute or external mandate. ITCC meetings were indented to be extension of IT Governance for department outreach and where departments could interact with each other. • Currently the ITCC biweekly meetings are informative in nature, ETS management providing status updates and news for the department IT Coordinators about the shared services provided or planned by ETS. • ITCC's one way role, does not accommodate the original intent of allowing a multi-way way sharing of needs, issues, opportunities. • State CIO should meet with the ITCC from time to time. This interaction provides an opportunity for departments to communicate directly with the CIO.
IV&V	• IV&V process would benefit from more uniform analysis and reporting practices, with consistent focus areas covered (risks, scope, schedule, quality, costs) across the programs that the IV&V vendors serve. Currently, various practices and content are delivered depending on the vendor. • IV&V vendor objectivity has also been questioned.
ETS ITG	• Core functions of ETS are supporting departments IT planning and roadmapping, investment management (budget and spend request process), procurement and contracting and benefits realization and vendor management. • To achieve above, ITG creates standards and guidelines. • Enforcement of standards and guidelines suffers from them not being charted at policy level.
Access Hawaii Committee (AHC)	• Access Hawaii Committee (AHC) focuses solely on the State internet portal aspects. • Division of responsibilities (processes and technology) between state (ETS) services and portal provider (NIC Hawaii, wholly owned subsidiary of Tyler Technologies) is not always clear.
Information Privacy Security Council (IPSC)	•
Working Groups	• Current Strategic Priority Working Groups are mostly in hibernation and not active. The Groups that do convene actively, are more informative in nature than advisory or preparatory.
Department level governing bodies	• Many have informal bodies, active in assessing needs and proposals, but in most of these instances there is a lack of consistency on the agenda, attendance, and schedule of these meetings. • A few (2-3) departments have a formal governance structure in place and active. One being chartered in a law. • Many departments have no apparent department level structures defined or active currently. • Many departments still, however, state that the current model is effective. (This may indicate lack goals and metrics setting for IT these structures.)

2.2 Processes

2.2.1 Budgeting

State budgeting process in Hawai'i is depicted in figure below. Department of Budget and Finance publishes the Governor's Budget Execution Policies and Instructions annually, along with the Executive Memos and Finance Memos that relates to Budget Preparation for IT.

State Budgeting Process	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Program structure update by B&F (even yrs.)				Year 1								
Departments program structure updates (even yrs.)												
B&F Budget preparation instructions												
Departments budget requests to B&F												
B&F initial recommendations and appeals to B&F												
DB&F revised recommendations to, appeals to Gov.												
Decisions finalized & transmitted to departments												
Budget & Variance Report to Legislature												
Budget bill to Legislature	Year 2											
Gov. execution policies, DAGS appropriation warrants												

IT planning and budgeting	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ETS updates to State IT Strategy, if any												
Departments' consolidated IT planning												
Departments' IT budget requests												
ETS Review of Departments IT Budget Requests												

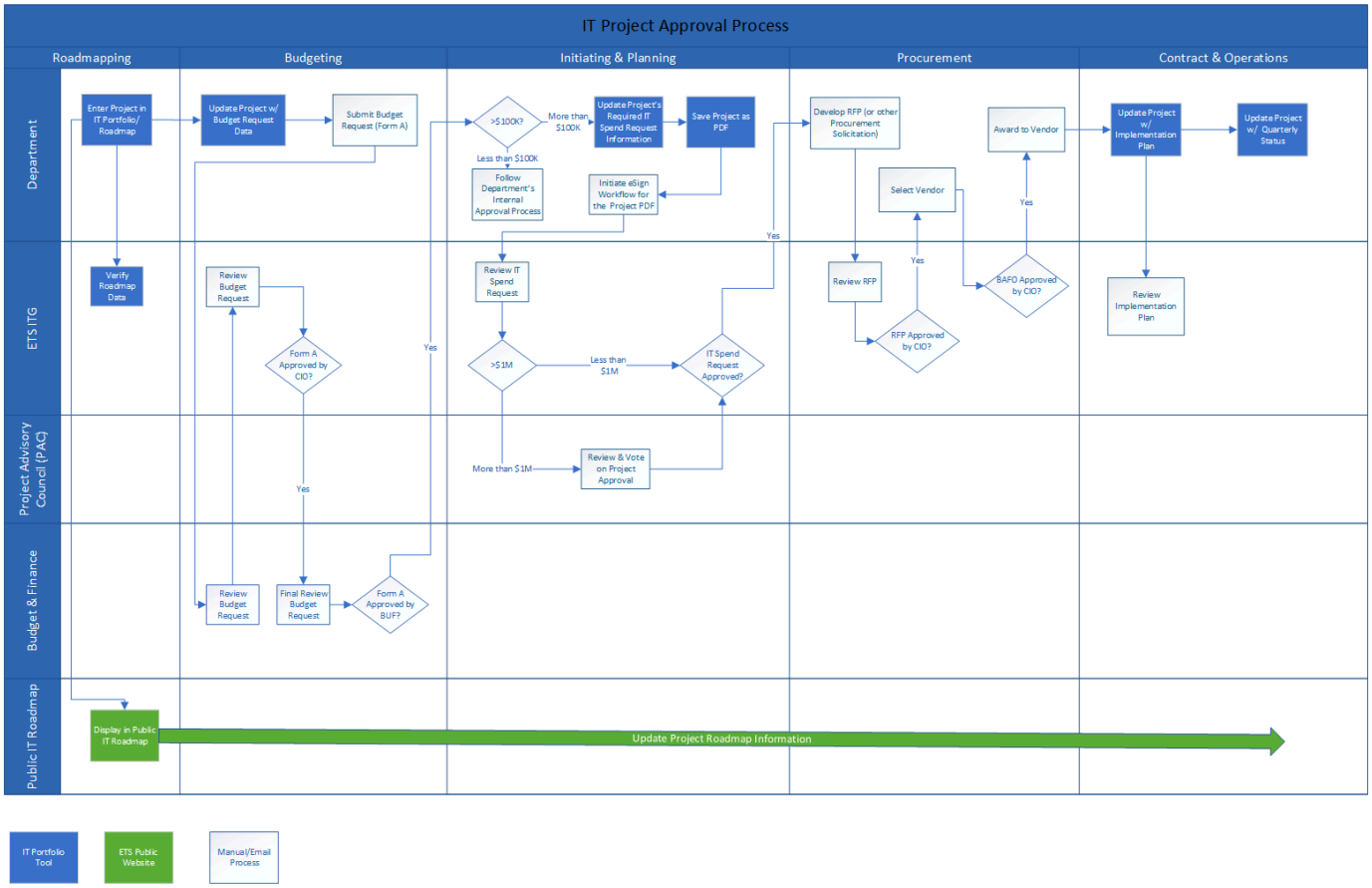
2.2.2 Efficiency and Effectiveness

Below table summarizes the observations regarding the IT budgeting process.

Activity	Observation
Strategic planning and road-mapping	• Lack of formal, collective longer-term planning at the agencies; that produces documented plans and roadmaps with which investments (budget and spend requests) would align to. • This collective planning is not happening both at the department level and at the state level, between agencies. • Lack of awareness of the State IT Strategic Plan and how it should shape department planning and influence investment decisions.
Budgeting	• Budgeting suffers from lack of longer term, collective strategic planning at the agencies. • The budget requests (budgeting phase) and spend requests (Initiating and planning phase) are not aligned and not often kept aligned / matching. • Lack of common guidelines and checklists for defining robust business cases for the budget requests.

2.2.3 IT Investment Management

The IT investment management process defined Administrative Directive AD 18-03 mandates all IT projects that meet any of the criteria specified in this directive must adhere to the program governance process outlined in below diagram.



Process is being followed well by the agencies, in that virtually all IT spend requests flow through the process as intended. Budgeting and Initiation and Planning Phases are most mature, but the Roadmapping, Procurement and Contract & Operations phases lack certain consistency, detail, and rigor, resulting in a suboptimal end-to-end process. The recommendations for changes to the process are listed in Chapter 5.

2.2.4 Efficiency and Effectiveness

Below table summarizes the observations regarding the IT Investment Management process.

Process Phase	Observation
Strategic planning and roadmapping (Same as with Ch. 4.3)	• Lack of formal, collective longer-term planning at the agencies; that produces documented plans and roadmaps with which investments (budget and spend requests) would align to. • This collective planning is not happening both at the department level and at the state level, between agencies. • Lack of awareness of the State IT Strategic Plan and how it should shape department planning and influence investment decisions.
Budgeting (Same as with Ch. 4.3)	• Budgeting suffers from lack of longer term, collective strategic planning at the agencies. • The budget requests (budgeting phase) and spend requests (Initiating and planning phase) are not aligned and not often kept aligned / matching. • Lack of common guidelines and checklists for defining robust business cases for the budget requests.
Initiating	• Spend Request information required in LeanIX Project Fact sheets has been evolving quite heavily but is now stabilizing. • Departments follow the process (LeanIX) quite well, assisted by ETS Analysts at the monthly Roadmapping meetings. However, there likely are cases where the process is circumvented. • Lack of common guidelines and checklists for refining robust business cases for the spend requests.
Procurement	• Lack of capacity and capability for procurement and vendor management tasks; requirements gathering, alternatives analysis, RFP preparation, response evaluation, contract negotiations and vendor management (compliance, performance) during project implementation and maintenance & operations. • Ability to leverage vendor contracts between various programs and departments is limited in most cases. • Choosing the most fitting and value adding procurement methods and vehicles. • Lack of consistent practices statewide for vendor and offer evaluation. • Lack of consistent practices statewide for IT contractual clauses. • Updating some key information (in the Spend Request Project Factsheets in LeanIX), for example the cost information, through the lifecycle of the investment is lacking, leading to inaccurate data and skewed aggregations.
Contract and operations	• There is a lack of common and recurring practices for benefits realization and measurement. • There is a lack of contract and vendor management guidance and best practices.

2.3 Tools

2.3.1 Project and Application Portfolio Management Tool

State uses LeanIX as the statewide IT governance tool. The tool is used by ETS and the agencies. Main uses cases of the tool are:

- IT investment management: Recording and tracking of IT budget and Spend Requests. These are collected as "Project Fact Sheets", which contain business justification, cost, schedule, provider, affected application etc. information.
- Application portfolio management: fit and cost analysis, lifecycle management, redundancy analysis.

2.3.2 Other tools

ETS and the state lack dedicated, common and shared IT management tools, outside of LeanIX. There is a lack of an end-to-end IT governance and service management tool or a stack of integrated, interoperable tools.

2.3.3 Efficiencies and Effectiveness

Below table summarizes the observations during the committee work, from the Working Group Survey, the preliminary report to the Legislature and the two recent Governance studies, regarding the key governance tools.

Tool	Observation
LeanIX	• LeanIX is a lightweight tool that requires a lot of customization by the state to make it effective and efficient. LeanIX allows that customization, which is ones of its strengths. • On the other hand, LeanIX is not strong and providing strong guidance on any particular area – it can provide basic level functionality for project portfolio, cost and asset management with manual customization and manual maintenance. • ETS has a strong internal capability in developing and maintaining the tool, which can be credited in keeping the tool viable. • Adoption and leverage of the tool could be much better, even within ETS. Low adoption is due to many reasons; perception of the tool not being easy to use or effective (even after good internally executed modifications) one of them.
Other tools	• ETS and the state lack dedicated, common, and shared IT management tools, outside of LeanIX. There is a lack of an end-to-end IT governance and service management tool or a stack of integrated, interoperable tools. • This lack of an integrated IT governance and management toolset, prevents automation of many end-to-end governance and management processes, from IT planning to managing costs and service levels and service performance (e.g., incidents, problems, requests, and changes to the services) in a continual manner.

2.4 Artifacts

Governance artifacts are here defined to be the written laws, policies and standards that direct IT, the management of IT and the use of IT. Table below lists and describes the key IT governance policies and artifacts at the state level.

Policy	Type	Purpose
HRS 27-43	Law	Office of enterprise technology services, chief information officer and information technology steering committee establishment and responsibilities.
AD 18-03 Program Governance and Independent Verification and Validation Requirements for Enterprise IT Projects	Policy / Directive	Update and clarify the mandatory governance process for Executive Branch enterprise information technology (IT) programs and projects ensuring they achieve intended objectives and provide maximum return on investment.
AD 19-03 Enterprise Governance Committee in Support of the Hawai'i Information Portal and Continued Modernization Efforts	Policy / Directive	Directive for establishing IT standards to support and enable large scale enterprise IT modernization initiatives, currently specific only to HIP program (ERP for payroll, HR and Time and Leave).
Governor's Budget Execution Policies	Policy / Directive	Annual updates to budget execution procedures.
Director of Finance Budget Preparation Policies and Procedures	Policy / Directive	Annual updates to budget preparation procedures.

2.4.1 Efficiency and Effectiveness

Below table summarizes the observations during the committee work, from the Working Group survey, the preliminary report to the legislature and the two recent governance studies, regarding the state level governance policies / other artifacts.

Policy / Artifact	Observation
HRS § 27-43	• Text is vague in certain places, for example: "Work with each executive branch department and department to develop and maintain its respective multi-year information technology strategic and tactical plans and road maps that are part of the State's overall information technology strategic plans, road maps, and directions;" does not adequately define the accountability and responsibility of the task. • Role of CIO is suggested to be amended, see chapter … • Organizational placing of ETS is suggested to be amended, see chapter … • Role of IT Steering Committee (ITSC) is suggested to be amended, see chapter …
AD 18-03	Directive does not have enough detail for certain phases of the process, namely the Roadmapping, Procurement, and Contract and Operations.
AD 19-03	Principles and intent of this directive should be extended to other programs. Scope should also be extended to cover all areas of the governance of the implemented systems.
Department level policies and artifacts	• Many focus on security (including AUPs), and hardware / software procurement. • Fewer have system specific policies and procedures, data access, usage reporting and dissemination policies. • Some have division level policies. • Keeping up with external standards is a challenge due to lack of capacity. • Lack of documented department level IT governance principles and strategic IT plans, aligned with departments business plans
Standards, guidelines, procedures	• There is a lack of common, uniform, artifacts on the lower-level standards, such as service descriptions and service level agreements. • Currently there is no common Service Catalog in place, for ETS and departments to have and share. • Also, one key governance and management vehicle will be a common Service Catalog, for ETS and for the departments to have and share. This should be jointly defined and adopted, leveraging a shared dedicated tool.

3 Summary of Sister States IT Governance Models

3.1 Analysis Methods and Summary of Findings

Sister state assessment consisted of the identification and review of documented practices across forty-nine (49) sister states. No direct interviews were conducted by the Governance Structures Committee.

In summary: Most states adopt a hybrid operating model while having strong law and directive based, enabling mandate for the central IT to govern and enforce key policies and standards over the decentralized services as well. Extensive, inclusive stakeholder engagement and consultation is at the core of the governance of the typical oversight areas: investments, security, data, technology architecture, and projects. Below table summarizes the findings further.

Theme	Summary of observations
Operating model	• Hybrid is the most common, where authority for IT assets, services, financial and human resource management, and operations is distributed between the state IT organization and individual state agencies. • Extensive centralization has been and is becoming more and more common - Central state IT organization has authority over most areas of IT including assets, services, financial and human resource management, and operations. However, even with more centralization, a common model is to leave the departments control over many of their Line of Business type of services, that are used only at the specific department and department divisions. • There are no fully decentralized states - State departments CIOs have authority over all IT areas including assets, services, financial and human resource management, and operations.
Typical oversight areas	• IT investment & project portfolio management. • Information security and privacy. • Technology architecture. • Program and project specific to oversee large projects. • Data governance.
Formal structures	• Strategic layer - state and department level direction and policy setting (long term scope). • Tactical layer - department level oversight (medium term scope). • Operational layer - project and service delivery level governance (applying policies in practice).
Engaged stakeholder groups	• IT Leaders and Managers – Are the main drivers of IT governance in most if not all states. • Business Leaders - Department representatives serve actively in IT governance processes in many states. • Residents – In some states there are or have been, mechanisms to engage citizens more directly. That is for example to be able to review and prioritize enterprise-wide technology investments. • Commissioners (equivalent to ITSC members in Hawai'i) - In many states' cabinet-level commissioners serve in high level IT governance bodies to ensure continuity and congruence of state and departments strategies. • Legislators – Some states have legislators serve on the state's IT executive board to ensure congruence with legislative priorities. • Vendors.
Enabling mandate	• Legislative mandates - Organization and reporting relationships designated by legislation. • Executive Orders - Organization and its authority designated by Governor's Executive Order.
Central authority levels (separately from operating model)	• Majority of states apply or are moving towards strong central authority regardless of formal operating model, where the State CIO and governance bodies have the authority to set and enforce IT standards extensively statewide. • Some states balance moderate authority - CIO and/or Governance boards have the authority to set and enforce some IT standards less extensively and deeply.

4 Details for Strategic Steering and Governance Structures Recommendations

4.1 Governing Bodies and Roles

Working Group's suggestions to update current key roles and governing bodies to better serve the current state and the shared services model are listed in below table.

Governing Body or Role	Recommendation
State CIO	Identify the "Chief Innovation Officer" instead of "Chief Information Officer". Re-focus technology teams away from simple services to development operations (DevOps) centers of innovation.
Department IT Services Manager Position Description	Introduce a role at the departments which would be responsible of the maintenance of the Department Service Catalog and Service Descriptions, incl. SLAs. To allow a holistic up-to-date view to current services and a counterpart for ETS on department Service Portfolio (planned or in development services).
IT Steering Committee	Clarification of the role and responsibilities of ITSC • Decision authority and expectations; • Role in ensuring continuity over administration changes; ITSC should have relative independence from the CIO; from "assist" to advice and verify. CIO would serve as a voting member. In its current role, how it is stated in the law, ITSC is an assistant, subjugated to the CIO.
Project Advisory Council (PAC)	Clarify the purpose and need for PAC and its approval, if there is already budget, business leadership, legislative and departmental IT approval. Refer to Project and Portfolio Management Strategy Committee Recommendations for details.
IT Coordinating Council (ITCC)	• Charter the role and mandate formally. • ITCC can act as a key governing body in not only being informative in nature, but in two-way communication between ETS and the agencies. ITCC should be mandated to manage the demand, requests and queries coming from the agencies. • Rename to Shared Services Council. • Extend duration of the meetings. • Monthly or Bi-weekly.
ETS ITG	• Formalize role and outputs, allowing more enforcement of certain policies and standards.
Access Hawaii Committee (AHC)	• Define RACI (processes and technology) for state (ETS) and the portal provider. With the intent on ensuring the providers technology and solution architecture remains in alignment with state preferences and standards.
Create new IT Governance Councils for specific IT Governance areas	Define and mandate new IT Governance Councils. The key responsibilities of these working group would be to: • Define and prepare topical policies and standards. • Support and assist departments with their questions and challenges on matters at hand related to the topic. Members would consist of department business and IT leaders and management and ETS subject matter experts. For details, see chapter 6.1.2.
Department level Governing Bodies	Establish a minimum requirement for governing bodies and processes, for IT budgeting and investment management: • Department IT strategic plans to provide context, direction and boundaries for budget and spend request business cases. • Department level review of every Budget Request above 100K. Having consistency in how certain types and scope investments are processed and reviewed and by whom in the department, would benefit the execution of and adherence to IT department and state IT plans and principles, and enable detection and review of potential new shared services.

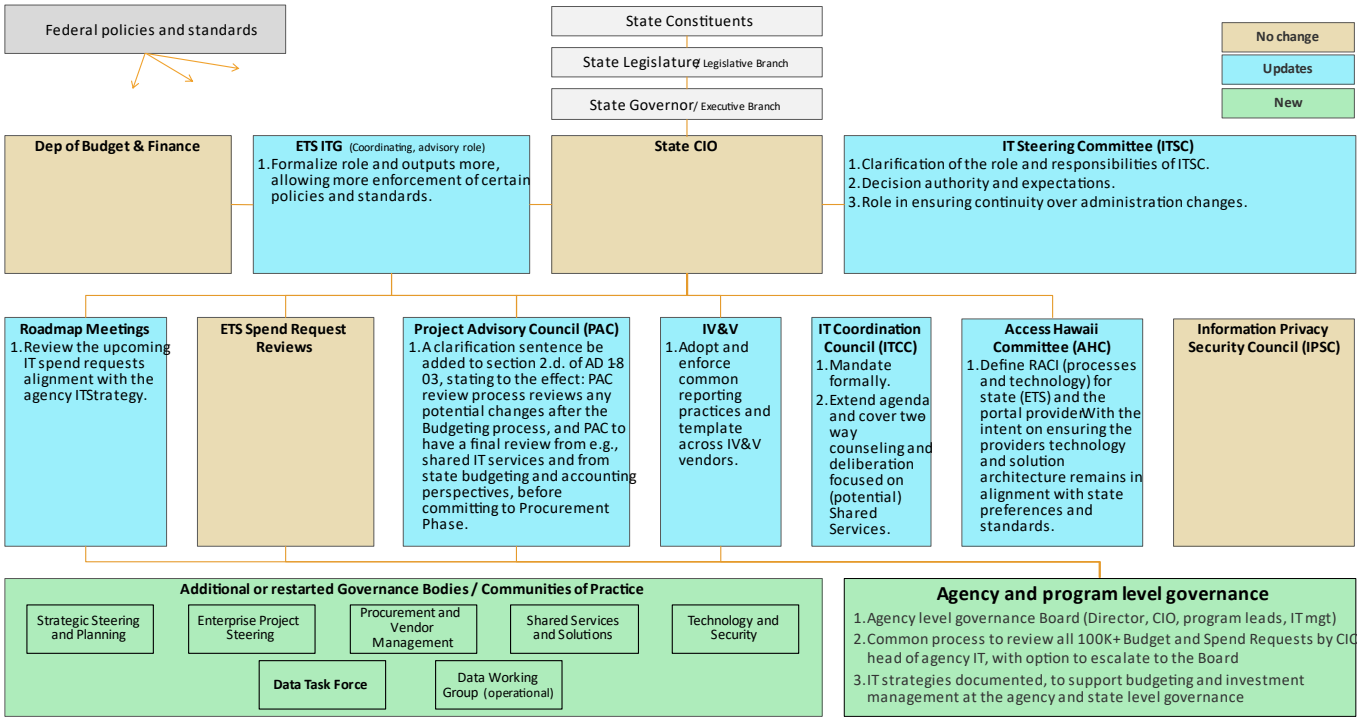
4.1.1 Recommended New IT Governance Bodies

The User Groups' role is to jointly consult, deliberate, and discuss the matters specific to the governance area. The Councils would also develop policies, standards, and guidelines for the specific area, to be approved by higher level governing bodies. Suggested IT Governance User Groups are represented in the following table.

Chapter 5 outlines the Charters for the recommended new IT governance bodies.

4.1.2 Summary

Diagram below summarizes the recommended changes to governing bodies overall.



4.2 Processes

Working Group's suggestions to update current key Governance Processes to better serve the current state and the shared services model are listed in below table.

Process	Recommendation
Strategic planning and roadmapping	• Mandate and enforce formal, collective longer-term planning at the departments; that produces documented plans and roadmaps with which investments (budget and spend requests) would align to. • Template for the plans exist and has been tested in the state IT Governance tool (LeanIX).
Budgeting	• Define and establish and process and tooling to match and align budget requests (budgeting phase) and spend requests (Initiating and planning phase). Using state IT Governance tool (LeanIX). • Define and adopt common Business Case guidelines and checklist for defining robust business cases for the budget requests. Enforce adoption, by altering Form A as needed. • Require each Form A to be associated with department Strategic IT Plan.
Project Initiation	Define and adopt common Business Case guidelines and checklist for defining robust business cases for the budget requests. Enforce adoption, by altering state IT Governance tool (LeanIX) Project Fact Sheet mandatory fields.
	Require each Project Spend Request to be associated with department Strategic IT Plan and to a Form A.
	Further details in Portfolio Management Section of this Report.
Procurement	• Establish and mandate a clearer role and responsibility for ETS to support requirements gathering, alternatives analysis, RFP preparation, response evaluation, contract negotiations. • Depending on the nature (complexity, risks, effort, level of customization) of the procurement: Create and adopt checklists (minimum requirements to be covered) for pricelist-based contracts, similar as the RFP current checklist provided by ETS. Capacity to support departments in procurement is also needed, to facilitate the potentially heavier process. • Identify means to leverage vendor contracts between various programs and agencies. • Create, within the fitting IT Governance council, standard and guideline to choose the most fitting and value adding procurement methods and vehicles. • Create, within the fitting IT Governance council, consistent practices statewide for vendor and offer evaluation. • Define and create template for IT contractual clauses, with SPO and Attorney General's office.
	Further details in Sourcing and Procurement Strategy Section of this report.
Financial and Benefits Realization Management	Define and enforce a process to keep IT Project costs up to date in the state IT Governance tool (LeanIX), referring the contracts and agreements, post award. Define a tracking mechanism of defined benefits, post implementation.
Service Catalog Management	Adopt a common Service Catalog and a Service Catalog Management process, to update and maintain information about IT services for users, customers, and service provider parties.
Service Level Management	Adopt a common Service Level Management process: Service Level Agreement checklist, performance monitoring and management process.

4.3 Tools

Working Group's suggestions to update current key governance tools to better serve the current state and the shared services model are listed in below table.

Tool	Recommendation
Statewide IT Portfolio Management (LeanIX)	Adopt and enforce the IT Strategy related factsheets.
	Redesign existing LeanIX screens to show/hide only fields required and used for IT Governance and aligned updates.
	Build IT cost model into the tool (Project Fact Sheet).
	Implement asset management features (solution component library).
Integrated IT Management and Governance tool	An option is to integrate IT governance and management tools under one platform: Consisting of IT demand and portfolio management, IT project management, IT service management and operations and IT cost management. • This would replace current IT Governance tool (LeanIX).
IT Service Management (ITSM)	Define and implement an IT Service Management (ITSM) tool. • Currently ETS uses MS SharePoint and is starting to test and pilot a dedicated product (FreshService).

4.4 Governance Artifacts

Working Group's suggestions to update current key governance policies to better serve the current state and the shared services model are listed in below table.

Policy	Recommendation
HRS §27-43	Amend and HRS §26 to establish ETS as its own Executive Branch Department, independent of the Department of Accounting and General Services. ETS currently does not have autonomy for human resources, budget management, or office space which are controlled by Department of Accounting and General Services. Autonomy would facilitate faster administrative decisions, hiring, and the ability to scale services more easily.
	Amend to specify that the Chief Information Officer is not responsible for University of Hawaii, Department of Education, Office of Hawaiian Affairs, and Hawaii Health Systems Corp. The UH, DOH, OHA, and Hawaii Health Systems Corp. currently have their own IT offices and substantial autonomy for governance of IT systems and personnel without ETS oversight. HRS § 27 43 does include a carve out provision for what is not within the scope of the Chief Information Officer.
	Amend to identify the "Chief Innovation Officer" instead of "Chief Information Officer". Trends in both the private and public sectors are to re-brand the traditional role of CIO, and to re-focus technology teams away from simple services to development operations (DevOps) centers of innovation. This reflects the increasing perceived value of IT work not as merely services to manage your data (i.e., information) but rather value creation services.
	Amend to refer to an Information Technology Steering "Board" governed by HRS § 26, instead of "Committee". As the ITSC's current composition is highly concentrated within government, to encourage public investment in government infrastructure, and to align with private sector trends, the composition of the ITSC should be changed to a board / commission governed under HRS § 26. This will empower this governance body to have formal decision-making authority that is balanced with the Governor's agenda for State IT and give ETS additional continuity.
	Amend so that accountability and responsibility of creating and maintaining department IT strategic plans is expressed more clearly.
	Amend to clarify that it is the responsibility of departments to develop and maintain their respective multi-year information technology strategic and tactical plans and road maps that are part of the State's overall information technology strategic plans, road maps, and directions.
AD 18-03	A clarification sentence be added to section 2.d. stating to the effect: PAC review process reviews any potential changes after the Budgeting process, and PAC to have a final review from e.g., shared IT services and from state budgeting and accounting perspectives, before committing to Procurement Phase. Since the legislature approves departments budget, with agencies' directors' approval and each program consults with their finance them before proposing project for consideration. Departments have expressed the need to clarify the purpose and need for PAC and its approval, if there is already budget, business leadership, legislative and department IT approval.
	Amend to state a minimum requirement for governing bodies and processes at the department level for IT budgeting and investment management.
	Address the process change recommendations related to IT investment management process (initiation, procurement, contract, and operations).
AD 19-03	Status and means of enforcement (practical application) needs to be clarified, for example whether the policy potentially is to cover all major transformation efforts, not only Payroll (HIP).
Department level policies and artifacts	• Mandate documented department level IT governance principles and strategic IT plans, aligned with departments business plans. • Mandate and define data strategies and data management policies, aligned with state level data strategy and standards (once these are defined). • Security…
Standards, guidelines, procedures	• Create and adopt statewide common, uniform, artifacts on the lower-level standards, such as service descriptions and service level agreements. • Create and adopt statewide a common Service Catalog structure and taxonomy, for ETS and departments to have and share. • Enforce and mandate the adoption of the standards, through referencing in the policies.

4.5 Enablers of Success

- Organizational change management
- Business engagement and cooperation
- Legislature engagement and cooperation

5 New Recommended IT Governance Bodies

NOTE: These User Groups and their charters are to be verified and agreed in July-August, 2023.
NOTE 2: The state IT strategic plan needs to be reviewed and revised, to remove the existing Strategic Working Groups, which would make way for the User Groups. The user groups are wider in nature, than the Working Groups were.

The following User Groups are recommended, to enhance the governance of IT at the state:

- User Group – Strategic Steering and Planning
- User Group – Shared Services and Solutions
- User Group – Procurement and Vendor Management
- User Group – Business and Data Architecture
- User Group – Technology and Security

Membership and attendance to a user group is voluntary, after registering as a member to the group.

State CIO is the executive sponsor of the user groups, and the user groups reports to the state CIO. User groups are facilitated by an ETS subject matter expert and attended by ETS leadership, management, and subject matter experts as per their focus areas.

Following subchapters define the purposes, memberships, roles, responsibilities, methods, and procedures for the User Groups.

5.1 Strategic Steering and Planning User Group

5.1.1 Purposes and Agenda Items

This user group shares, discusses, and deliberates:

- Departments strategic IT plans and the state IT strategic plan;
- Overall IT demand and needs, before budgeting and investment management steps;
- ~~Consult on IT financial management and benefits realization matters or large initiatives and cross agency initiatives;~~
- Formulate policies, standards, and guidelines for the area.

5.1.2 Memberships

User group is open to:

- Department executive and program leadership
- Department IT leadership, management, and subject matter experts.

5.1.3 Procedures and Tools

This user group convenes twice a year by default, in July – August and January. Additional meetings may be held on a just reason.

Strategic IT plans and relevant report / dashboard views are stored in the state IT governance tool (LeanIX), and standard MS office formats for members' access. The user group will have an MS Teams channel and a MS SharePoint site to facilitate collaboration and store documentations.

5.2 Shared Services and Solutions User Group

This user group reviews, analyzes, and deliberates:

- Current shared services (fit and performance);
- Potential new shared services;
- Formulate policies, standards, and guidelines for the area.

5.2.1 Memberships

User groups is open to:

- Department executive and program leadership;
- Department IT leadership, management, and subject matter experts, particularly the IT Service Managers,

5.2.2 Procedures and Tools

This user group convenes every two months by default. Additional meetings may be held on a just reason.

Relevant reports and dashboards are stored in a fitting IT Service Management tool (TBD), and standard MS office

formats for members' access. The user group will have an MS Teams channel and a MS SharePoint site to facilitate collaboration and store documentations.

5.3 Procurement and Vendor Management User Group

This user group shares, discusses, and deliberates:

- Current and upcoming IT procurement cases;
- Procurement vehicle (price lists) related matters;
- Statewide contract, cross-department opportunities;
- Vendor performance and vendor management issues;
- Formulate policies, standards, practices, and guidelines for the area.

5.3.1 Memberships

User groups is open to:

- Department executive and program leadership, procurement officers and ASOs;
- Department IT leadership, management, and subject matter experts, particularly the IT Service Managers,

5.3.2 Procedures and Tools

This user group convenes monthly by default. Additional meetings may be called if there is a just reason.

Relevant reports and dashboards are stored in fitting IT governance (Lean IX) and service management tools (TBD), and standard MS office formats for members' access. The user group will have an MS Teams channel and a MS SharePoint site to facilitate collaboration and store documentations.

5.4 Business and Data Architecture User Group

This user group shares, discusses, and deliberates:

- Business process analysis and modeling – identifying and defining shared processes and capabilities;
- Data architecture; master data, reference data, business glossaries, data dictionaries;
- Identify areas to streamline, optimize and harmonize architectures;
- Formulate policies, standards, and guidelines for the area.

5.4.1 Memberships

User groups is open to:

- Department executive and program leadership, business process experts, data stewards;
- Department IT leadership, management, IT service managers, data custodians.

5.4.2 Procedures and Tools

This user group convenes monthly by default. Additional meetings may be called if there is a just reason.

Relevant artifacts are stored in fitting IT governance (currently Lean IX), business and data architecture tools (TBD) and standard MS office formats for members' access. The user group will have an MS Teams channel and a MS SharePoint site to facilitate collaboration and store documentations.

5.5 Technology and Security User Group

This user group shares, discusses, and deliberates:

- Technology platforms that may have plenty of support and allow to build and operate on them state-wide;
- Current IT security topics and threats;
- Upcoming policy or standard changes;
- Define principles around Reuse / Buy / Build strategies;
- Review and advice on technology selections;
- Formulate policies, standards, practices, and guidelines for the area.

5.5.1 Memberships

User groups is open to:

- Department executive and program leadership;
- Department IT leadership, management, IT architects and specialists.

5.5.2 Procedures and Tools

This user group convenes monthly by default. Additional meetings may be called if there is a just reason.

Relevant artifacts are stored in fitting IT governance (currently Lean IX), IT architecture tools (TBD) and standard MS office formats for members' access. The user group will have an MS Teams channel and a MS SharePoint site to facilitate collaboration and store documentations.

5.6 Data Task Force

The purpose of Act 167 of 2022 is to establish within the office of enterprise technology services a chief data officer and a data task force to develop, implement, and manage statewide data policies, procedures, and standards.

The efficient integration, management, governance, and sharing of data can greatly improve state programs and the delivery of services to the State's citizens. Therefore, unless expressly prohibited by law or regulation, it is vitally important that data held by state agencies be made readily available to other state agencies with a minimum of administrative obstacles so that data shared across agencies contributes to the effective, efficient, and transparent delivery of information resources and services. It is equally vital that state agencies make reasonable efforts to provide public access to this data, unless expressly prohibited by law or regulation.

The chief [information] data officer, in consultation with the data task force and the office of information practices, shall develop policies and procedures to implement section 27-44, including standards to determine [which] the data sets that are appropriate for online disclosure as provided in section 27-44[;] and the data set format standards to be used by all agencies in making their data sets available; provided that the standards shall not require the departments to post information that is otherwise required to be disclosed under chapter 92F, but is personally identifiable information, information that may pose a personal or public security risk, is of minimal public interest, or is otherwise inappropriate for online disclosure as part of a data set.

5.6.1 Memberships

The task force shall comprise the following members:

- (1) One representative of the judiciary, to be appointed by the chief justice of the supreme court;
- (2) The superintendent of education, or the superintendent's designee;
- (3) The director of human services, or the director's designee;
- (4) The director of health, or the director's designee;
- (5) The director of business, economic development, and tourism, or the director's designee;
- (6) The president of the University of Hawaii, or the president's designee;
- (7) Two members of the public to represent nonprofit organization stakeholders having experience in data, of which one member shall be chosen and invited to participate by the speaker of the house of representatives and one member shall be chosen and invited to participate by the president of the senate; and
- (8) Two members of the public to represent for-profit business stakeholders having experience in data, of which one member shall be chosen and invited to participate by the speaker of the house of representatives and one member shall be chosen and invited to participate by the president of the senate.

The chief data officer shall serve as the chair of the task force and shall ensure that the task force is evaluated periodically.

5.6.2 Procedures and Tools

The data task force convenes TBD by default. Additional meetings may be called if there is a just reason.

Relevant artifacts are stored in fitting data governance and management tool, and in standard MS office formats for members' access. The task force will have an MS Teams channel and a MS SharePoint site to facilitate collaboration and store documentations.

5.7 Project Steering and Advisory Structures

Please refer to Project and Portfolio Management Strategy Committee's recommendations.

6 Current State Assessment Studies

6.1 IT Consolidation Working Group Survey

Below table summarizes the responses from the Survey of the IT Consolidation Working Group Members on how they see IT Governance at their departments. The responses represent 16 out of 17 departments, with 21 respondents.

Question	Summary of responses	Summary of response suggestions as to how to improve
Describe your department IT function: teams, and key decision making and direction setting roles?	Typical set-up •One department level IT Officer/Manager (e.g., CIO). •IT Supervisors / coordinators (e.g., per division or major solutions) reporting to the manager, overseeing IT. •Larger departments have more specialized roles, e.g., system analysts / programmers, DBAs and infrastructure, network, and operations focused staff.	•About half of the responses thought that their set-up was effective as-is. •Some responses expressed need to have more staff capacity dedicated towards certain focus areas; for example, security, compliance, architecture (e.g., evergreen and automation), project management, and vendor / procurement / contract management. •Some redundancy that could be streamlined was also indicated.
Who (roles) assesses the needs and makes the decisions about major IT changes: IT investments, new IT positions and hiring or technology architecture at your department?	•Majority of responses indicate a centralized review of major decisions, by the department IT leadership and the business leadership (Director), IT in a consulting and advisory role, as well and ASOs in many/most instances.	•Centralized, collective review process appears to be inconsistent (e.g., business leadership and ASO involvement) and not formalized, with some departments indicating a very decentralized model. •Better adherence to and compliance with department and state policies, with cooperation from divisions; large changes or hiring.
Are IT change needs and change proposals (such as investments), presented to and assessed collectively, cross programs and divisions, and what are the mechanisms for this cooperation?	•Based on responses, there appears to variation in these processes between departments and divisions. •Based on comments, there also is variation between different cases (similar in size), within the same department. •Overall, there seems to a more isolated evaluation and decision making, than collective, department wide even when matter at hand might would warrant.	•More frequent and broader commination within department, cross programs, and divisions. •Sharing of others' projects/programs planning to leverage technology and vendor services; department level meetings with E.g., ETS analyst facilitating the meetings. •Include dept. CIO in divisional IT planning. •Additional IT staff would support more timely change proposals. •Department programs don't currently have enough staff to properly support new IT efforts.
What kind of IT planning takes place in your department - to achieve a business aligned, holistic, longer-term roadmap for IT and who is involved in this planning?	•There is a distinct lack of systematic and formal strategic IT planning at the departments. •IT planning that is reported to take place occurs within IT and excludes most of the rest of the organization (the business) •Planning is more tactical in nature, typically one fiscal year out, quite siloed and focuses on prioritizing already identified needs and projects. •A few responses stated there is a department wide strategic planning process in place, however, with no mentions of documented plans being produced and e.g., how those plans effect investment decisions. •One response mentioned difficulty of maintaining plans and as technology and directives change rapidly.	•Developing individualized roadmap for every division. •Programs may need to involve HISO more on their program specific projects.
List and describe the (formal or informal) IT governing bodies that are in place and operational at your department?	•Most responses state that some informal bodies are active in assessing needs and proposals, but in most of these instances there is a lack of consistency on the agenda, attendance, and schedule of these meetings. •One or two departments state to have a formal governance structure. One being chartered in a law. •Many responses state that there is no department level structures defined or active currently. •Many responses still, however, state that the current model is effective. (This indicates lack of proper goals and metrics setting for IT governance).	•Involve more divisions in governing bodies. •May need an overall department steering committee. There is not a formal process for overall reviews of architecture and planning across the projects and domains beyond the HISO review. The buy-in for new technologies is at each business unit and Deputy Director level, there may be organizational benefits to a higher-level review of all the projects. •Formal body would be better, but the department needs more resources to support more formal processes.
What kind of tools are used to govern IT at your department (e.g., dedicated IT planning, or service management tools, MS office tools)?	•Common, most often mentioned tools: MS Office (incl. MS Project), LeanIX for project initiation and portfolio management & reporting, •Also mentioned by two departments: IT service management tool (helpdesk, issue tracking). •Security management tools were also mentioned.	•Additional architecture review and alignment tools may benefit transparency and alignment of capabilities across projects/business areas. •Still trying to find tools/methods to improve communication and planning. •It would be nice to have a dedicated tool that wouldn't require too much overhead to upkeep.
What state level policies and standards are followed?	•Most of the responses mentioned AD 18-03 and the budget execution policies. •Majority responses also mentioned State Procurement Office policies and DHRD Acceptable Usage of Information Technology Resources policy.	•

What department or division level IT policies and standards are in place (other than state level) and who creates and approves the policies?	•Many responses focus security (including AUPs), and hardware / software procurement. •Fewer have system specific policies and procedures, data access, usage reporting and dissemination policies. •Some responses mentioned division level policies. •Keeping up with external standards is a challenge due to lack of capacity.	•Keeping up with external standards is a challenge due to lack of capacity.
How does your department work with ETS when it comes to IT investment proposals and technology & resource planning?	•Networking, Production Services and Client Services for technology and resource planning. •Working closely with ETS on ETS-205 Form C, IT Roadmap and for advice on any new projects. •Monthly Roadmap meetings are considered effective. •LeanIX to launch initiatives, then further collaboration depending on the size of the initiative. •Attending ETS ITCC meetings to learn about upcoming purchase decisions and participate accordingly.	•Weekly and monthly status meetings with ETS are effective. •It would be good for department to understand the ETS roadmap, technology vision, and upcoming changes.

Below table lists the results of the perceived weaknesses and strengths of IT Governance. Below are respondents' individual observations, not summaries. IT coordinators were asked: *"Thinking about the state of IT at your department, analyze current pain points and their root causes, in how IT is governed and managed at your department. To help structure thinking, you can think of areas such as IT investment management, project intake, selection and prioritization, procurement, project management and delivery activities, project benefits tracking and realization, resource and workforce management, IT service management and operations, infrastructure management, vendor management, risk and security management, data governance and management, performance management and measurement."*

Weaknesses	Root causes of the weakness
Funding	Small department
Staffing	Small department
Many offices scattered around	
Scheduling/planning for service enhancements and change requests.	Caution in scheduling because of highly integrated systems; resource constraints; external agency dependencies; Legislature driven.
Keeping up with security standards and compliance.	Constantly changing standards. Not enough available time and resources.
Hardware/software refresh cycle too long.	IT team needs to improve planning - considering system evaluation, purchase options, system compatibilities, lifecycles, and budget request/approval timeline.
Ability to leverage vendor contracts between the various B&F programs and attached agencies is limited in most cases.	Lack of scale, most cases pertaining to funding and resources.
As a smaller department we often lack the resources which are available to larger Departments that can advance various IT initiatives.	Smaller scale and primarily general funded operations require us to rely on Enterprise solutions that are offered through the ETS and or smaller scale initiatives that can be supported internally by the Department.
Staffing level; turnover is extremely painful.	Poor support from DHRD and under-market pay make filling positions very difficult.
Lack of test and process automation.	Staffing levels.
Contract negotiation and development.	Lack of bandwidth and specialization
Lack of approved dept. IT budget	Form A budget requests for recurring operating expenses are never approved at the legislature
Staffing shortage	Form A budget requests for additional staff positions are never approved at the legislature
No control over prioritization of division IT activities	Division IT staff aren't under any operational control by the dept. CIO
No enterprise funding for accounts for blue-collar staff	
Limited separation of duties	Lack of staff
Lack of central IT Budget	No approval from legislature
Lack of project ownership by business unit	Not being accountable, scope creep on the business unit side
Data Silos	Programs protective of their own data, Resistance to data sharing due to security/confidentiality restrictions, need for standards and broader department-wide data governance to enable lines of business use of data for decision-making
Hardcopy Paper Storage	Resistance to Change, Lack of business awareness on business side/staff of electronic forms and processes
IT investment Management	No IT Budget
Resource and Workforce Management	No IT Budget
Data Governance and Management	No data guru in the department – too many federal requirements on data sharing
Procurement of IT Services	Inefficient procurement when using vendors not on vendor list
High cost for low bandwidth connectivity at remote offices causing remote office inefficiencies.	Lack of vendors on vendor list for Fiber connectivity, professional services
Compliance with governance policies is not monitored.	Lack of resources/tools to properly monitor compliance
Governance policies are often copied from other standards and not customized for the department operations.	No dedicated resources for creating and maintaining IT governance. Some governance is external to the department.
Strengths	**Opportunity - not linked to the Strength on the left**
Department leaders core system business knowledge. In the agency, there are processes in place that identify direction and determine the needs to move the agency in this direction. Effective strategic plans are in place.	The consolidation effort at the State level will help if we can identify the long-term goals for various IT initiatives and make them known to all departments. This way, as an example, a department that will be planning to launch a project or upgrade a system can accommodate and complement these identified initiatives. If the state selects e.g., a "brand" of database and uses its leverage for licensing, then departments can tweak their strategic plans to head toward this direction if designing new systems.
Knowledgeable and forward planning staff.	Cost savings if multiple departments IT infrastructures can be housed in one location and shared knowledge if using similar infrastructures.

Communication between Departmental Administration and the B&F Programs and Attached Agencies is a strength.	Smaller scale and fewer groups of diverse end users can allow the Department to find the right IT solutions. Smaller scale could also allow us to move more quickly in both the acceptance, testing, and deployments of these solutions.
Smaller scale allows the Department to move quickly in deploying enhancements, changes, and advances that are suitable for our B&F operations.	Test automation, data Integration, hybrid data center (datacenter plus cloud, as appropriate). Doing this now to some extent.
Close to the customer—direct discussion with division & department leadership.	New staff will bring fresh ideas, separation of duties and more cross-training.
Special Funded—allows for adequate funding of projects	Artificial Intelligence/Machine Learning
Less red tape	Cloud Migration
Data available to make informed business decisions	Data Modernization, Data Sharing and standardization
E-Sign of documents	Training staff in new skillsets
Significant amounts of data available for public health and program decision-making (although sometimes restricted by data sharing limitations)	All state departments transition to electronic forms processing between agencies (inter-agencies) for efficiency gains in the approval and reporting processes.
Agency transitioned to complete electronic forms requests and management among all divisions for procurement, IT, HR, etc. Increased timely approval processing within agency.	Add fiber vendors, professional service vendors, etc. to state vendor list.
Agency transitioned to hybrid telework during the COVID-19 pandemic for increased work efficiencies for divisions and office employees who perform efficiently and effectively at a remote environment. Increased communication and management of employee performance.	Tool to formally track governance policies and compliance.
IT decisions internal to the department are made quickly	Hire more IT staff
Department IT policies can be created/modified quickly.	Seek more funding
Resolution of IT issues is quick.	
Threats	
EOL Hardware and Software is hard to replace with limited funds and limited IT staffing	
Keeping up-to-date with changes set forth by ETS	
Failure to take advantage of innovations due to a lack of scale may limit our department's ability to best leverage certain IT advancements and initiatives and lead to stagnation.	
Lack of staff	
DHRD Staffing level appears at times on verge of collapse	
Unexpected liabilities due to loss of funding for enterprise services (e.g. loss of enterprise funded Adobe licensing)	
Enterprise mandated requirements that suddenly require unfunded IT resources (e.g. F1 accounts needed to access DHRD training)	
Cybersecurity	
Procurement Process Length of Time	
Inability to replace End of Life Hardware	
Difficulties recruiting and retaining staff and organizational knowledge	
Risk and security management	
Lack of intra agency electronic forms integration and adoption.	
Other State agencies require paper and do not accept electronic forms.	
Increased inefficiencies with delay in forms processing due to paper requirements from other departments.	
Maintaining compliance with IRS publication 1075	

6.2 State Business Leadership Survey (November 2021)

Office of Enterprise Technology Services coordinated a Business Context Discovery Engagement that was facilitated by the Info Tech Research Group and took place over 4 days from November 1st to November 4th, 2021. Interview sessions were held with 19 executives and their staff to gather facts and information around the performance of ETS against their legislated mandate and the Strategic Plan In addition, each Department had the opportunity to describe their technology

details, challenges, opportunities, and risks through candid and open discussion. Table below summarizes the key, recurring themes from the interviews.

Theme	Description
Role of ETS	While there is clarity around some governance functions like cyber-security and project portfolio management, some Departments expect support that exceeds the mandate. Service awareness is relatively low.
ETS Services Needed	Many departments are experiencing increased technology support needs. Legacy services are being sunset (e.g., mainframe), and Departments need guidance on replacements (cloud).
Staffing	ETS, and IT functions and all departments in general are understaffed, and vacant positions sometimes threaten operations and services. There is a risk of further retirements and resignations affecting critical services. The likelihood of effective and efficient hiring and restaffing seems low due to ineffective HR processes. Historic knowledge is being lost.
Data Management	Some tactical data efforts seem to be underway but there is no strategic framework to coordinate them. Departments and the public value data for transparency, operational efficiencies and effective decision-making.
Project Management	Several significant enterprise projects are underway & with few exceptions, appear to be well-received. Reliance on vendor execution is extremely high. These projects are positioned to modernize & simplify business processes & technology solutions in key financial operational areas. Role and adoption of AD 19-03 is unclear.
Procurement	The state is very reliant on vendors and 3rd parties for technology solutions & implementation. In-house expertise is needed for procurement management.
Vendor Management	Vendors are engaged for department solutions and implementation in silos. Multiple departments independently engage the same vendors on similar solutions and even different solutions. Lack of Department technical expertise in vendor selection and negotiation positions the State poorly to leverage cost effective solutions and strategic approaches.
Department Collaboration	Some Departments appear to have more staff & financial resources and positions them to lead technology strategies & directions, but without sufficient centralized (ETS) support or guidance.

6.3 Spring 2020 ETS Governance Study with Info-Tech Research Group

The governance areas analyzed in the study were:

- IT Direction and Strategic Planning
- IT Architecture
- IT Policies
- Procurement and Vendor Management
- IT Investment Management
- Data Governance

Key observations of the study are summarized in below table:

Area	Improvement Goals	Pain points	Blockers	Improvement actions
IT Direction and Strategic Planning	•Align with State strategic plan 7 strategic priorities. •Ensure state departments and agencies align their strategies (roadmaps) with state IT Strategic Plan. •Identify opportunities for joint efforts or statewide contracts rather than duplicated efforts across departments.	•Non-compliance. •Inactive working groups. •Lack of Motivation and alignment with departmental priorities. •Lack of communication of benefits of execution of IT Strategic Plan.	•Resource capacity. •COVID priorities. •Enforcement not a priority.	•Ensure leads comply with defined protocols, procedures, and agenda for committees, working groups. •Review membership of each committee. •Working groups to define scopes and execution plans for each priority. •Define and communicate minimum requirements for agency strategic plans (e.g. demonstrate support for strategic plan priorities). •Enforce compliance with state law for submission of agency strategic plans (e.g. annual report to legislature on non-compliant agencies). •Ensure portfolio management tool has up-to-date information on executive branch projects and applications. •Review accuracy and appropriateness of business capabilities associated to projects and applications. Expand as needed.
IT Architecture	•Sharing and reuse of existing hardware and software •IT systems are well-engineered and appropriately designed for their intended use. •IT Systems can be quickly configured to meet business needs. •Systems are healthy, stable, and upgradeable. •IT systems are well-engineered and appropriately designed for their intended use. •State quickly benefits from new technology Legacy systems decommissioned.	•Excessive manual infrastructure work instead of DevOps automation. •Lack of software quality due inadequate (automated) testing.	•Resource capacity.	•Coordinate workshop on “Implement Dynamic and Sustainable IT Operations.” •Promote evergreen technology platforms. •Produce guidance on technology architecture modernization/selection. •Develop DevOps guidance – emphasize the benefits.
Policies	•Ensure that policies are relevant and up-to-date. •Compliant with legal & regulatory requirements •Ensure IT policies are enforced. •Policies lacking in many areas today. •Need framework for IT policies (all areas and integrated) •Accessible, easy to understand and follow	•Limited policies. •Adoption and acceptance.	•Resource Capacity. •Priority. •Framework just emerging.	•Conduct inventory of existing policies (https://ets.hawaii.gov/policies/). •Identify priority policies (see ITRG policy assessment tool). •Identify resources to develop needed policies. •Develop plan for policy development. •Communication plan. •Ongoing education. •Enforcement.

Procurement and vendor management	•Ensure value for state expenditures on technology. •Ensure appropriate ETS involvement in acquisitions. •Ensure M&O requirements are well defined. •Ensure RFP process is standardized, well defined, ensures clarity and due diligence and that the process is adhered to. •Ensure appropriate representation from both business and IT in selection committees. •Provide standard evaluation criteria. •Provide contract negotiation checklist (e.g. ensure continuing operation if vendor defaults, access to the data or source code, etc.). •Ensure delivery of the agreed services (e.g. SLA compliance, deliverables meet requirements, etc.). •Partner with vendors to improve processes.	•Uneven quality of vendor deliverables. •RFP quality. •Contract quality.	•Time. •Resources. •Other priorities.	•Review/update/create policy requiring ETS involvement in procurement process – (formalize/define ETS' selection involvement-JS) •Develop contract negotiation / requirements checklist. •Develop standard IT vendor proposal evaluation criteria. •Provide "best practices" for formation of selection committees – when to engage with ETS. •Communicate reminder to Dept heads about the state directive requiring ETS involvement in procurement (Administrative Directive No.18-03) – memo from CIO? New policy? •Create and communicate appropriate checklist for service/product delivery by phases (stage gates for RFP, Requirements, Design & Implementation, UAT, Deployment). •Consider retreat or one-day workshop with key vendors to discuss their ideas on how process could be improved. •Consider feedback & process improvement surveys aligned with each stage gate.
IT Investment Management	•Proactive and transparent portfolio planning and governance through system life cycle. •Transparency into prioritization, cost, schedule and performance and re-baselining of projects. •Sharing and reuse of existing hardware and software IT systems are well-engineered and appropriately designed for their intended use. •Being able to demonstrate value from the investments. •Avoiding bad investments. •Active management of technology life cycle. •Ensure total cost of ownership is considered as part of investment decisions. •Ensure alignment to State and ETS' strategic goals	•Decisions made on several projects without full information on impact on resources, timing, effort, support. •Lack of appropriate level of planning for projects •Competition for IS resources	•Lack of project portfolio management and project management expertise. •Lack of governance	•Provide additional tooling for estimating functional and technical fit for applications, project value & risk for IT projects. •Improve statewide business capability map and work together with departments to map applications and projects to appropriate business capabilities. •Establish shared recommendations based on excellent experiences at departments with particular technologies. •Establish reporting on Major Info Systems for better utilizing the IT Steering Group. •Provide project charters to align business outcomes to the technology. Project Charters may eventually replace the T205 Part C.

Data Governance	•To serve the often-conflicting interests of government transparency, citizen data privacy, and state sensitive operational data security, state data must be classified (confidential, restricted, sensitive, public, etc.). •What kind of data? PII, Income Data, PHI, Address Info, PCI Who can access the data? confidential, restricted, sensitive, public. •State data (at the departments) should be securely shared: for evidence-based policy formulation for economic/spending decisions. •Applicable Public data should be identified, shared, and updated as open data on the state's open data portal. •Ensure information lifecycles – as governed by state Records Management (Archives) and Record Reporting (OIP) policies - are communicated (disposal schedule, records retention, etc.).	•No visibility into State data. •Uncertainty regarding confidential data storage and exchange State open data is not current. •Difficulty in utilizing data for economic/spending justification and decision-making.	•Time. •Resources. •Other priorities.	•Create a plan for capturing classification of data starting with major systems. •Work with the State's CISO to determine the security standards for data sharing. Survey state departments for data sharing wants and needs. •Data sharing prioritization needs to be determined. •Standard data sharing agreement template. •Prioritize open data policies and procedures. •Facilitate communication regarding policies on data retention and disposal.

Consolidation of IT Services Act 179. 2023 Planning – OCM Plan

1 Executive Summary

This plan outlines the contents of the more detailed organizational change management plans, which will be developed once agreement has been reached on the scope, timing and approaches of the consolidation.

To ensure successful consolidation-related transitions of staff, ETS will support employees through their transitions and both ETS (target) and source department management are committed to work with each person to embrace and adopt the changes.

Details and timing of the change management processes will be crafted once the scope and timeline of changes are more defined. Three principles will serve as the foundational framework for managing the changes:

- Good **communication, sponsorship and championing** is vital for the success here. Executive level directors (sponsors) will be the primary sources of organizational messaging and the managers and employee supervisors (change champions) for personal impact matters. Sponsors and change champions will communicate the 'why' of the effort and clearly and continuously communicate to their departments all updates and progress and collect feedback. An employee's immediate supervisor is responsible for ensuring forward momentum with the ability to remove barriers for a successful transition. Scheduled periodic meetings (communication) with sponsors and change champions to provide status and issue updates and to discuss stakeholder input and feedback.
- **Employees are influencers of the planned changes** as much as they are subjects. They will have a voice in the scoping, planning, design, and implementation of the changes. Employees will have a collective voice and an individual freedom of choice in the significant decision points along the change journey.
- Ensuring the staff at all levels have the prerequisite skills and knowledge for the future responsibilities and tasks will be ensured through various **training programs** and continuing professional development opportunities.

2 Change Management and Communications Plan Committee

2.1 Mandate and Goals

Following were defined as the goals for the committee:

- Identify key stakeholder groups and analyze their level of influence and interest.
- Formalize a plan to ensure that all stakeholders are informed of changes and engaged, and the level of readiness stakeholders should have to prepare for the IT consolidation effort.
- Identify considerations for transition with regards to staff retention and satisfaction.
- Develop a plan for communication, including vendors, central state offices, legislators, unions, etc.
- Determine the key factors to communicate, the means of communication, and the frequency and timing. Define the communication process, including who should sign off on communications and how to collect stakeholder feedback.

2.2 Members and Activities

The Governance Structures Committee conducted its work between 07/01/23 and 10/30/23. Committee members and participants were:

- Robert Hiltner – Department of Commerce and Consumer Affairs
- Arthur Buto – Department of Business, Economic Development & Tourism
- Ryan Shimamura – Department of Human Services
- Judy Yamada – Department of Public Safety
- Elaine Lake – Department of Health

3 Stakeholder Analysis

3.1 Identified Stakeholders

Figure 3. below shows the key stakeholders on an interest, influence, and contribution (size of bubble) scale.

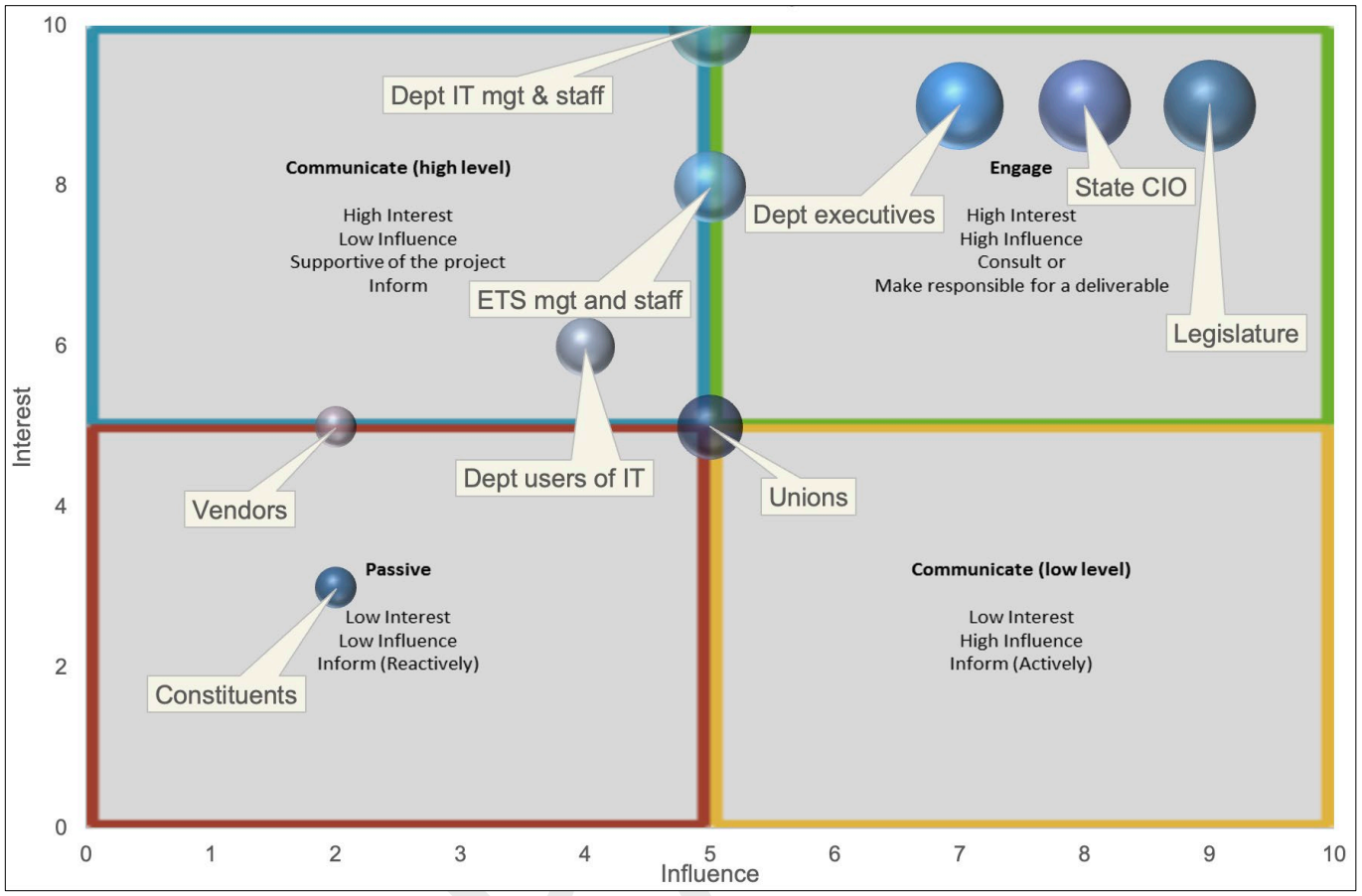


Figure 1. Stakeholder analysis summary.

3.2 Impacts of Changes

Table 1. summarizes the impacts of the anticipated changes.

Stakeholder	Role	Impacts and Scope of Changes
State CIO	Sets and plans ETS direction, voice of ETS	Power, control, and responsibilities increase.
ETS mgt and staff	Executes CIO agenda and delivers shared IT services	Responsibilities, and coworkers change, moderate scope.
Dept executives, incl. CIO / IT coordinator	Decide on major departmental IT changes	Power, control, and responsibilities decrease. Lower costs. Moderate scope.
Dept users of IT	Primary users and recipients of IT services	• Some services / solutions. Limited scope. • Contact channels and persons. Moderate scope. • Improved, more accessible and effective services. Moderate to broad scope.
Dept IT mgt & staff	Manage and deliver department IT services and projects	Responsibilities, employee, and coworkers change. Limited to broad scope - depending on focus and dept.
Vendors	Deliver IT services and implement projects	Customers and cooperation processes change. Moderate scope.
Unions	Consult with members and with management regarding impacts of changes in duties, responsibilities, and reporting	Advocate for members' issues and concerns
Legislature	Drive the consolidation initiative as a whole	Desired: More and easier transparency. Broad scope.
Constituents	Service recipients, direct and indirect	Desired: Improved; more accessible, consistent, and effective services. Broad scope.

Table 1. Impact analysis summary.

3.3 Readiness Assessment

A readiness assessment will be a crucial step in the Organizational Change Management (OCM) process of the IT consolidation. It will involve evaluating departments' preparedness and capacity to successfully undergo the changes.

A more detailed readiness assessment will be created once the scope of the consolidation is agreed upon, but the following actions will be the main components of the assessment:

- Identifying what needs to be achieved through the readiness assessment.
- Clearly stating the scope of IT consolidation, its goals, and expected outcomes.
- Identifying and confirming the key stakeholders for the change initiative.
- Determining the specific criteria that will be used to evaluate readiness. These will include factors like current staffing levels, skills and knowledge, technology infrastructure, leadership support, and organizational culture.
- Collecting relevant data and information to assess each of the chosen criteria. This will involve surveys, interviews, and focus groups.
- Using a scoring system (e.g., Likert scale) to quantify the readiness levels for each criterion and based on the assessment, identify any gaps or challenges that could hinder the successful implementation of the change initiative.
- Creating action plans to address the identified gaps and challenges. This plans details steps, responsibilities, and timelines for mitigation actions.
- Sharing the assessment results and action plans with key stakeholders and seeking input and buy-in on the proposed actions.

Table 2. below lists examples of change readiness assessment criteria.

Criteria	Description	Domain
Employee awareness and understanding	Degree to which employees are aware of the change, understand its implications, and know their role in it.	Affected departments
Staffing level	If the existing staffing level can support the change.	Affected departments
Skills and competencies	Whether employees have the necessary skills and knowledge to adapt to the change.	Affected departments
Resistance levels and concerns	Existing resistance levels, including identified concerns and potential sources of resistance.	Affected departments
Leadership support and alignment	The extent to which top leadership supports the proposed change and the extent to which the proposed change aligns with the department's mission	Affected departments
Organizational culture	Analyze whether the culture is conducive to change or if there are cultural barriers.	Affected departments
Technology	If the existing technology and systems can support the change.	Affected departments
Timeframe	Consideration of the time constraints associated with the change	Affected departments
Past change experience	An evaluation of how the organization has handled previous change initiatives, including successes and areas for improvement.	Affected departments, and the change program
Regulatory and compliance considerations	How the proposed change aligns with relevant regulations, policies, and compliance requirements.	Affected departments, and the change program
Change management capabilities	Extent to which there are established change management practices, processes, and expertise.	Affected departments, and the change program
Feedback mechanisms	Existence of mechanisms for employees to provide feedback, ask questions, and express concerns about the change.	Affected departments, and the change program

Table 2. Organizational readiness assessment criteria examples.

4 Actions and Methods of Engagement

Table 1 summarizes the key actions and methods of stakeholder engagement.

Stakeholder	Actions Necessitated by Impacts	Engagement Methods and Accountabilities
State CIO	Establish a more structured and standardized governance model with departments, and with vendors.	CIO is the key change leader, coordinates all and delivers some of the executive level communications.
ETS mgt and staff	Provide training, role, and process definitions.	ETS management and staff are active participants in and influencers of changes. Engaged and informed actively on their affected service areas.
Dept executives, incl. CIO / IT coordinator	Provide more transparency (IT services, assets, and costs). Adopt a stronger role in IT governance with ETS.	Keep informed and engaged actively on major plans and decisions. State CIO is the key engagement point, consolidation program management informs.
Dept users of IT	Inform proactively on upcoming changes. Seek requirement and design input and feedback where applicable.	
Dept IT mgt & staff	Engage and involve proactively from the beginning on planning and designing services, roles, and delivery processes.	
Vendors	Communicate changes. Proactively engage in contract amendment or cancellation negotiations where needed.	Dialog through current vendor managers, departments and ETS in sync.
Unions	Engage in consultation regarding changes to members' roles, responsibilities, and reporting	
Legislature		
Constituents		

Table 3. Key actions and methods of engagement.

4.1 Establishment of Change Program Office and Resourcing the Consolidation Program

To be added…

4.2 Active Engagement of Affected Employees and Department Leadership

Engaging affected IT staff is seen by the committee a crucial aspect of successful consolidation. When employees feel and truly are involved, informed, and supported during change, the expectation is that this will support them to to adapt positively and help them contribute to the success of the planned centralization of services.

Affected employees will be involved in the planning process as early as possible. Their input, feedback, and ideas will be sought and considered in the design of changes. This will hopefully help in building a sense of ownership and ensures that their concerns are considered.

Objectives of the centralization, staff transitions and the vision for the future will be articulated clearly to help employees understand the purpose behind the consolidation and how the changes align with the overall goals of the state and ultimately departments' programs. At the same time, the consolidation will be open to adjusting the changes based on feedback and evolving circumstances as this will also show that the consolidation values the input of the affected employees.

In practice, channels for employees to provide feedback, ask questions, and express concerns will be established to enable active listening of their input and to address their concerns. Both online channels and regularly convening in-person meetings will be leveraged. Certain levels of accountability for the individuals and teams for their roles in the change process will also be held, in part to reinforce the sense of ownership. Progress and results metrics will be identified and measured, and successes will be recognized.

A more detailed plan for engagement management actions will be crafted once agreement has been reached on the scope of the consolidation - people, processes, services, and technology.

4.3 Communication Plan

Communication builds awareness and desire of the need for change and provides reinforcement to sustain the change, conveying the reasons for the change, the expected outcomes, and how it will affect employees.

Below table summarizes the key goals, channels, and responsible parties for communication towards the audiences. Key audience groups are generally positioned in the top left quadrant on the stakeholder analysis (see page 3, figure 1.).

Responsible party	Goals / key messages	Channels	Feedback mechanisms
State CIO	Overall big picture; why we are doing this, high level scope and approach.	Communication and planning events. Email.	Teams, email to program management, to supervisors who collect feedback and summarize. Surveys.
Dept. leadership	Same as CIO, within the department.		
Dept. management / supervisors	Impact; how will the work area and individual's work change. Requirements for change.	In person. Email, Teams.	In person. Email, Teams. Surveys.

Table 4. Communication roles.

The more detailed communication plan will be developed once agreement has been reached on the details of the scope of the consolidation (people, processes, services, technologies & solutions), schedule, and transition approaches & sequence.

This plan will include:

- Goals and objectives of the plan
- Messages
- Audience segments
- Communication channels
- Timeline of communications relative to program milestones:
- Create a detailed timeline indicating when each communication will be sent out.
- Include milestones and key dates related to the initiative.
- Responsible parties
- Feedback channels
- Measurement and evaluation of the effectiveness of communication
- Potential roadblocks or challenges and mitigation strategy
- Success metrics
- Lessons learned.

4.4 Training and Development Plan

Training gives individuals knowledge on how to change and the ability to implement the required skills and behaviors. Trainings will primarily cover the immediate needs for transitioning staff and for all other affected staff. Secondarily, but no less importantly, broader, continual training programs will be developed to support the continual improvement of state IT services and capabilities of state IT staff.

A more detailed training plan will be developed once agreement has been reached on the details of the scope of the consolidation (people, processes, services, technologies & solutions), schedule, and transition approaches & sequence.

This plan will include:

- Definitions of new roles and responsibilities of affected employees in the to-be organization model
- Identification of training needs for affected employees
- Identification of 3rd parties to support the design and delivery of trainings and training materials
- Development of training materials and programs
- Delivery methods and schedule.

4.5 Resistance management

Resistance management will be one component of consolidation change management. It will involve identifying, understanding, and addressing the concerns and objections that the affected personnel will have in response to the changes. Managing resistance will help smooth the transition and increase the likelihood of

successful change adoption. Resistance management will be one key responsibility of the organizational change management lead and will include following tasks:

- Identification of potential sources of resistance
- Strategies for addressing and mitigating resistance
- Escalation procedures for unresolved issues.

Key methods of resistance management will include:

- Open and transparent communication
- Engaging and empowering stakeholders
- Anticipating resistance by identifying and understanding concerns
- Proactively addressing misinformation and rumors
- Customized support
- Highlighting benefits and celebrating successes
- Involving change champions who are enthusiastic about the changes and can help influence and support peers.

5 Considerations with regards to staff retention and satisfaction

When conducting IT consolidation in state of Hawaii, specific workplace cultural and logistical considerations will be considered. By incorporating these considerations, will create a more inclusive and sensitive approach to IT consolidation, which is likely to contribute positively to staff retention and satisfaction.

Providing options for flexible work schedules or remote work, where applicable. This can help employees better manage their work-life balance during times of change.

- Encouraging affected IT staff to engage and participate in planning and design activities and events. Being actively involved in the will foster ownership and helps them feel valued.
- Recognizing and rewarding achievements, and positive contributions to the IT consolidation effort.
- Providing regular and transparent communication about the changes, including the reasons behind them, the expected benefits, and how they align with the department and state goals.
- Continuously seeking feedback from affected employees about their experiences during the consolidation and being prepared to adapt strategies based on this input.
- Providing training programs to equip employees with the skills and knowledge they need to adapt to the changes to boost confidence and competence.
- Clearly communicating how employees can grow and advance within the organization even amidst change and offering development paths when possible.
- Creating a workplace culture that emphasizes teamwork, open communication, and mutual respect. Ensuring that employees feel supported by their peers and supervisors.
- Addressing employee concerns proactively, by actively listening to employee feedback and address concerns promptly and demonstrating that their input is valued and taken seriously.
- Addressing concerns about job security honestly and provide reassurance about the future of employees' positions in the organization.
- Establishing channels for employees to provide feedback and ask questions. Regularly solicit their input on the change process.
- Keeping a close eye on employee morale through surveys, one-on-one discussions, or other feedback mechanisms. Use this information to make necessary adjustments.
- After the changes have been implemented, conducting evaluations, gathering lessons learned and identifying areas for improvement in future change initiatives.

More detailed plan of retention and satisfaction assurance actions will be crafted once agreement has been reached on the scope of the consolidation - people, processes, services, and technology.

6 Timeline of Key Actions

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1 Organizational Structures Committee Overview

1.1 About Act 179 and Goals

Act 179 2022 was passed in the 2022-2023 legislative session. The primary goal as stated in the Act 179 IT Consolidation 2022 Preliminary Status Report for the State of Hawai'i Legislature, are to, "gain from economies of scale and provide for a more efficient and secure use of technology and information management." The mandate of Act 179 is to,

1) Establish a working group to, "develop a plan for the phased consolidation of all state executive branch information technology services and staff, where determined practicable by the working group within 5 years",
2) "Make recommendations to attract high-quality information technology professionals to the State",
3) And to identify, "any proposed legislation," needed to accomplish this.

1.2 About the Organizational Structures Committee

The Organizational Structures Committee is one of twelve committees formed to address Act 179 and its requirements. Members were recommended by their Working Group leaders and serve in a voluntary capacity. The Organizational Structures Committee focuses on where resources such as equipment, staff, and services are located and who is responsible for making IT related decisions.

Work began with a kick-off meeting on February 2, 2023. The committee consists of eleven IT coordinators and managers from nine different executive departments. The Committee Members include:

Committee Member	**Department**
Arthur Buto	Department of Business Economic Development and Tourism- GIS
Mark Choi	Department of Human Services
Corey Higa	Department of Taxation
Linda Inouye	Department of Hawaiian Home Lands
David Keane	Department of Human Services Development
Lila Loos	Department of Land and Natural Resources
Amy Saito	Department of Transportation- Airports
Robert Sequeira	Department of Transportation- Highways
Derek Sodetani	Department of Accounting and General Services
Lena Wang	Department of Transportation- Harbors
Susan Yonemura	Department of the Attorney General

1.3 Key Deliverables

There are four main deliverables for the Organizational Structures Committee. They are:

1) Document current state IT organizational structures in use in Hawaii.
2) Research organizational model alternatives based on sister states data provided by the project sponsor.
3) Identify challenges and pain points in the current organizational structures where IT positions exist.
4) Recommend the optimal organizational structure to be utilized by ETS post consolidation-practices.

2 Definitions, Standards, and Scope of Work

2.1 Definitions

The **organizational structure** refers to how the work will be organized both vertically and horizontally. With respect to the vertical structure, does the hierarchy have many levels or layers. Who or whom are in the top position(s), who reports to whom in the organization, and who has the authority to make what types of decisions. Horizontal structure involves how the work will be organized-what is the orientation, the approach. How are an organization's resources allocated and deployed. The horizontal structure will also involve the relationships between the work units, groups, and their various functions.

Organizational structures are typically categorized as *centralized, decentralized, and hybrid*. In a centralized structure, the main agency provides IT governance, strategy, oversight as well as IT services, support and personnel for other state agencies.

In a decentralized structure, individual departments have their own internal IT resources including staff to support systems, strategy, and customer needs.

In a hybrid structure, there is a combination of a central IT agency and internal department IT staff and resources. The amount of coordination, support, resources, and staffing will vary. Although this model may seem more expensive, department IT staff are often fulfilling needs that may be unique and/or cannot be met by the central IT agency

2.1.1 Glossary

Term	Definition
ASO	Administrative Services Office
ATG	Department of the Attorney General
CIO	Refers to ETS's Chief Information Officer
DAGS	Department of Accounting & General Services. Also the overseeing department for ETS (see ETS)
DCCA	Department of Commerce and Consumer Affairs
DHHL	Department of Hawaiian Home Lands
DHRD	Department of Human Resources Development
DHS	Department of Human Services
DOD	Department of Defense
DOH	Department of Health
Dota	Department of Taxation
ETS	Enterprise Technology Services (the State's main technology department) also referred to as State IT
ERS	Employee Retirement System
HDOA	Hawaii Department of Agriculture
HHFDC	Hawaii Housing Finance and Development Corporation.
IT	Information Technology
NASCIO	National Association of State Chief Information Officers. The primary organization that

	State CIOs engage with. Its mission is, “to foster government excellence through leadership of quality business practices, information management, and technology” (Source: NASCIO.org)
OPSD	Office of Planning and Sustainable Development
PUC	Public Utilities Commission
Working Committee	Act 179’s primary steering committee

2.2 Committee Activities

The Organizational Structures Committee major activities include:

1. Creating ground rules on attendance and voting
2. Defining organizational structures and operational models
3. Providing current organizational charts and summarizing the IT related staff by levels or layers.
4. Identifying criteria for determining which organizational structure would be recommended.
5. Developing a survey to collect sister-states data.
6. Researching sister states’ organizational models, gathering and summarizing the information for Committee review.
7. Identifying pain points in the current IT’s organizational structure.
8. Reviewing other Act 179 Committee reports and findings.
9. Determining the weighting for the quality criteria
10. Rating the solutions based on the quality criteria to select the optimal organizational structure for recommendation.

3 Deliverable 1: Current State IT Organizational Structures

Currently, the State of Hawaii Executive branch operates in a hybrid model of partial centralized IT services and all departments having their own IT staff and resources. IT staff resources vary by department, several have single or two-IT related staff while others have 30 or more IT related staff. Act 179 has the potential of impacting departments by shifting staff to the central IT department. How the departments will continue to meet their IT needs is a concern of the Organizational Structure Committee.

The following are summarized **IT positions by Department** (unless otherwise noted) by layers or levels. The Department Director position or equivalent was level 1. Typically, the Director is a non-IT position, thus, that will be described as Level 1 '0'.

3.1.1 Department of Accounting and General Services

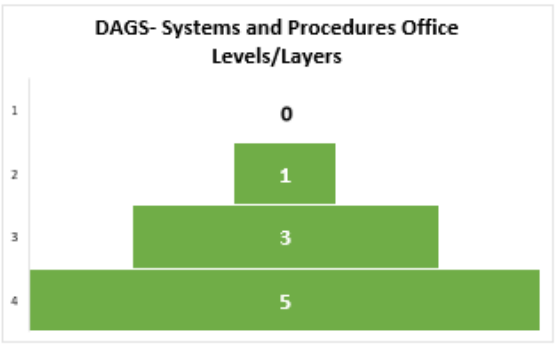


Figure 1.1

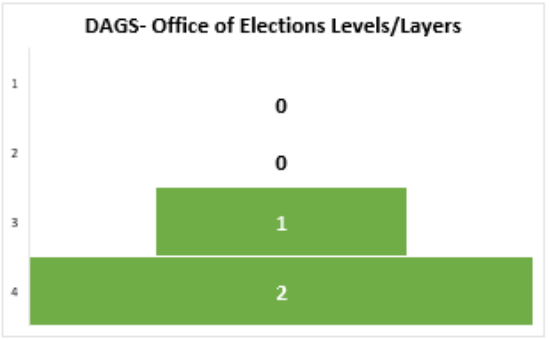


Figure 1.2

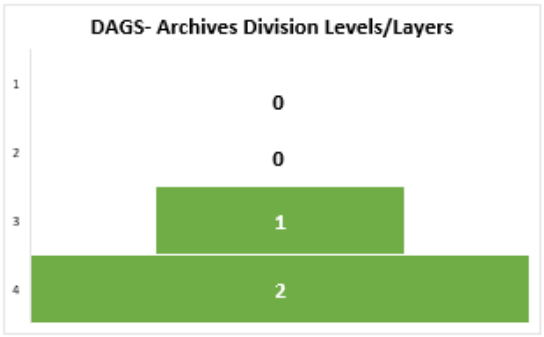


Figure 1.3

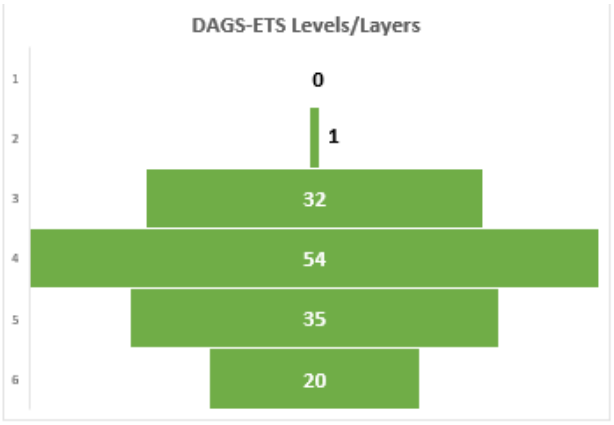


Figure 1.4

3.1.2 Department of Agriculture

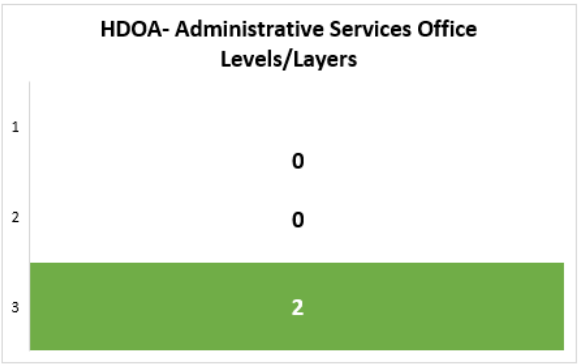


Figure 1.5

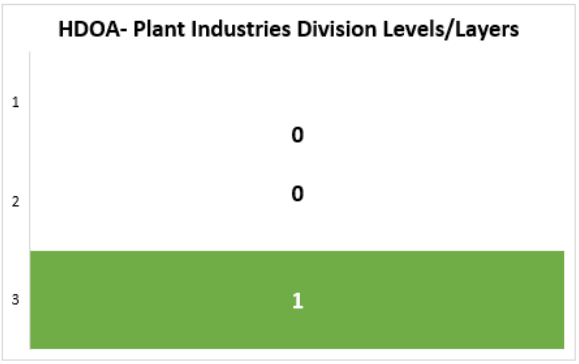
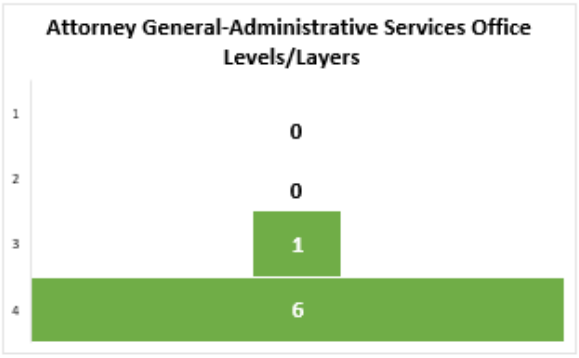


Figure 1.6

3.1.3 Department of Attorney General



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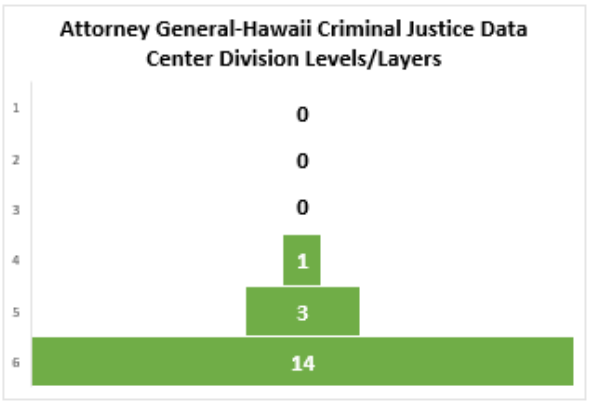

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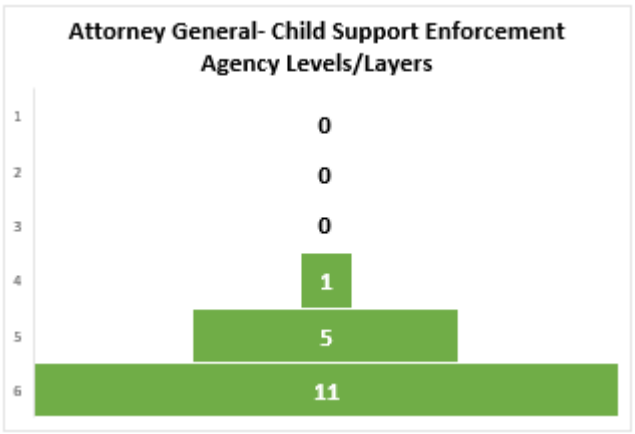


Figure 1.9

3.1.3 Department of Budget and Finance as of June 30, 2022

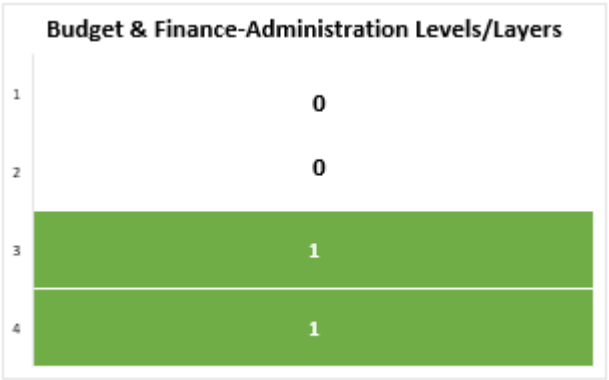


Figure 1.10

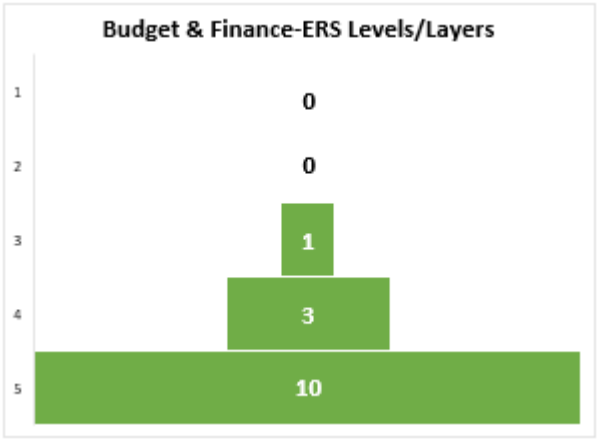


Figure 1.11

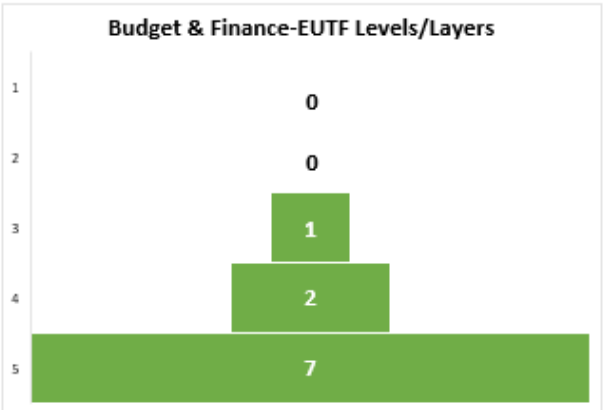


Figure 1.12

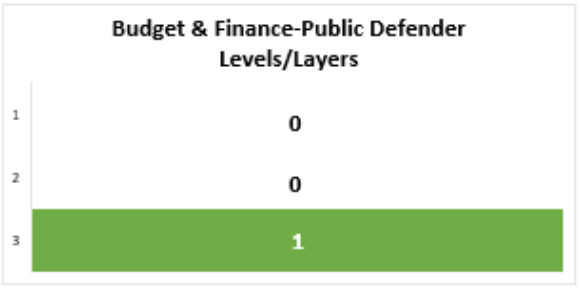


Figure 1.13

3.1.4 Department of Business Economic Development and Tourism (DBEDT)

Figure 1.14

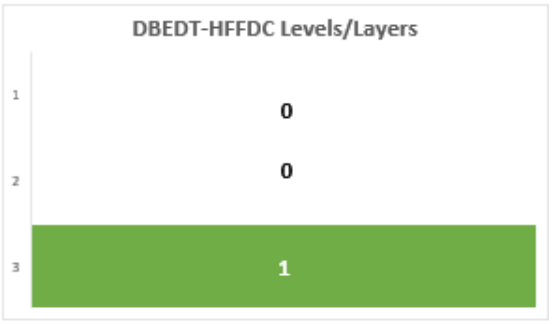


Figure 1.15

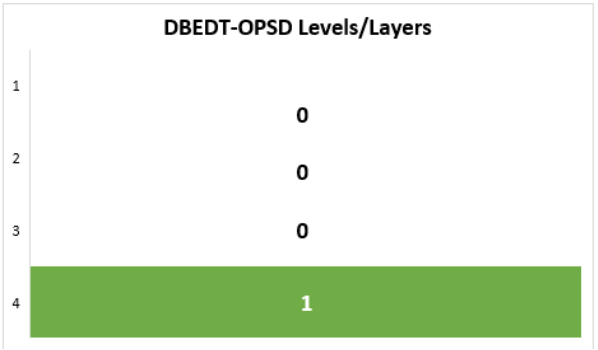


Figure 1.16

3.1.5 Department of Commerce and Consumer Affairs (DCCA) as of 6/30/2022

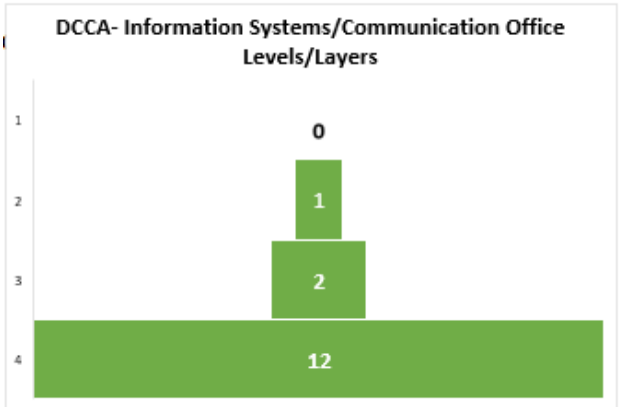


Figure 1.17

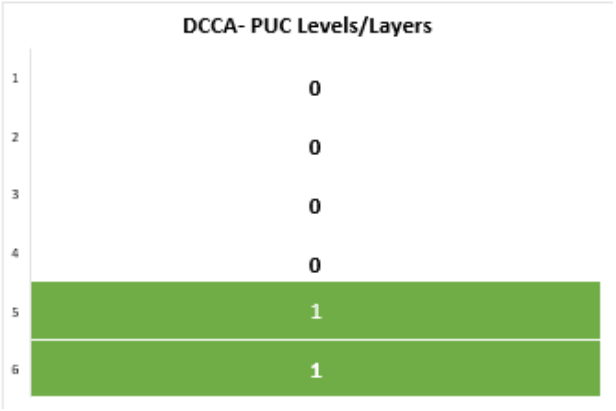


Figure 1.18

3.1.6 Department of Defense (DOD) as of 3/1/2023

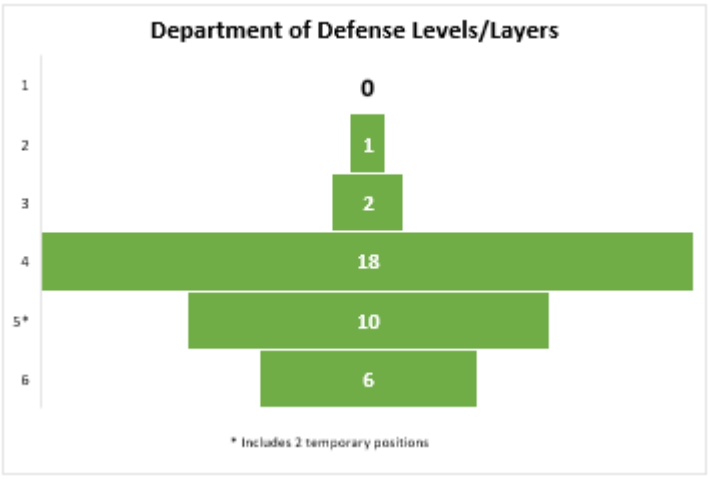


Figure 1.19

3.1.7 Department of Hawaiian Home Lands (DHHL)

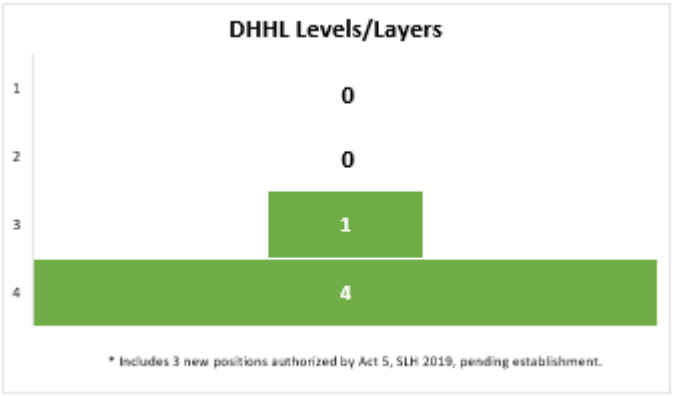


Figure 1.20

3.1.8 Department of Health (DOH)

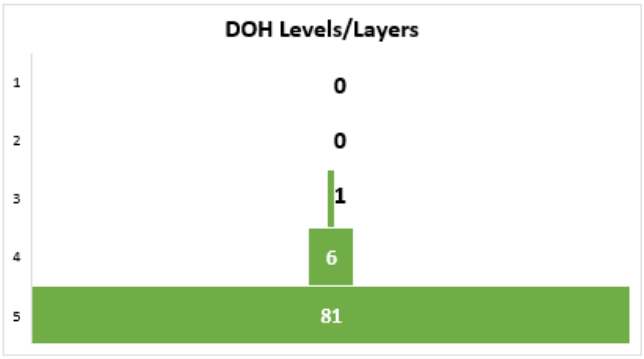


Figure 1.21

3.1.9 Department of Human Services

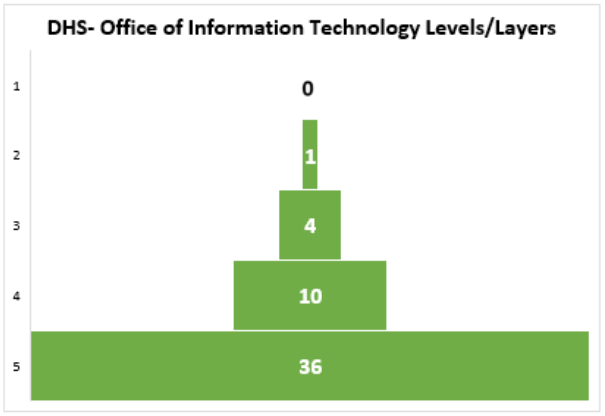


Figure 1.22

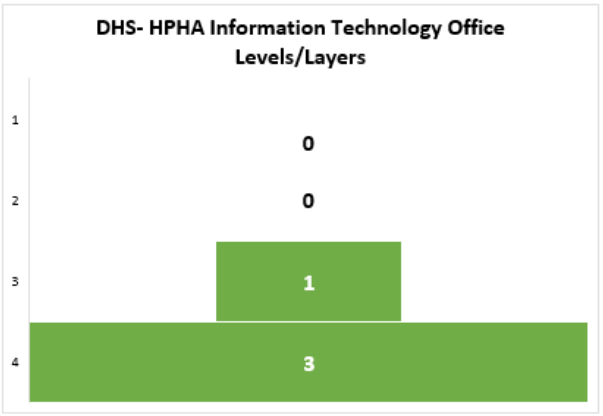


Figure 1.23

3.1.10 Department of Human Resources Development

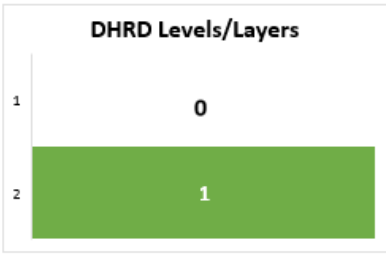


Figure 1.24

3.1.11 Department of Labor and Industrial Relations (DLIR) As of 1/30/2023

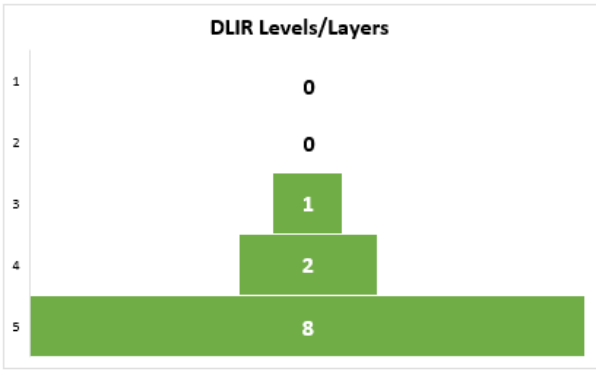


Figure 1.25

3.1.12 Department of Land and Natural Resources (DLNR)

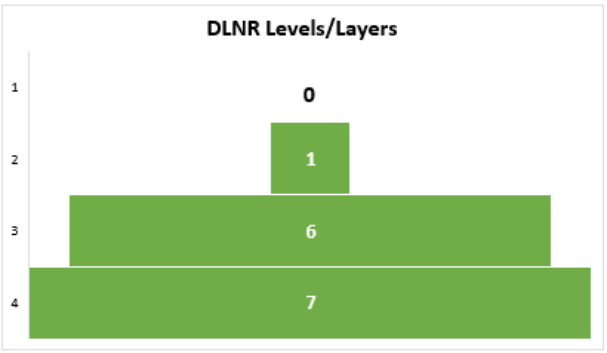


Figure 1.26

3.1.13 Department of Public Safety As of 7/1/2022

Figure 1.27

3.1.14 Department of Taxation (DOTax)

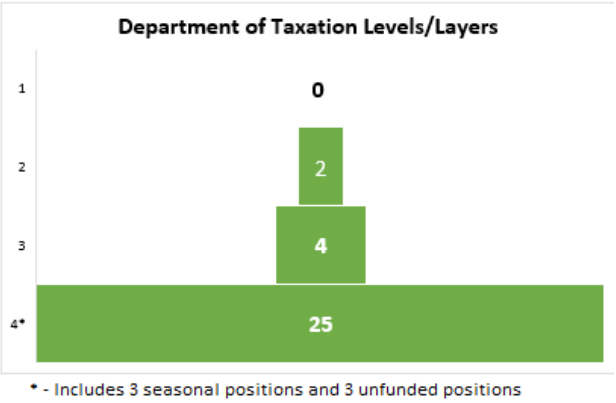


Figure 1.28

3.1.15 Department of Transportation

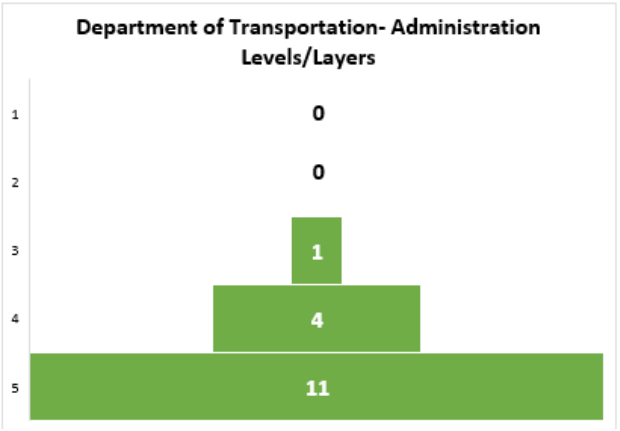


Figure 1.29

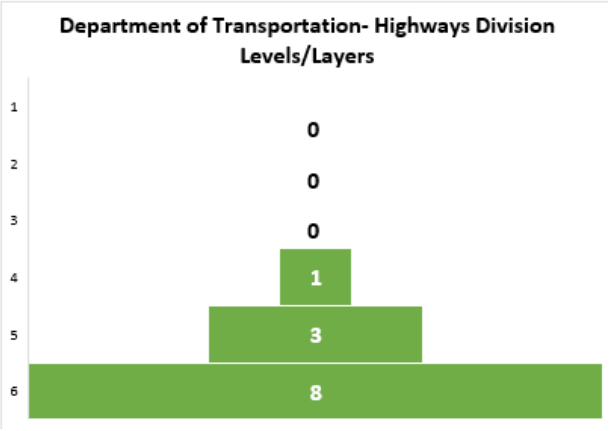


Figure 1.30

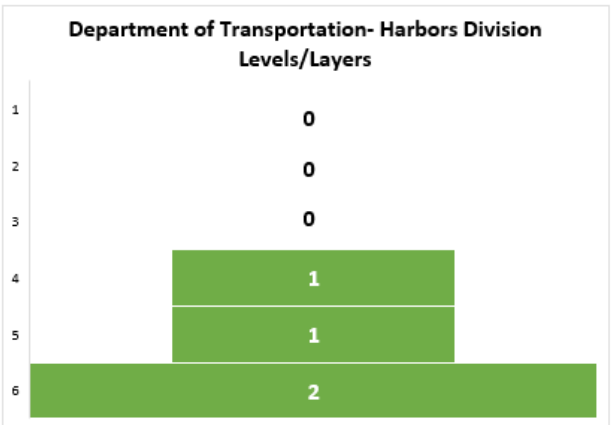


Figure 1.31

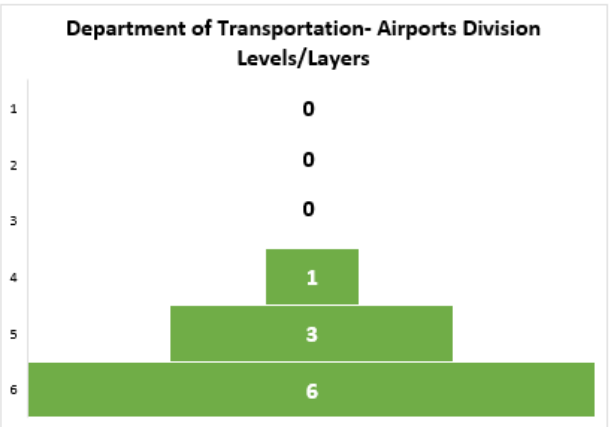


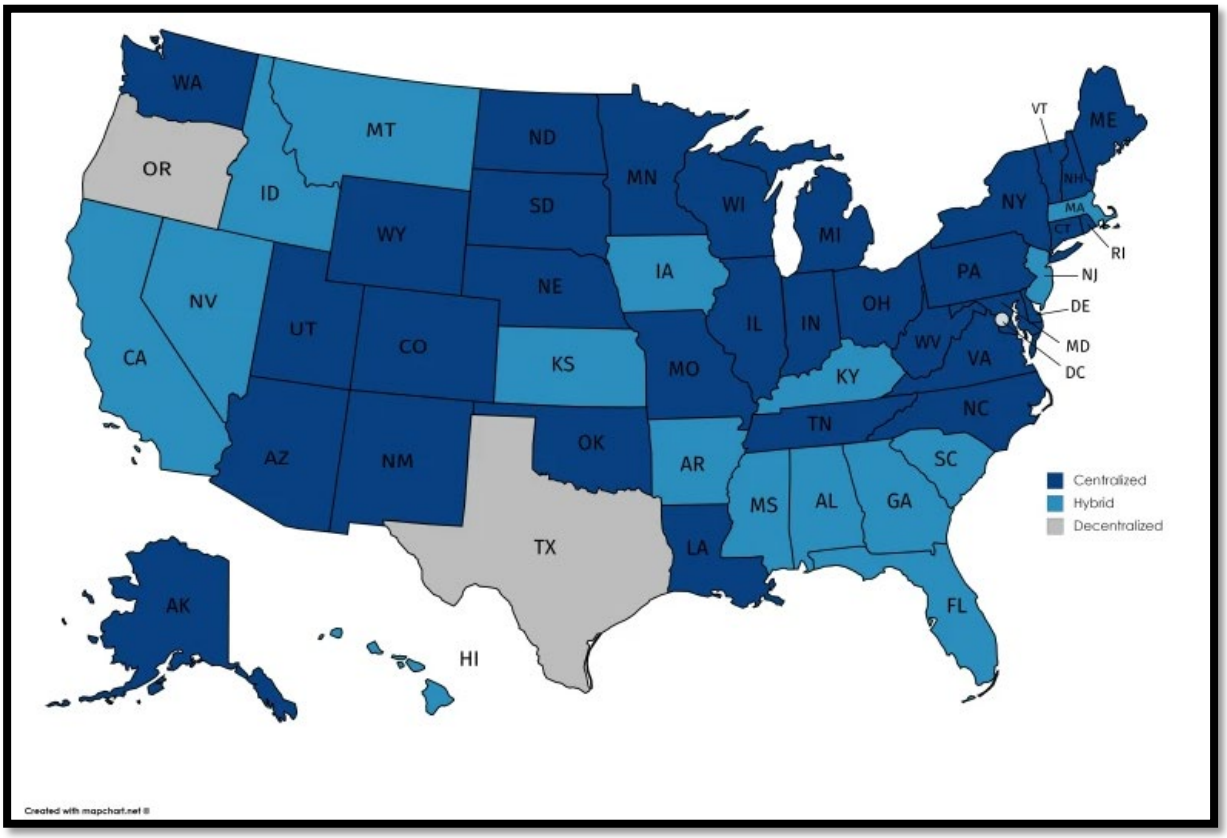
Figure 1.32

4 Deliverable 2- Summary of Sister States IT Organizational Structures Models

4.1 Analysis Methods and Scope

The most recent survey for organizational structures in the United States was conducted by Government Technology in 2018. See summary map below.

Map 1: Landscape of State IT Systems in the US (2018)



(Source: Miller, Ben, January 1, 2019, State IT Structure Landscape Changes Dramatically, website www.govtech.com, https://www.govtech.com/data/state-it-structure-landscape-changes-dramatically.html)

The map above shows that over half the states in 2018 had centralized IT systems. Unfortunately, this report is no longer maintained by Government Technology. In forecasting what this map looks like today, the following analysis was performed- the simplest, most economical IT structure is a centralized model that is centrally funded. However, states receive federal funds for projects, some of which involve the implementation of technology solutions. Use of federal funds is narrowly restricted to expenditures within the scope of the funded project and the agency receiving the funding. Therefore, it is reasonable to assume that states operating in a mixed funding environment have departmental IT groups to support federally funded department-specific projects. Thus, the Committee has made the assumption that the *majority of states have a **hybrid organizational structure***.

(Note: based on subsequent information available, summarized in Table 1 and attached in Appendix 7.2 , Nebraska and Pennsylvania have hybrid organizational structures.)

Therefore, a more meaningful study would be to analyze the ***organizational structures' orientation or approach***. There are 4 basic types which are service-based, customer-based, asset-based, and process-based:

- **Asset based** group like systems, hardware, networks, software, and people within groups to create economies of scale.

- **Process based**- group like processes to focus on efficiency by optimizing processes, activities, and service delivery.
- **Service based**- group like services to focus on key offerings.
- **Customer based**- group like customers together to enable customer focus and response.

Though this information would be helpful to understand what sister states are using and to help identify best practices, no nation-wide survey data has been identified. Consequently, the Committee developed a survey to collect this information.

4.2 Sister State Survey

A survey was developed by the Committee to collect sister state data (see Appendix 7.1). The CIO was to solicit the NASCIO Organization to distribute the survey on behalf of the State of Hawaii.

The survey was forwarded to the CIO on March 30, 2023. The CIO subsequently forwarded the survey to the NASCIO organization for distribution. NASCIO however, did not approve survey distribution.

4.3 Summary of Findings

On May 30, 2023, in light of the time constraints and limited cumulative information available, a scope change to limit the sister-states research was made. The research is based on the CIO's peer to peer recommendation of the following states- California, Kansas, Minnesota, Nebraska, and Pennsylvania were identified and these are the major findings.

Table 1

Reference/ State	Organization Structure	Operating Model and/or Approach	Advantages	Disadvantages	Comments
California	Hybrid	Service	Common and modern position classifications across all departments allowed clear career paths, increase in applicants and greater clarity in reporting relationships and managerial roles.	Massive change for all departments to transition to new classifications.	Research focused on California's consolidation of 36 IT classifications to 9 service-wide classifications. Based on information from the California Department of Technology's (CDT) website. CDT provides oversight and infrastructure for many state departments and serves as the custodian of information for mission-critical and essential business applications.
Kansas	Hybrid	Asset/Service	Centralized responsibility for technology architecture and assets, including telecom and cyber security; centralized development of IT management plan; enterprise technology standards and processes; enterprise data management standards	None	From their website: "The State of Kansas Executive Branch Information Technology organization is made up of more than **1,400** information technology professionals, residing within cabinet agencies, non-cabinet agencies, regent institutions, and the Office of Information Technology Services, the central IT office."; there is an annual reporting requirement to the legislature to a joint committee on IT, established in statute, that reviews the use of and the results of implementing new technology acquisitions, project implementations and budgets, and IT strategic plans

Minnesota	Centralized	Service/ Process	"One Strategy/One Management Structure." "Designed to scale." "The plan will give people good options to build exciting careers in government IT." "Set phases that allow for fast action, early wins, strategic planning, while minimizing disruption." "Saving money in procurement."	None	Consolidation started in 2011 and completed in 2021. Utilization of a "Phased approach." "Minimize disruption of the daily business of government." "Facilitate the alignment of authority, responsibility and accountability as priority number one." "Emphasize communication at all times to all audiences – business, employees and leadership."
Nebraska	Hybrid	Services oriented but also other leadership, funding, partnerships were utilized	See comments	None	3/2016-6/2017. High-level, not detailed. Core ITIL practices in accordance with. Line of business left untouched. Core IT services focus-facilities, tech support services, various enterprise services, redundant data centers. Enterprise services desk support. Top to bottom. 2017-SOH, cloud computing GPC initiative. DHRD supported this to get cloud services at no cost. Lessons learned 1. Clear vision from beginning to end 2. Leadership needs to be in it for the long term, needs continuity. 3. New leaders (CIOs) changed priorities.
Pennsylvania	Hybrid	Enterprise Standards governed by EO Enterprise IT.	Establishes enterprise-wide guidance of standards and business process management for applications development or investment in current applications. Defines business functions and processes along with roles and responsibilities for each function. Published guidance to portal provides ease of access by agencies.	N/A	Allows flexibility to agencies to align appropriate business decisions and allows exemptions.
NASCIO Report	Mixed, more centralized (see comments)	N/A	N/A	N/A	Report contained outdated information not relevant to organizational structure best practices for 2023. *Comment:* There have been many changes and especially during COVID i.e. shift from the mainframe to cloud-based, virtualization, more online activities, and telework were omitted. As IT departments expanded respectively, it allowed for a decentralized model. Thus, the model and recommendations from 2006 are not relevant.

5 Deliverable 3

Identify challenges and pain points in the current organizational structures' orientation and approach where IT positions exist. The following are Committee members' pain points.

No.	Description
1	If hardware and software can be procured centrally, then departments can select what they need.
2	We currently have only 2 IT staff but will be hiring 3 more staff to modernize the applications. So 1 supervisor to 4 staff. Not sure how this will change with the IT Consolidation.
3	Staffing level not sufficient to support all (of its department) agencies; no additional positions anticipated. The department needs more IT staff.
4	Organizing by IT discipline/skills; onsite support with limited staff.
5	How is consolidation going to help the dept IT being short staffed. The services, software, etc. that are not being consolidated need to be adequately resourced.
6	Currently, services are scoped to the systems that each IT group is responsible for.
7	Current issues- (The) Dr Fortress (incident) could have a lot of improvements to what occurred there.
8	If network trouble shooting occurs, first it is addressed at the Dept level. If escalation is needed, then dept IT collaborate with ETS to solve on ETS' network because dept IT does not have access. Additional support is needed on the ETS side, they would need to expand their staff to handle more issues.
9	For non-shared services, staffing levels need to be reviewed for adequacy
10	Departments need more staff now to address increased demands. How can we communicate with the legislature and inform them that departments need to be allowed to request additional IT positions without the threat of consolidation. New positions are frozen, how can the departments get needed resources now. Is there a mechanism to review for current departments' adequacy.

6 Deliverable 4- Post-Consolidation IT Organizational Structure Recommendation

6.1 The Tool

The XY diagram is a Lean Six Sigma tool that was utilized to identify quality criteria, solutions, and provide prioritized weighting and selection. This tool allows members to focus on identifying objective criteria and ranking while also including the CIO's 'voice' in providing criteria weighting.

6.2 Quality Criteria Identified

The committee identified the following quality criteria which was used to evaluate the various organizational structure orientations and approaches.

- **Fast response to customer questions**- Based on the severity level, central ETS needs to get to the correct resource and reply back to the requestor quickly.

  The committee recommends: for external customers- a same day response (not necessarily resolution) is expected. For internal requests based on severity level, high priority such as a centralized network outage (15 minutes to resolve, a response is needed within 30 minutes), medium severity (response within 1 day), and low severity (can be

longer than 4 days depending on the issue) would be desired.

- **Fast processing speed –** This describes the system speed and the performance of the various IT systems. What the levels of performance are, should be defined in implementation. For use of external contractors, this would be defined in the service level agreement.
- **Clear accountability to meet IT processes and procedures-** Determining who is responsible, is it the department IT or ETS? Handoffs or boundaries between the central ETS' and the departments' roles and activities are clearly defined.
- **Clear accountability to meet department's needs-** Ensuring that ETS is responding to the departments' needs whether it be questions, expertise, support, escalations, etc. and not just focus on central issues.
- **Strong communication between IT groups-** Departments often have unique services, products, and needs. There needs to be strong collaboration, communication, and a willingness to work together to provide services, develop projects, and address issues.
- **IT discipline and skills** – ETS staff has the knowledge and skills to resolve the issue, answer questions, or support a project, etc.

6.3 Weighting of Quality Criteria

After Committee members identified important features or qualities that the future state organizational structure approach needed to have, the CIO assigns the weighting on a scale of 1 to 9. This ensures that the Voice of the Business is captured that there is alignment with the Sponsor's objectives, goals, and vision.

The Sponsor deferred weighting to the Committee to better understand the department ITs' needs and concerns and to the increase Voice of the Process. After discussion, the Committee determined the following weighting -

Weight	Quality Criteria
10	Fast response to customer questions
9	Fast processing speed
9	IT disciplines and skills
8	Clear accountability to meet IT processes and procedures
8	Clear accountability to meet Departments' needs
5	Strong communication between IT groups

6.4 The Rating

Next, the four approaches or solutions were rated using a geometric progression scale of 0, 1, 3, and 9. With 0 being no impact, 1- low impact, 3- medium impact, and 9- highest impact of the quality criteria to the proposed solutions. With the variables' weighting and rating assigned, a calculated score is derived.

6.5 The Solution Matrix

The following chart shows the solution results.

SOLUTION MATRIX

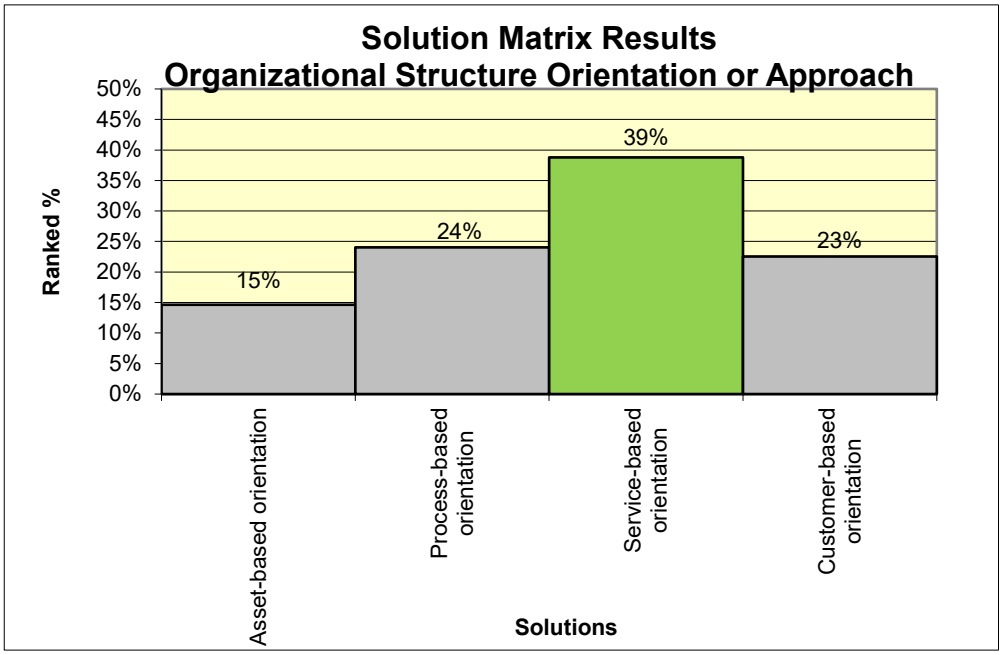
Process:	IT Organizational Structures
Date:	7/3/2023

Rating Scale:
0- None, 1- low, 3- medium, 9- highest

	Solutions (Xs)	Quality Criteria (Ys) / Description	1 Fast response to customer questions	2 Fast processing speed	3 Clear accountability to meet IT processes and procedures	4 Clear accountability to meet Dept's needs	5 Strong communication between IT groups	6 IT disciplines and skills	Rating score(s)
		Weight	10	9	8	8	5	9	
1	Asset-based orientation		1	1	3	1	1	9	137
2	Process-based orientation		3	3	9	3	9	3	225
3	**Service-based orientation**		9	9	9	3	3	9	363
4	Customer-based orientation		9	1	1	9	1	3	211
	Total values-								**936**

The following chart shows the totals as a percentage (%) of the total value.

Chart 1



The service-based orientation had the highest percentage score of 39%. Thus, based on the quality criteria, weighting, and rating, the Committee recommends the **service-based** organizational structure orientation or approach.

6.6 Assumptions, advantages, concerns, and additional comments

In recommending service-based organizational orientation or approach, these are the assumptions, advantages, concerns, and additional comments for consideration.

Assumptions

- This recommendation assumes that the quality criteria which represents cumulative departments' needs and concerns will be part of the implementation and addressed.
- This recommendation assumes that further discussion with the Department IT sections will occur. Recommending SLAs to be developed with the Department IT sections and proper documentation of procedures to ensure clarity and efficiency will occur.
- There is an assumption that ETS will pay and fund all shared services that have been identified for consolidation and that there will be no charge backs.
- Because there currently exists a hybrid organizational structure and a service-based orientation approach, it is assumed that no additional legislative changes are needed.

Advantages

- This approach aligns with the current and proposed (expanded) shared services model.
- This approach would result in more specialized experts.
- This approach would result in faster responses to customer questions of the shared services.
- This approach would result in a faster shared IT systems' processing speed.
- This approach would result in a high level of accountability to meet IT processes and procedures.

Concerns

- There may not be as clear accountability to meet all Departments' needs.
- There is a concern with the overall source of funding; who will fund the specific updates and/or needs specific to the department.
- This approach may not meet all the needs of customers.
- Many department ITs do not have sufficient resources presently and in the future to address the remaining non-shared services needs.
- There is a concern with the handoffs and responsibilities between central ETS and the department ITs. Clear procedures need to be developed and well communicated.
- There are concerns that continued communication with the Department ITs will diminish after the committee work concludes.
- There are concerns of how the Departments' organizational structure will be affected post-consolidation.
- There are concerns of how ETS will resource the expanded shared services and whether Department level staff will be taken away.
- There are concerns that currently, Departments are under-resourced and staffed when compared to typical IT Department to IT users benchmarks. And how this will be addressed post-consolidation and including the pre-consolidation interim period.

Other Comments
- The departments are responsible for the IT organizational structure within their respective department. This recommendation pertains to the central ETS agency's organizational structure only. - The Committee is requesting that ETS hire additional staff and not take IT staff from the departments.

6.7 Final Comments

Based on research, analysis, and discussion, it is the Committee's recommendation that the optimal organizational structure to be utilized by ETS post consolidation is the **hybrid organizational structure** with central ETS performing identified core services.

Furthermore, the orientation or approach that is recommended is the **service-based orientation or approach.** The service-based approach also aligns to the expansion of core shared services and ETS' current organizational structure.

Current pain points, assumptions, advantages, concerns, and additional comments as noted above were provided for consideration.

7 List of Appendices

7.1 Sister States Survey

Survey questions:

1. Is your organizational structure (check one): **Centralized__ Decentralized__ Hybrid__**

   Definitions: Centralized-central state IT organization has authority over all areas of IT including assets, services, financial, human resource management, and operations.

   Decentralized-State agencies have authority over their own IT areas including assets, services, financial, human resource management, and operations.

   Hybrid- Authority is distributed.

   - Describe any exceptions _____

2. In the core or primary IT services center, which of the 4 types or operating models are you most aligned to, or indicate the combination? (check all that apply)

   Asset based___ Process based___ Service based___ Customer based___

   Other_____

   Definitions: Asset based group like systems, hardware, networks, software, and people within groups to create economies of scale.

   Process based- group like processes to focus on efficiency by optimizing processes, activities, and service delivery.

   Service based- group like services to focus on key offerings.

   Customer based- group like customers together to enable customer focus and response.

3. Has your organization gone thru **IT consolidation**? **Yes ___ No ___**

   IT decentralization? **Yes___ No___**

   Other (please describe i.e. privatization)? _____ **Yes___ No ___**

   - If 'yes' when? Or when do you expect it to be completed? (enter date) _____

4. Lessons learned. Is there anything you would have done differently? Or anything that has not worked as expected? Please explain:

7.2 Sister States data

7.2.1 California

CalHR-Cross-Boundary-IT-Class-Consoli

7.2.2 Kansas

SB 57 review IT contracts.pdf

7.2.3 Minnesota

Commissioner
October NASCIO pre

7.2.4 Nebraska

Enterprise-IT-Initiati
ves-StateofNebraska

7.2.5 Pennsylvania

Penns
Consolidation Statu

7.2.6 NASCIO

NASCIO-ITConsolid
ationMay2006.pdf

IT Consolidation Working Group
Sourcing and Procurement Committee

Recommendations for Sourcing and Procurement Consolidation

Table of Contents

1 Overview

As part of the IT Consolidation Working Group, the Project and Portfolio Committee was launched with the following purpose and scope - taken from the Act 179 IT Consolidation 2022 Preliminary Status Report:

"Identify pain points in the current IT procurement process. Recommend a model to be able to leverage economies of scale for IT procurement by having ETS act as a broker for IT procurement transactions, including those that fall under the scope of shared services. Identify other opportunities to capture cost savings and efficiencies by assessing current spend across the executive branch, reviewing procurement policies, identifying any policy changes, and recommended consolidation of future contracts."

The committee's goals were:

1. Collect IT spend data from all departments in working group and analyze.
2. Identify opportunities for consolidation to leverage economies of scale.
3. Analyze current shared services.
4. Recommend which contracts should be consolidated.
5. Identify any necessary policy changes.
6. Send current shared services catalog and recommendations of which contracts should be consolidated to Provider (or Vendor) Management Plan committee and Human Resources Plan committee.
7. Identify pain points in the current IT procurement process.
8. Recommend a model to be able to leverage economies of scale for IT procurement by having ETS act as a broker for IT procurement transactions, including those that fall under the scope of shared services.
9. Identify other opportunities to capture cost savings and efficiencies by assessing current spend across the executive branch, reviewing procurement policies, identifying any policy changes, and recommended consolidation of future contracts.

2 Current State - IT Sourcing and Procurement

Procurement is the business function concerned with acquiring (procuring) the goods and services that are vital to an organization. So, procurement is essentially the umbrella term under which you'll find purchasing, sourcing, requisitions and purchase orders.

Sourcing is the *subset of procurement that comes before any purchases* are made. Strategic sourcing is the process of understanding the environment and supply ecosystem and then defining supply channels and procurement methods that provide the greatest value, not just the lowest prices. Goals of sourcing in adding value to procurement are to.

- Pick out the best fitting suppliers.
- Create clear, unambiguous contracts and purchase orders.
- Ensure consistent high quality of services through strong supplier relationships.

2.1 Current Procurement Governance Structures at the State

- Hawaii Public Procurement Code (Chapter 103D)
- Price and vendor lists provided by the State Procurement Office (SPO)
- Hawaii Administrative Rules (HAR) on procurement (Chapter 3)
- State Procurement Office (SPO) Solicitation templates (e.g., Competitive Sealed Proposal Request for Proposal template)
- Strategic vendors
- Technology architecture blueprints (e.g., ETS guidance)
- IT special conditions (e.g., ETS guidance)
- Procurement Circulars. Specifically for IT Services Procurement Circular No. 2017-06

As it relates to IT sourcing and procurement within the executive branch, Enterprise Technology Services (ETS) has the following policy and guidance structure:

- Hawaii Revised Statute §27-43 makes it the responsibility of the CIO and ETS to *"Coordinate each executive branch department and agency's information technology budget request, forecast, and procurement purchase to ensure compliance with the department or agency's strategic plan and road map and with the office of enterprise technology services' information technology governance processes and enterprise architecture policies and standards, including policies and standards for systems, services, hardware, software, and security management*".
- Until possibly rescinded by a successor policy, the state's enterprise IT projects are explicitly governed by ADMINISTRATIVE DIRECTIVE NO. 18-03 – Program Governance and Independent Verification and Validation Requirements for Enterprise IT Projects ("Administrative Directive 18-03"). Regarding sourcing of IT, this policy mandates that all IT projects classified as **enterprise projects** must have ETS' involvement and review in the early stages of the overall project (and project request/demand) lifecycle:
- IT Roadmapping
- Budgeting
- Initiating
- Planning

Then, regarding procurement, the phase review states that "Requests for proposals, quotes, or bids and the corresponding statements of work must be reviewed and approved by the CIO before being released as final. After a vendor has been selected, best and final contract versions must be reviewed and approved by the CIO before final execution. This is to ensure solicitation and contract documents are appropriately aligned with the project objectives for project success, and appropriate safeguards are in place to protect state interests."

3 CURRENT STATE – IT SPEND REQUEST DATA

To establish adequately useful data for current state sourcing and procurement analysis, the Sourcing and Procurement Committee initiated a project to enrich the fiscal year 2022 and fiscal year 2023 spend request data in the state's standard IT Portfolio Management Tool. ETS Office of IT Governance reviewed and amended spend request data for IT projects in the IT Portfolio Management Tool, together with the executive branch departments.

The resulting data, used for this analysis, can be found in the ETS Act 179 IT Consolidation Project Sharepoint site, titled "2023.01.12 - IT Spend Data Collection – DRAFT."

4 IT SPEND REQUEST DATA - FINDINGS AND OPPORTUNITIES

Key findings of the survey results are summarized below.

- Variety of services, products, vendors
- Where there is /same/shared services, ETS is already the shared service provider
    - Mainframe as a Service – Kyndryl, ASG, CA Technologies, Software AG
    - Microsoft O365
    - Adobe
    - ESRI
    - Others
- Areas to consider, depending on need:
    - Consolidated sourcing activities across Departments for strategic IT vendors

- Consolidated vendor management, by Department and across Departments will be possible if more data is aggregated and shared
  - E.g., DOT: Oracle, Autodesk
  - Platform enterprise price agreements
    - Oracle
    - Salesforce
    - Tableau
    - Service Now
    - Microsoft Syntex
- Creation of State Independent Verification and Validation (IVV) vendor list, via SPO
- Centralized procurement/management by ETS
  - End user / workspace
  - Network / LAN / WAN / Transport
    - E.g., MS Teams calling
  - Security
- Policy/procedure
  - Use of procurement methods/vehicles aligning with products/services sought? Sufficient to enable organizational initiatives, e.g., modernization efforts?
  - Evaluation procedural standards
    - Offeror capability verification procedures

5 Pain Points in the Current IT Sourcing and Procurement Processes

In this section, there is an attempt to draw conclusions from the general committee discussions and analysis.

5.1 Good Foundations and Practices to Build on

The following building blocks form a great foundation to keep building robust and sustainable IT procurement at the state:

- IT governance process for procurement
- Pricelists
  - GSA
  - NASPO Valuepoint
  - State of Hawaii

5.2 Areas to Keep improving on – Sourcing (pre-purchase)

The main findings are as follows:

Pain point	Implications	Cause
Capacity and capability for sourcing tasks is lacking at departments.	Cutting corners in the process, resulting in increased implementation and operational risks.	Lack of resources. Redundant procurements.
Leveraging of vendor contracts between the various programs and departments is lacking. Lack of **cooperative purchasing. Federated purchasing.**	Redundant procurements and operational IT systems.	Lack of cross departmental collaboration and information sharing.
Pricelists may not always be used in the most appropriate and value adding ways.	Increases risks in the implementation and operational states, particularly with more complex and larger procurements.	Tight schedules and pressure to act and deliver fast. Lack of resources and capability to execute longer, proper procurement processes.

5.3 Areas to Keep Improving on – Procurement (post-purchase)

The main findings are as follows:

Pain point	Implications	Cause
Capacity and capability for procurement and vendor management tasks is lacking at departments.		
Lack of **transparency**: HANDS does not show all the solicitations and associated procurement history.	Hinders the overall state level monitoring and governance activities.	

6 IT Sourcing - Recommendations for IT Consolidation

In this section, there is an attempt to draw recommendations from the IT spend request data analysis as well as general committee discussions and analysis.

6.1 Updating Certain Key Policies

These policies would focus in more clearly stating the:

- Use of pricelists
- Conditions for, application, and the process of cooperative procurement
- Explore revising procurement law and policy to allow for contract piggy-backing when certain criteria met

6.2 Creation of a Technology Platform Strategy and Guidance

This strategy would define the preferred technology platforms and strategy conformance rules, as necessary. The platform strategy is essential for any consolidation in that it would define the preferred platforms which would host most of the suggested future shared and consolidated IT solutions and services at the state. Technology platform and guidance would support departments' sourcing decisions, solution selection processes, and promote use of standard master contracts and master service agreements.

6.2.1 Definition of Platforms

National Institute of Standards and Technology (NIST) provides an overall definition[1]: "Information technology (IT), both hardware and software, that is physically part of, dedicated to, or essential in real time to the mission performance of special purpose systems".

Serving State's purposes more in-depth, Gartner[2] and the Technology Business Management Council (TBM) [3]expand the concept, defining platforms in the context of digital business existing at many levels. TBM provides examples of different platforms applicable at the state, without going into product or vendor names (page 25-26 of TBM v4.0).

6.3 Resourcing and Upskilling

ETS would benefit from more dedicated procurement professionals as well as more formally trained non-dedicated staff to help departments with needs-, alternatives- and procurement methods assessments:

- ETS would benefit from an IT Procurement Officer and 2 fulltime procurement managers.
- IT Governance analysts and Project Management Office analysts should be formally trained on National Association of State Procurement Officials (NASPO) and state (SPO) methods and best practices.

[1] https://csrc.nist.gov/glossary/term/platform_it

[2] https://www.gartner.com/en/information-technology/glossary/platform-digital-business

[3] https://higherlogicdownload.s3.amazonaws.com/TBMCOUNCIL/c15d372f-9951-46c8-9c3f-213c696401b6/UploadedImages/TBM_Taxonomy_V4_0.pdf (pages 25-26)

6.4 Establishment of Dedicated Procurement and Vendor Management User Groups

These user groups share, discuss, and would deliberate:

- Current and upcoming IT procurements;
- Procurement vehicle (price lists) related matters;
- Statewide contract, cross-department opportunities;
- Vendor performance and vendor management issues;
- Formulate policies, standards, practices, and guidelines for the area.

User groups would be open to:

- Department executive and program leadership, procurement officers and ASOs,
- Department IT leadership, management, and subject matter experts, particularly the IT Service Managers,

The groups would convene monthly or as needed. Relevant reports and dashboards are stored in fitting IT governance (Lean IX) and service management tools (to be determined), and standard MS office formats for members' access. The user groups will have a MS Teams channel and a MS SharePoint site to facilitate collaboration and store documentation.

6.5 More Stringent Leveraging of IT Sourcing Standards and Guidelines

Departments should be encouraged and pushed to more stringently leverage the various IT procurement related best practices provided by ETS and SPO, such as:

- IT solution alternatives assessment guideline and tool
- Procurement method selection guideline and tool
- IT RFP checklist
- IT RFP template
- IT contract special provisions checklist
- IT contract special provisions template

Most of the above are still in development, to be published by ETS in Q4/23 - Q1/24.

7 IT Procurement - Recommendations for IT Consolidation

No additional recommendations for other areas of procurement, outside of sourcing.

8 Roadmap of the Recommendations

Timeline of the suggested improvements is driven both by the complexity and the effort:

Year 1:

- Updating of certain key policies: identify applicable pricelists, vehicles, policies; look at piggy-backing laws of other states
- Creation of a technology platform strategy and guidance: identify and verify common platforms already in use or about to be implemented, functional/technical capabilities, costs to sustain
- Resourcing and upskilling: identify specific positions both within and external to ETS to support dedicating the procurement function for IT specifically
- Establishment of dedicated procurement and vendor management user groups: identify and verify various potential areas of common products and solutions across the Departments,
- More stringent leveraging of IT sourcing standards and guidelines: update existing standards and guidelines, identify areas that need standards/guidelines

Year 2:

- Updating of certain key policies: update existing pricelists, vehicles and policies; submit any required changes to procurement/contract laws and rules to legislature
- Creation of a technology platform strategy and guidance: prepare any consolidated funding scenarios (i.e., centralized funding vs. Department supported), and budget requests to the legislature; work with Departments on any migration scenarios to the common technology platforms
- Resourcing and upskilling: ensure proper procurement training, both from SPO and other available sources, are completed; if additional positions are warranted, include as budget requests to the legislature
- Establishment of dedicated procurement and vendor management user groups: define charters, create any required policies, formally stand-up user groups
- More stringent leveraging of IT sourcing standards and guidelines: creation of new standards and guidelines, with definition of how they will be incorporated into the governance processes

Year 3:

- Updating of certain key policies: provide awareness training and guidance to Departments on any new policies, laws
- Creation of a technology platform strategy and guidance: implement technology strategy and guidance, including any common platforms
- Resourcing and upskilling: incorporate any new positions into the ETS and/or other Department organization
- Establishment of dedicated procurement and vendor management user groups: continue to have user groups operate; refine structure/process if necessary
- More stringent leveraging of IT sourcing standards and guidelines: provide awareness training and guidance to Departments on any new sourcing standards and guidelines

End

IT Consolidation Working Group
Project and Portfolio Committee

Recommendations for Portfolio Management Consolidation

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1 OVERVIEW

As part of the IT Consolidation Working Group, the Project and Portfolio Committee was launched with the following purpose and scope - taken from the Act 179 IT Consolidation 2022 Preliminary Status Report:

> *"Analysis of existing Executive Branch IT projects and portfolios of IT applications. Recommend a portfolio management strategy that will enable better investments in future projects and more successful business outcomes. Determine existing project organization structures, what project controls are in place, and recommend any necessary changes."*

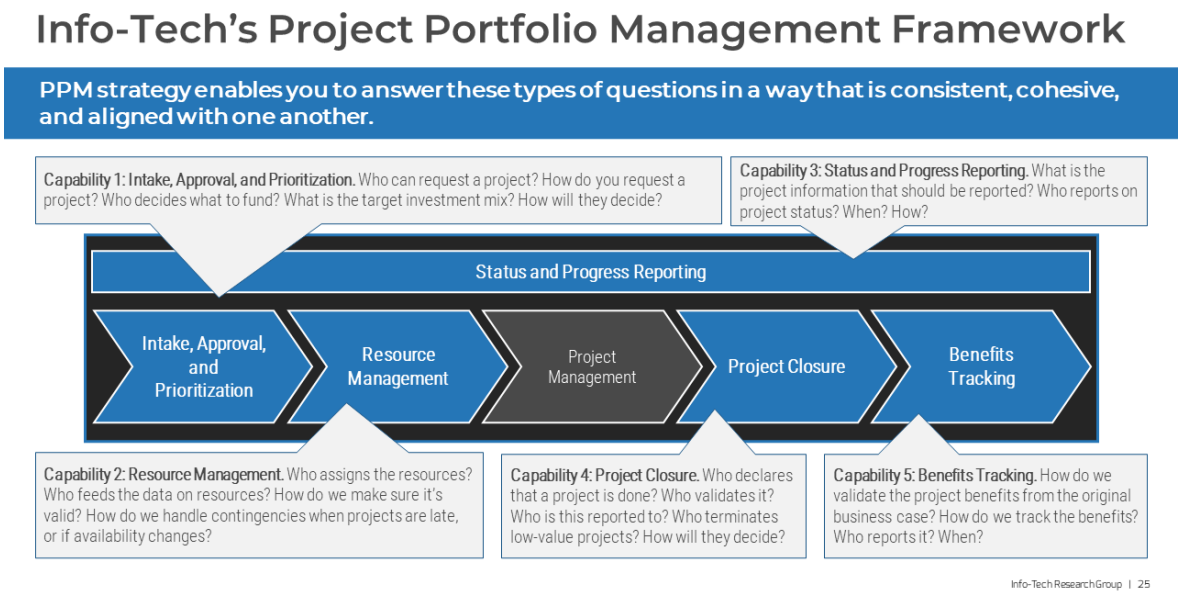
As the committee started meeting, it decided that the committee would prioritize analysis and recommendations for project portfolio management – and postpone the analysis of project management and IT applications portfolio.

The following scope and broad tasking were established:

1. Survey and collect current project portfolio management approaches and models within departments and agencies.
2. Analyze the departmental current state portfolio management data and recommend any revised project scope-aware policy, standards, and guidelines for IT project portfolio management.
3. Analyze and recommend a centralized project portfolio management approach that best enables return on IT investments in the state's future consolidated IT organization. Analyze and recommend any changes to the interaction (reviews, gate approvals) between departmental and centralized (ETS) scope-aware project portfolio management.

2 WHAT IS PROJECT PORTFOLIO MANAGEMENT?

There are a great variety of industry frameworks and related visualizations of project portfolio management as well as project management methodologies. For the committee's use, Info-Tech's project portfolio management conceptualization framework was selected.



2.1 Definitions

2.1.1 IT Project Portfolio

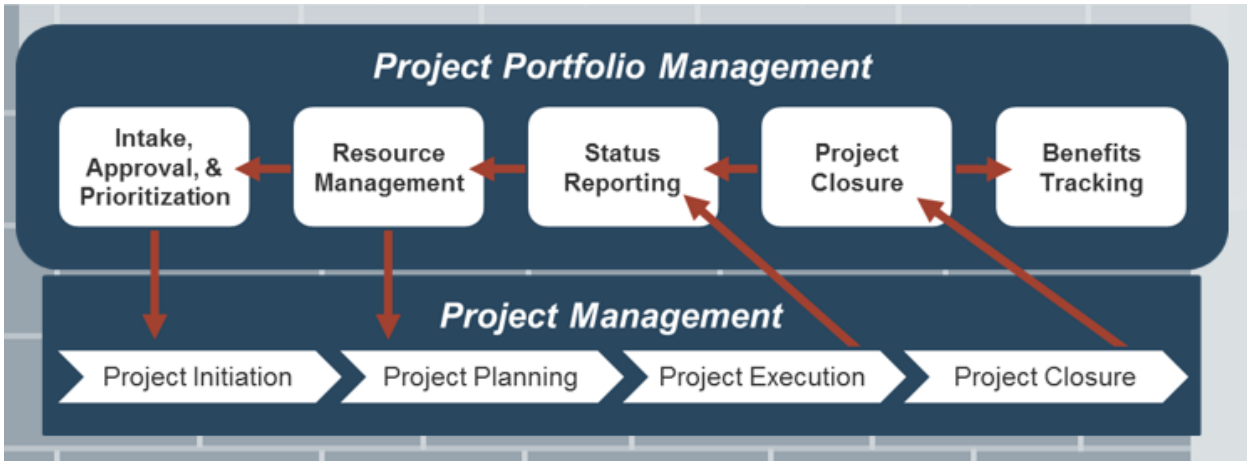
The statewide IT Project Portfolio contains all planned, active, and completed state IT projects. Subsets of this statewide IT project portfolio are typically categorized by either organizational structure (department, division, agency) or by budget program. Portfolio-level decision-making and governance of projects can be divided into:

1. Intake, Approval, and Prioritization
2. Resource Management
3. Project Management
4. Project Closure
5. Benefits Tracking

2.1.2 IT Project

A coordinated effort to achieve specific goals that may involve IT roadmapping, budgeting, initiating, planning, procurement, contract and operations, and Independent Verification and Validation (IV&V). Enterprise projects are subject to HAR §27-43.6 and Administrative Directive 18-03.

To illuminate the relation between project management and portfolio management, Info-Tech provides a clarifying diagram:



3 CURRENT STATE - IT PROJECT PORTFOLIO GOVERNANCE

Currently, as it relates to IT project portfolio management within the executive branch, Enterprise Technology Services (ETS) has the following policy and guidance structure:

- Hawaii Revised Statute §27-43 makes it the responsibility of the CIO and ETS to *"Coordinate each executive branch department and agency's information technology budget request, forecast, and procurement purchase to ensure compliance with the department or agency's strategic plan and road map and with the office of enterprise technology services' information technology governance processes and enterprise architecture policies and standards, including policies and standards for systems, services, hardware, software, and security management*". This investment-related requirement in the law is wider in scope than what can be considered "IT projects", however this responsibility for coordinating all IT procurement applies to appropriate technical and fiscal oversight of all IT projects as well.
- Hawaii Revised Statute §27-43.6 makes it the CIO's responsibility to select appropriate large IT projects that must acquire independent verification and validation services.
- Until potentially rescinded by a successor policy, the state's enterprise IT projects are explicitly governed by ADMINISTRATIVE DIRECTIVE NO. 18-03 – Program Governance and Independent Verification and Validation Requirements for Enterprise IT Projects ("Administrative Directive 18-03"). This policy essentially mandates that all IT projects classified as **enterprise projects** must have both
    - An IV&V contractor, and
    - Project phase gate reviews for the following phases:
        - IT Roadmapping
        - Budgeting
        - Initiating
        - Planning
        - Procurement
        - Contracts and Operations
- The implementation of the Administrative Directive 18-03 by the Office of Information Technology Governance is further explained at https://ets.hawaii.gov/it-governance.
- The Department of Budget & Finance Executive Memorandum 22-03 Attachment A, section 21.d. states that "All IT and TC acquisition requests (hardware, software, projects, maintenance contracts, renewals, consultant services, TC services, IT facilities, other IT products or services, etc.) with estimated costs of $100,000 or more require the approval of the CIO or the CIO's designee. All requests must be part of or in support of the requesting department's IT Applications and Projects Roadmaps and Plans information maintained on the ETS application portfolio management system."
- The Access Hawaii Committee (AHC) oversees the activities of the State of Hawaii's official Internet Portal Manager, Hawaii Information Consortium (HIC), LLC dba Tyler Hawaii. All departmental IT projects with services of HIC must be reviewed and approved by AHC.

4 CURRENT STATE – WORKING GROUP SURVEY

The Project and Portfolio Committee conducted a survey of the IT Consolidation Working Group appointed members on departmental IT Project Portfolio Management practices. For the purposes of this survey a Project is defined as "an IT-related effort with dedicated goals, schedule, resources - and funding in excess of $30,000".

The survey covered the full scope of project portfolio management from project demand management to benefits realization. Below are all the survey questions related to each phase of the portfolio management lifecycle.

4.1 Project Demand Management / Project Intake & Prioritization

1. How are project requests typically justified?
2. Who primarily produces project ideas and requests projects?
3. Who prioritizes project ideas for funding?
4. What percentage of overall department IT project funding goes to significant process improvement - rather than minor enhancements or maintenance & operations?
5. Is there a project portfolio prioritization and project selection method?
6. Which of the following project benefits are typically spelled out in project requests (select all that apply)?
7. Do larger projects require a more detailed business case in order to be approved?
8. What is the typical portfolio management tool?
9. Would statewide standard project selection tooling & guidance be adopted at your department?

4.2 Project Resource Management

10. Who assigns project resources?
11. Is existing staff availability a significant factor in selecting a project (rather than new positions)?
12. Is there a department-wide or division-wide resource allocation mechanism regarding state staff for competing projects?
13. What is an estimated average percentage of state staff in the combined state and vendor FTE staffing for projects?
14. How often is the start of a funded project delayed due to unavailability of state staff resources?
15. How often are ongoing projects delayed due to having less state resource availability than what was projected when the project was selected?

4.3 Project Management

16. What is typically done when projects are behind schedule?
17. How often is additional funding requested to complete projects?
18. How often do key state staff do project work while maintaining their normal operational role as well?
19. How often are state staff working on more than one project at a time?
20. Is there a formula or a rule of thumb for state staff allocation related to project cost?
21. How is project management mostly resourced?
22. Would statewide standard project resourcing guidelines be adopted at your department?
23. What active project information is reported?
24. Who reports on active project status?
25. What project management tooling is typically used by the department?
26. How is Organizational Change Management typically approached and valued?
27. What are typical reasons for project cost and schedule overruns?
28. Should ETS ideally provide project management services?

4.4 Project Closure

29. Who declares that a project is done?
30. Who validates that project is done?
31. Who is project completion reported to (select all that apply)?
32. Is any evaluation and procedure in place to terminate low-value projects?
33. Do projects apply common acceptance criteria / checklist template to support accepting the deliverables and closing the projects?
34. Would a statewide standard project closure checklist be adopted at your department?

4.5 Expected Benefits and Benefits Tracking

35. How does your department define expected benefits of IT projects?
36. Would statewide standard benefit tracking tooling & guidance be adopted at your department?

5 Survey Results

The detailed survey questions and answers can be found in APPENDIX 1 – Survey Questions and Answers.

6 Survey Findings and Opportunities

Key statistical findings of the survey results are summarized below. By the committee's estimation, the highlighted findings reveal the most promising opportunities for consolidated IT Project Portfolio Management standardization and tooling.

- Project Demand Management / Project Intake
  - 63% of survey respondents report that a department-wide or division-wide project portfolio prioritization method does not exist
  - 30% would like to adopt statewide standard project selection tooling & guidance and 90% would at least consider adopting this standardization
  - On average, 45% of IT budget is estimated to go to modernization (implementation) and 55% to maintenance and operations
- Resource Management
  - 70% report that they do not have a department/division-wide project staff resource allocation mechanism
  - On average, 45% of project staffing consists of state employees and 55% vendor resources
  - 70% report that state staff resource scarcity at least sometimes delays project start
  - 70% report that projects are often or sometimes delayed due to having less state resource availability than what was projected when the project was selected/started
  - 62% extend project schedules for projects behind schedule – rather than reducing scope or adding resources
  - 66% at least sometimes request additional funding in order to complete projects
  - 79% report that it is typical ("often") for key state project staff to maintain their normal operational role as well – rather than being dedicated to a project
  - 66% report that it is typical ("often") for state staff to be assigned to multiple projects at the same time, 100% report this to be the case at least sometimes, an indication of widespread staff shortages
  - 0% have a state staffing formula related to project financial scope
  - 46% are mostly relying on vendors for project management, 25% allocate non-dedicated agency staff, 29% have a dedicated project manager
  - 20% would like to adopt statewide standard project resourcing guidelines, and 91% would at least consider adopting such standardization
- Project Management (portfolio management engagement)

Cost - the funds paid out so far	71%
Cost - additional funding approved/requested	83%
Schedule - the original baseline schedule	63%
Schedule - the current projected schedule	96%

% of scope implemented	50%
Approvals (State and Federal) - approvals received / approvals status	58%
Risks and mitigation actions	46%

  - For the following project status indicators, below are the percentages of departments using each indicator in their IT project status reporting:
    - 58% use Excel as the project management tool
    - Lack of internal staff is the most common (29%) reason for project cost and schedule overruns
    - 46% think ETS should provide IT project management services/resourcing
- Project Closure
  - 67% replied that project manager declares a project is done, and 50% that project manager also validates that the project is done
  - 67% of department representatives replied that there is no evaluation or procedure in place to terminate low-value projects
  - 50% would adopt a statewide standard project closure checklist
- Expected Benefits and Benefits Tracking
  - 50% state that the benefit categories in the ETS IT portfolio management tool are used to define expected project benefits, 33% have their own benefit tracking approach, 17% do not have a defined benefit tracking approach

7 Survey-Informed Recommendations for IT Consolidation

In this section, there is an attempt to draw recommendation from both the IT Consolidation Working Group survey findings as well as general committee discussions and analysis.

One of the key set of recommendations revolves around working with the Governor in revising the "18-03" directive and replacing it with a successor policy. For this report, the recommended successor policy is called **Revised Enterprise IT Project Policy**.

7.1 ETS Budget and Organizational Changes

- ETS to acquire/develop tooling and a process for departmental/divisional IT project prioritization. There is already a pilot project underway with ETS, DHS, and DCCA to document departmental/divisional business goals and IT strategy (and IT goals/objectives) in the ETS IT portfolio management tool – for the purposes of driving IT project selection based on shared goals rather than more ad hoc methods. This effort should be formalized and adequately staffed to extend this process throughout the executive branch.
- In response to the finding across departments that staff are handling projects in addition to their regular duties and working on multiple projects simultaneously, and to improve project consistency, expand the ETS Program Transformation branch or establish a more comprehensive new statewide IT project management matrix organization and floating positions, where all or most large departmental IT modernization projects may receive augmented staffing from dedicated and experienced project managers. Cross-program project support will require administrative changes to support 100%-time tracking for proper cost allocation on Federal projects. Additionally, to ensure technical success and business alignment, the performance and time of these personnel needs to be overseen and directed by each respective business program.
  - Consider similar floating positions for technical subject matter expertise for large IT projects.

7.2 Policy Changes

7.2.1 Justify IT Projects with Strategic Goals

In the Revised Enterprise IT Project Policy specify requirements for justifying IT project request. These requirements should include:

- Relating projects to specific business goals and IT goals in ETS IT portfolio management tool
- Classification of expected benefits
- Scoring and ranking of project requests.

7.2.2 Improve Project Status Reporting

In the Revised Enterprise IT Project Policy provide criteria and standards for large IT project status reporting. In alignment with the survey findings, include project cumulative spending tied to current scope completion percentage in these criteria.

7.2.3 Define Project Closure Roles and Responsibilities

In the Revised Enterprise IT Project Policy specify project closure roles - and separate project management roles from project completion verification and validation roles.

7.2.4 Establish IT Project Benefits Tracking

In the Revised Enterprise IT Project Policy require IT project benefits tracking – and reference the related ETS-managed guidelines for IT project benefits tracking.

7.3 Guidelines

7.3.1 Establish IT Project Staffing Guidance

- Establish guidelines for departmental/divisional IT project staffing. In these guidelines pay particular attention to clarifying the roles and responsibilities between state and vendor project management staff. Also consider the financial scope of a project and a metric for adequate state project staffing.

7.3.2 Establish Project Benefits Guidance

- ETS should establish scope-dependent IT project benefits guidance.

7.4 Standards

7.4.1 Establish Standard Project Management Tooling

- ETS should acquire and manage a statewide project management toolset. This should include a standardized project management software system and related enterprise guidance resources from the ETS Program Transformation branch.

7.4.2 Establish Standards for External Project Management

- The State finds that its preferable to have State staff perform project management duties, but where the State must outsource project management to a third party, State project management standards as defined by ETS should be followed. Furthermore, it's recommended that the State include in its solicitations references to the State's project standards as applicable.

7.4.3 Establish Standard IT Project Benefit Classification

- ETS should establish standard IT project benefits classification.

7.4.4 Improve IT Portfolio Tooling

7.4.4.1 Background

While the state has standardized critical aspects of the IT spend request process using a standard IT portfolio management tool, there are significant inefficiencies in the overall portfolio lifecycle management that can be remedied by standardizing on a tooling solution that:

- Streamlines the full project lifecycle approval workflow from demand management to benefit tracking. This type of automated workflow should also allow customization of the approval workflow so that right people in the approval process can fluently understand and approve the appropriate steps in the evolution and approvals of a project.
- Enables elimination of all parallel data entry for IT project approvals, including requirements to streamline project budgeting and approval processes for all executive agencies and departments.
- Enables comprehensive IT system evolution roadmap & budget visibility

7.4.4.2 Recommendation – Portfolio Tooling Market Research

- The committee recommends a renewed comprehensive market research of both application portfolio management and project portfolio management tool landscape, conducted by an appropriate working group. After the market research, there should be a decision whether to invest in augmenting current tooling or to acquire a replacement set of tools.

8 Revised Enterprise IT Project Policy - Additional Recommendations

In this section, beyond the IT Consolidation Working Group survey and as a result of the continued discussions in the committee meetings, the committee recommends additional improvements to the Revised Enterprise IT Project Policy (replacing Administrative Directive 18-03).

8.1 Policy guidance for both Portfolio Management and Project Management

8.1.1 Project Portfolio Management

- Adopt an IT portfolio management framework. For example, use the Info-Tech portfolio lifecycle:
  - Intake, Approval, and Prioritization
  - Resource Management
  - Project Management
  - Project Closure
  - Benefits Tracking

8.1.2 Project Management

- Adopt an IT project management framework. For example, use the PMI project lifecycle:
  - Initiation
  - Project Planning
  - Project Execution
  - Monitoring/Controlling
  - Project Close

8.2 Establish a periodic departmental IT Strategy review meeting

- Establish a regular meeting with each department to review and approve the department's multi-year information technology strategic and tactical plans and road maps as required by HRS §27-43. These review meetings should include the following participants:
  - Department leadership

- Department IT leadership
- Project Advisory Council members:
  - Comptroller
  - Director of the Department of Budget and Finance
  - Director of the Department of Human Resources
  - Chief Information Officer
- ETS IT Governance staff
- ETS IT Operations leadership

8.3 Align project initiation with portfolio-level business and IT strategy

- Emphasize alignment of individual IT projects with the department/division business strategy, business goals, IT strategy, and IT goals

8.4 Change the role of PAC to be more impactful

- Change the timing of Project Advisory Council (PAC) reviews to coincide with the periodic departmental IT strategy review meetings.
- Emphasize PAC's focus on large departmental IT projects as part of portfolio intake, ideally before detailed planning and budgeting

8.5 Establish Project Portfolio Sharing

- Create a standardized format and schedule for ETS to share its project portfolio and strategy with departments. This will enable departments to align their project portfolios with ETS.
- Establish a process and standardized format for departments to view other departments' project portfolios, to accelerate collaborative planning for enterprise assets, shared solutions, and initiatives.

9 APPENDIX 1 – SURVEY QUESTIONS AND ANSWERS

1. How are project requests typically justified (select all that apply)?

Governor's priorities	11
Department strategic plan	13
Specific program/business goals	23
Department IT strategy	16
Other	2

2. Who primarily produces project ideas and requests projects?

Department leadership	2
Program leadership	9
Program staff	0
IT staff	5
All somewhat equally	8

3. Who prioritizes project ideas for funding?

Department leadership	7
Division leadership	10
Program leadership	6
Other	1

4. What percentage of overall department IT project funding goes to significant process improvement - rather than minor enhancements or maintenance & operations?

Average Estimate: *48%*

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5. Is there a project portfolio prioritization and project selection method?

Yes	9
No	15

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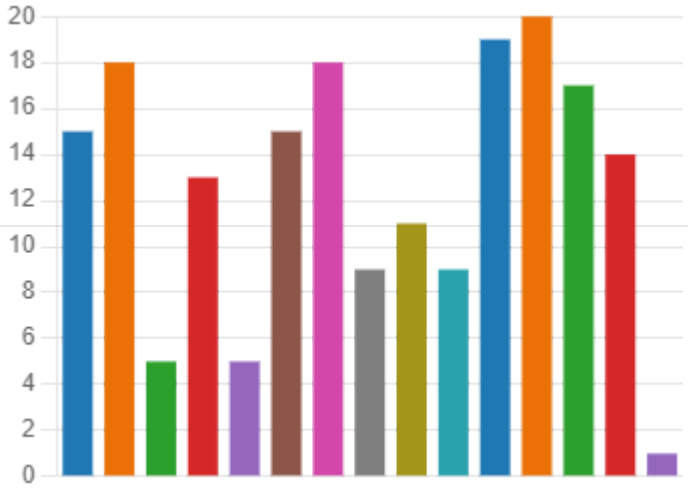
6. Which of the following project benefits are typically spelled out in project requests (select all that apply)?

Cost Reduction	15
Constituent Service Improvement	18
Vendor Service Improvement	5
State Internal Process Improvem...	13
Government Transparency	5
Regulatory Compliance	15
Usability	18



Business Intelligence	9
Data Quality	11
Flexibility/Configurability	9
Technology Maintainability	19
Performance/Availability	20
Security	17
Interoperability	14
Other	1

7. Do larger ($ amount, staff resources & process change) projects require a more detailed business case in order to be approved?

Yes	20
No	4

8. What is the typical portfolio management tool?

No tool	3
Excel	7
LeanIX	13

Other	1

9. Would statewide standard project selection tooling & guidance be adopted at your department?

Yes	7
Maybe	15
No	2

10. Who assigns project resources?

Funding decision-maker	7
Project manager	11
Other	6

11. Is existing staff availability a significant factor in selecting a project (rather than new positions)?

Yes	18
No	6

12. Is there a department-wide or division-wide resource allocation mechanism regarding state staff for competing projects?

Yes	7
No	17

13. What is an estimated average percentage of state staff in the combined state and vendor FTE staffing for projects?

Average Estimate: *48%*

14. How often is the start of a funded project delayed due to unavailability of state staff resources?

Never	7
Sometimes	16
Often	1

15. How often are ongoing projects delayed due to having less state resource availability than what was projected when the project was selected?

Never	7
Sometimes	13
Often	4

16. What is typically done when projects are behind schedule?

Extend completion schedule	15
Reduce deliverable scope	2
Add state resources	1
Procure vendor resources	2
Other	4

17. How often is additional funding requested to complete projects?

Never	8
Sometimes	16
Often	0

18. How often do key state staff do project work while maintaining their normal operational role as well?

Never	0
Sometimes	5
Often	19

19. How often are state staff working on more than one project at a time?

Never	0
Sometimes	8
Often	16

20. Is there a formula or a rule of thumb for state staff allocation related to project cost (something like "1 dedicated project resource for each $1M")?

Yes	0
No	24

21. How is project management mostly resourced?

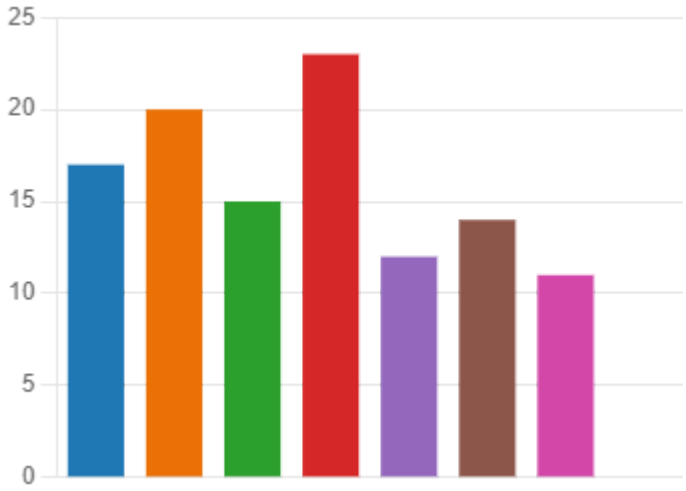
Non-dedicated agency staff	6
Dedicated project manager	7
Mostly relying on vendors	11

22. Would statewide standard project resourcing guidelines be adopted at your department?

Yes	5
Maybe	17
No	2

23. What active project information is reported (select all that apply)?

Cost - the funds paid out so far	17
Cost - additional funding appro...	20
Schedule - the original baseline ...	15
Schedule - the current projecte...	23
% of scope implemented	12
Approvals (State and Federal) - ...	14
Risks and mitigation actions	11
Other	0

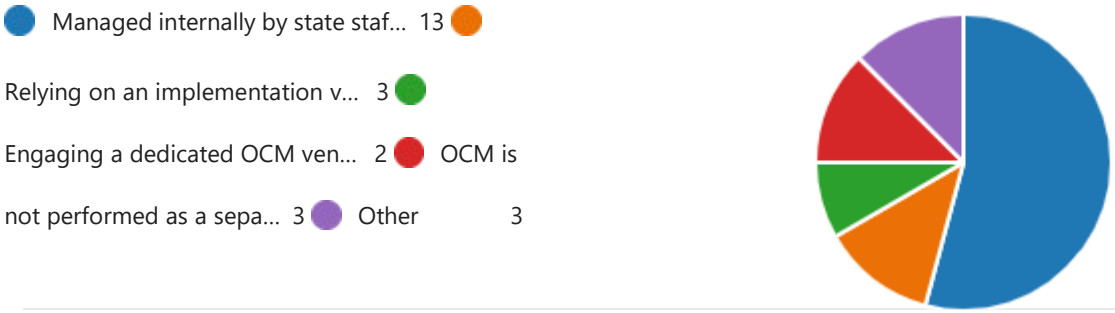


24. Who reports on active project status?

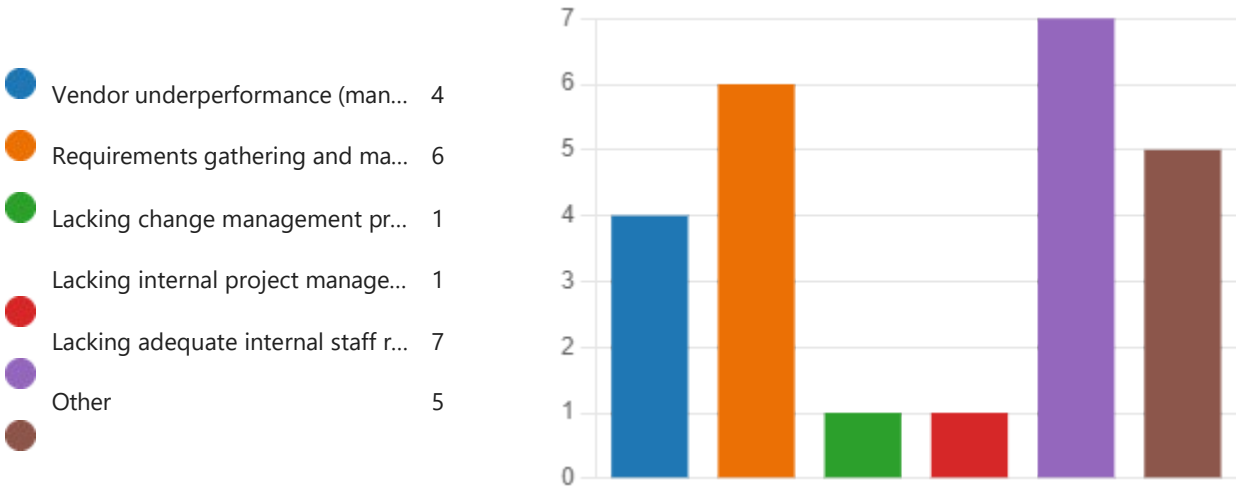
State project manager	7
Vendor project manager	1
Both	16

25. What project management tooling is typically used by the department?

26. How is Organizational Change Management typically approached and valued?



27. What are typical reasons for project cost and schedule overruns?



28. Should ETS ideally provide project management services?

Yes	11
No	13

29. Who declares that a project is done?

Funding decision-maker (spons...	6
Project manager	16
IV&V Vendor	0
Other	2

30. Who validates that project is done?

Funding decision-maker (spons...	1
Project manager	12
Steering committee	6
No formal evaluation	5

31. Who is project completion reported to (select all that apply)?

Funding decision-maker	17
Steering committee	9
CIO	6
Other	6

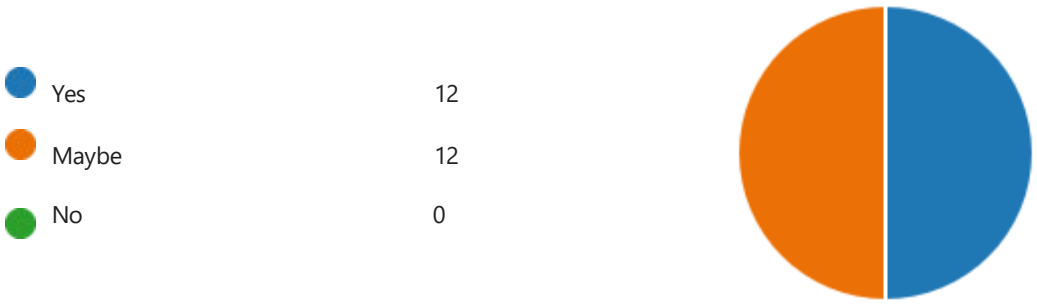
32. Is any evaluation and procedure in place to terminate low-value projects?

Yes	8
No	16

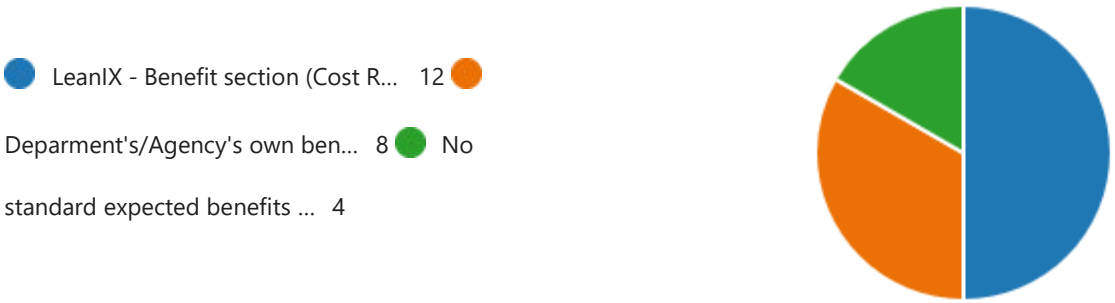
33. Do projects apply common acceptance criteria / checklist template to support accepting the deliverables and closing the projects?

Yes	12
No	12

34. Would a statewide standard project closure checklist be adopted at your department?



35. How does your department define expected benefits of IT projects?



36. Would statewide standard benefit tracking tooling & guidance be adopted at your department?

IT Consolidation Working Group
Provider (or Vendor) Management Plan

Recommendations for Provider Management Consolidation

1 Table of Contents

2 Executive Summary

As ETS continues to focus on the "Shared Services" model for consolidation, it will be important for ETS to develop itself as a *service provider*. A service provider should have a well-defined set of services it provides and a strategy on how to best deliver those services to its customers.

To improve IT service management (ITSM) capabilities of ETS, further planning and development needs to occur in the People, Process, and Technology (PPT) framework as it applies to ITSM. It was evident from the customer surveys and feedback that ETS must improve its ITSM capability around its current services.

The following improvements were identified as high priority:

- Modernize the ETS Service Desk tooling.
- Develop and publish a service catalog.
- Increase ETS Service Desk staff to align with the growing number of shared services.
- Develop and publish more policies and standards.
- Improve the communication plan, training, and awareness for ETS services.

It is important to consider that when services are consolidated, centralization can diminish an agency's ability to directly support its users and their unique needs. Department IT staff will have less control and decision-making authority over the service, which may reduce flexibility in tailoring support to their specific user needs. The overall effectiveness of the centralization will highly depend on how well ETS can manage and deliver its services. Thus, ITSM is critical to the success of the entire IT consolidation project.

3 Provider (or Vendor) Management Plan Overview

3.1 Mandate and Goals

According to the Act 179 2022, and as stated in the Act 179 IT Consolidation 2022 Preliminary Status Report for the State of Hawai'i Legislature, the mandate and goals of the Provider (or Vendor) Management Plan, henceforth referred to as the Committee, are to:

- Perform analysis of services currently provided either internally or externally (via vendor) to executive branch departments.
- Perform baseline user satisfaction surveys.
- Determine whether services currently provided are adequate and meets the needs of the "customer."
- Identify any areas that requires future vendor sourcing by completing a make/buy assessment and recommend a sourcing method.
- Finalize a list of shared services to be included in the IT consolidation effort.

3.2 Members and Activities

The Committee started its work on March 14, 2023, and wrapped up in early July of 2023. The Committee met periodically to discuss the scoping of work, review frameworks, identify key assignments and timelines, plan for information gathering and outreach to the state departments, and review and analyze the results. Members helped manage the communications to the departments and collected the survey results and feedback.

The Committee members are:

- Bryce Fujii, ETS (Facilitator)
- Dexter Lee (Note taker)
- Catherina Pratt, ETS (Note taker, former)
- Juha Kauhanen, ETS (Business Architect)
- Tracy Ban, B&F
- Joan Delos Santos, DBEDT-OP
- Lila Loos, DLNR
- Ryan Shimamura, DHS
- Judy Yamada, PSD
- Lynne Youmans, AG

3.3 Standards and Scoping of Work

The Committee's work was carried out with the perspective that ETS is the *Provider*, and the state departments and agencies are the *Customers*.

As defined by the Information Technology Infrastructure Library (ITIL) framework, the committee used the following definition of *Services*:

Services are a means of delivering value to customers by facilitating outcomes customers want to achieve without the ownership of specific costs and risks. Services facilitate outcomes by enhancing the performance of associated tasks and reducing the effect of constraints. The result is an increase in the probability of desired outcomes.

The delivery of services by ETS, as the *Provider*, include services rendered internally by ETS, or could be brokered through ETS and orchestrated by a *Vendor* (external service provider).

The Committee aligned its standard to the preliminary proposal of expanding enterprise shared services as described in the first report to the legislature:

ETS has formulated a preliminary proposal for discussion by the Consolidation Working Group as a model of what a successful IT consolidation might look like. The proposal is based on a "Shared Services" model which many other State governments have successfully adopted.

Shared services differ from centralized services. Whereas centralized services focus on consolidating work in a single location, shared services are provided by ETS to other departments as a part of a service offering to keep the department's overhead lower. Shared Services are a way to gradually gain additional economies of scale just as other State governments have done over time.

The Committee scoped its work to the following primary elements:

1. Analysis of the list of current shared services that ETS provides, curated by the Sourcing and Procurement Strategy Committee. This included activities such as defining service taxonomy and brief descriptors.
2. A satisfaction survey sent to the state departments, rating each of the shared services in the list.
3. Analysis of the survey results and feedback received from each state department to determine whether shared services provided by ETS were adequate and met the needs of the state departments.
4. Identify and recommend what existing services could benefit with further vendor sourcing and determine new areas of IT consolidation where ETS could provide future shared services.
5. Finalize a list of the current and future state shared services to be provided by ETS.

4 Current State ETS Shared Services

4.1 Evolution of the ETS Shared Services List and State Service Catalog

The list of current state ETS shared services was derived from two main data sources. In 2022, a 4-day workshop hosted by ETS and lead by Info-Tech Research Group was held from August 30 to September 2. Participants of this workshop included ETS leaders, department IT Coordinators and various IT staff. The working group was tasked with exercises to define and inventory the services their organization provided, and the Info-Tech team consolidated the work output into a spreadsheet. The output was a list of 633 services. The data was analyzed by ETS Program Transformation to make an initial proposal for which of the 633 services might become "shared services".

Four major categories were formed:

- Category #1: Is already centralized
- Category #2: All can be centralized
- Category #3: Agency-mission specific
- Category #4: Parts can be centralized

The spreadsheet can be referenced in **Appendix A - InfoTech Service Catalog Workshop 2022.xlsx**.

A second data set was taken from the ETS Service Desk ticketing system. A list of the categories used to categorize service requests and incidents received by ETS customers was captured to identify current services for which ETS was providing support.

The list of services in Category #1 of the Service Catalog workshop data was then merged with the list of Service Desk Categories into a single spreadsheet. Additional classification of ETS services in the list was modeled after Version 4.0 of the Technology Business Management Taxonomy specification documents. The resulting taxonomy was defined as Type > Category > Subcategory > Service / Solution. The high-level Types that were used are as follows:

- End User Services
- Infrastructure & Platforms
- Professional Services
- Shared Applications
- Line of Business Applications

The shared services list was then reviewed across each of the service owners within ETS to ensure accuracy and completeness of each service item. The completed list of ETS' current shared services can be referenced in **Appendix B - ETS Current Shared Services.xlsx**.

The resulting State-wide IT Service Catalog is presented in Figure 1 below.

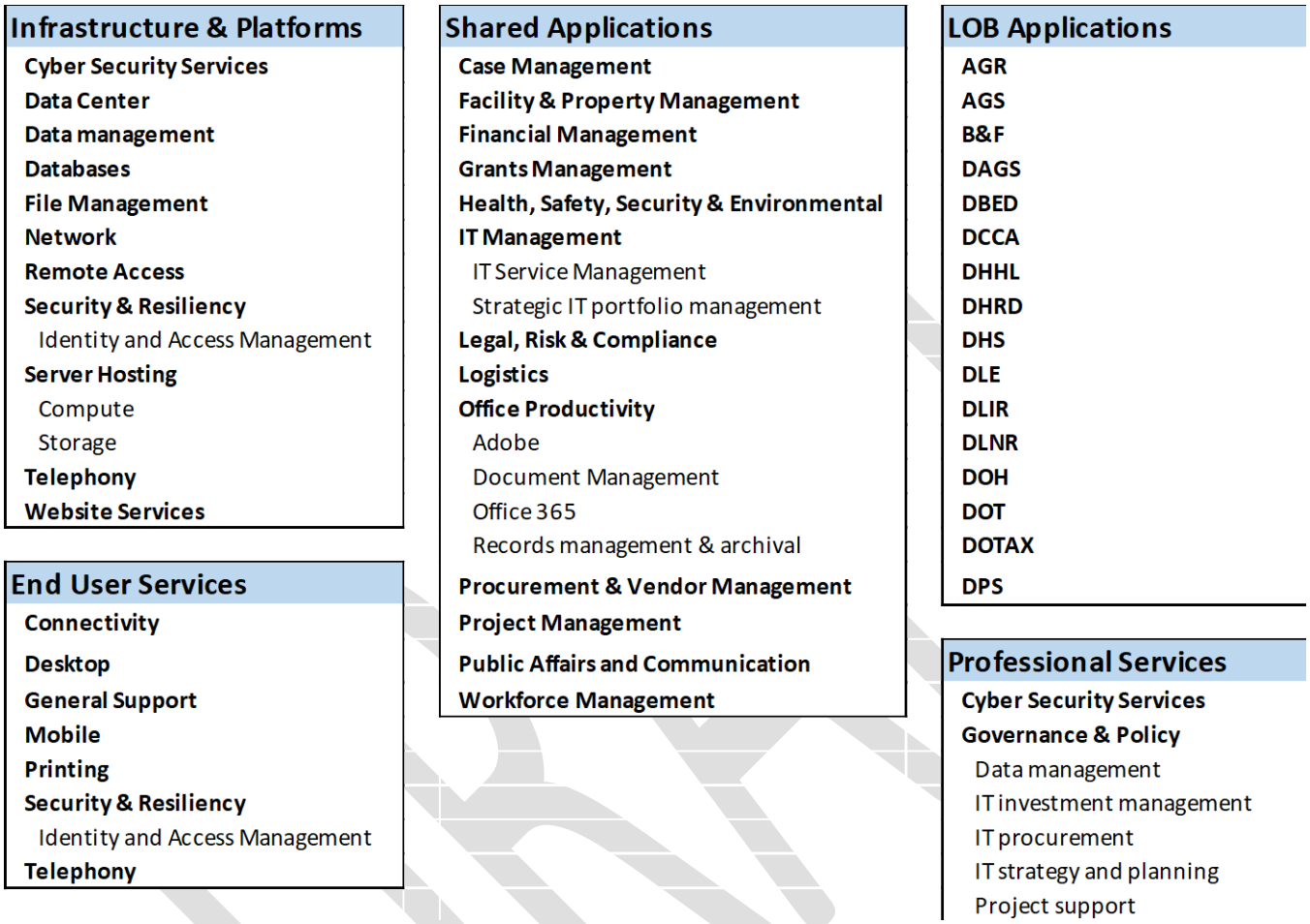


Figure 1. State IT Service Catalog.

5 User Satisfaction Survey Collection and Results

5.1 Collection Method

In order to perform a baseline user satisfaction survey, the Committee established the following rating criteria:

- 1 – Consistently fails to meet expectations
- 2 – Often fails to meet expectations
- 3 – Consistently meets expectations
- 4 – Often exceeds expectations
- 5 – Consistently exceeds expectations
- N/A – Not applicable (Department does not utilize the service)

The department contacts were tasked to rank each of the services in the ETS Current Shared Services list using the rating criteria to portray how well the department felt ETS delivered each service. The survey instructions

described that service delivery could be primarily provided by ETS or brokered by ETS via an ETS-managed vendor.

The survey was sent out to the following departments and divisions:

- Department of Agriculture
- Department of Accounting and General Services
- Department of the Attorney General (AG) - Child Support Enforcement Agency
- Department of the Attorney General (AG) - Hawaii Criminal Justice Data Center
- Department of the Attorney General (AG) - Juvenile Justice Information System
- Department of the Attorney General (AG) - Child Support Enforcement Agency
- Department of Business, Economic Development, and Tourism
- Department of Budget and Finance
- Department of Budget and Finance
- Department of Budget and Finance
- Department of Commerce and Consumer Affairs
- Department of Defense
- Office of the Governor
- Department of Hawaiian Home Lands
- Department of Human Services
- Department of Human Resources Development
- Department of Health
- Department of Labor and Industrial Relations
- Department of Land and Natural Resources
- Department of Public Safety
- Department of Taxation
- Department of Transportation - Administration
- Department of Transportation - Airports
- Department of Transportation - Harbors
- Department of Transportation – Highways

5.2 Collection Results

The survey results were collected from each of the department contacts, and the numeric scores were averaged across the departments and aggregated into a single baseline score for each service item. Further feedback was collected from the department if they rated a service a score of 2 or lower.

The final aggregated baseline satisfaction score can be referenced in *Column A* of **Appendix B - ETS Current Shared Services.xlsx**. *Columns K-AI* show the results per each department.

5.2.1 Analysis of the results by Service Type:

End User Services – Current services provided in this area were scored slightly above average (3 - consistently meets expectations) with Telephony being the lowest yet still meeting expectations. However, department feedback regarding delivery of these services expressed that help desk ticket response times were poor and customers are not able to track and view the status of open tickets due to the limitations of the current system.

Infrastructure & Platforms – Scores for current services provided in this area ranged from 3 – 4, with both Landline and VOIP Telephony services scoring the lowest. Public Websites, the Government Private Cloud, Endpoint Detection and Response, State NGN, and Enterprise Active Directory scored on the higher end closer to a 4, often exceeding expectations. The feedback collected in this area included common themes of customers not understanding or having enough information about the service and its function, being unaware of what is provided with the service and not understanding the shared responsibility model, or dealing with untimely responses to requests.

Professional Services – Current services provided in this area, mostly under the category of Governance & Policy, scored the weakest across ETS services. Services such as Project Management, Vendor and Offer Evaluations, System Design, Development and Implementation, and IT Policy, Standard and Guideline Development scored in the upper 2s (Often fails to meet expectations). Feedback gathered around these ratings show there is a lack of communication, information, and education around these services. Governance standards may not be effectively published, communicated, and provided to Departments in a way that can be accessed and searched. Departments want to see more publicized policies and standards and the delivery of consultation services is not effective or reaching the right customers.

Shared Applications – Current services provided in this area ranged from 3 – 4. PeopleSoft Payroll, T&L (HIP) ranked the lowest in this area, but still met expectations of the customer.

Line of Business Applications – This type of service was not polled as they are part of a department's mission and should remain as close to the "business owner" (i.e., State program) as possible, or are special funded programs specific to a federal grantee, or are otherwise impractical to centralize such as administering badge access at a department's location.

6 Recommendations on Current ETS Services

This chapter discusses the findings of the ETS current services satisfaction survey results. Details on a per service level can be found on **Appendix C - ETS Current Shared Services Recommendations.xlsx**.

6.1 Improve IT Service Management Capabilities

ETS is developing and adopting a new IT service catalog structure and IT service management tooling in 2023-2024. The new catalog will ease customers interaction with ETS services and will also create a universal structure for the entire state – all departments – to adhere to and align with. This structure and taxonomy (see figure 1.) will enable governing, management and transition of service delivery responsibilities between state entities more fluently.

The objectives of the new tooling are to improve the tracking of incidents and requests, increase response and resolution times, increase the visibility of case status for the customer, improve reporting and analysis of service levels, and provide a centralized information library that's easily searchable. Improved tooling for IT operations management and IT asset management can provide better assurance that IT services/systems are reliable and available.

Increased staffing for the ETS Service Desk will be required to provide improved support and service levels of ETS services. The ETS Service Desk is currently staffed by 2 FTEs and overseen by an ITS VI Section Manager who is responsible for the Public Information Access Section. In year 1, the ETS Service Desk should be restructured to become its own section within ETS-TSSB and include a dedicated Service Desk Manager position to oversee the

service desk staff, focus on the standardization of service management within ETS, and to strategize and plan for the section's activities. Future planning to mature the ETS IT Service Management capabilities would be required. In year 2, it would be desired to further increase the size of the service desk staff and implement a tiered support structure using an internal labor model, insourced from within the state's workforce or the establishment of new positions through the legislature. Further planning with the Human Resources Plan committee may determine how ETS could obtain the additional service desk staffing.

6.2 Increase Service Awareness and Improve Communications and Training

ETS will develop and adopt improved guidance documentation and self-help options. A technical service catalog will be developed along with the IT service management tooling to help customers learn, find, and request ETS provided services more easily. Each ETS service will need improved descriptions with costs and SLAs.

ETS has a single Service Delivery Specialist II position within TSSB/PIAS. The Service Delivery Specialist should be integrated with the new ETS Service Desk structure. Additional Service Delivery Specialists would be essential to ensure that ETS is meeting service level expectations and customer satisfaction across all its shared services. These positions could work with each of the branches to track and maintain updated metrics/goals, KPIs/OKRs, around ETS' shared services. In addition, the service delivery team could provide trainings, manage the training schedule, and assist with the coordination of trainings across the various ETS teams that are responsible for each ETS shared service. Trainings can also be augmented by strategic vendors and further sourced through enterprise support contracts such as the existing Microsoft Unified Support and Adobe Enterprise Term License Agreement, and made accessible to the state departments.

6.3 Develop and Publish Policies and Standards

Departments are asking for more policies, standards, and guidelines on IT, as they know that the systems they use and look to procure are parts of a bigger whole and need to work together and integrate with other, reliant, or feeding systems, and may also have requirements to be compliant with laws and regulations, national, local and internal to the state.

ETS will be developing and updating IT policies in 2023-2024, to not only address the changes brought up by the consolidation / centralization efforts, but also due to requirements set by the rapidly evolving external factors, including technology. Areas of policy development include:

- Cybersecurity and resiliency
- Data governance and management
- Technology platforms and infrastructure (incl. cloud and networks)
- Artificial intelligence
- Project management
- Procurement management
- Mobile devices
- Accessibility

These policies will be published to state entities internally and some also publicly at ETS' website.

6.4 Identify Services for Potential Retirement

The following services should be considered for modernization and/or further consolidation and standardization of technology infrastructure and platforms chosen:

- Landline Telephone Support – The use of POTS/Centrex systems could be modernized to a cloud-based solution. The recommendation is to adopt VOIP or Microsoft Teams Phone/Calling. Microsoft Teams Phone/Calling will further promote Teams as a unified communication tool for voice, meetings, chat, and collaboration needs. For agencies that require guided implementations, integrators can be sourced to expedite implementation timelines, provide smoother transition, increase success of adoption, and provide subject matter expertise.
- IBM Power Systems – This service provides a hosting environment for virtual servers and is currently maintained to support the current workloads for a few customers. No additional workloads or expansion of this environment is projected. Customers on this infrastructure should plan for migration to the Government Private Cloud or an appropriate public cloud service. The IBM Power System should be retired within the next 5 years.
- Enterprise Server (Mainframe) Services – This environment will ultimately be retired as the current hosted applications modernize.

7 Recommendations on Further Consolidation of IT Services

Several Consolidation Working Group Committees analyzed the current IT services provided across the departments. Figure 2. Provides a high-level summary of the findings and recommendation at this stage.

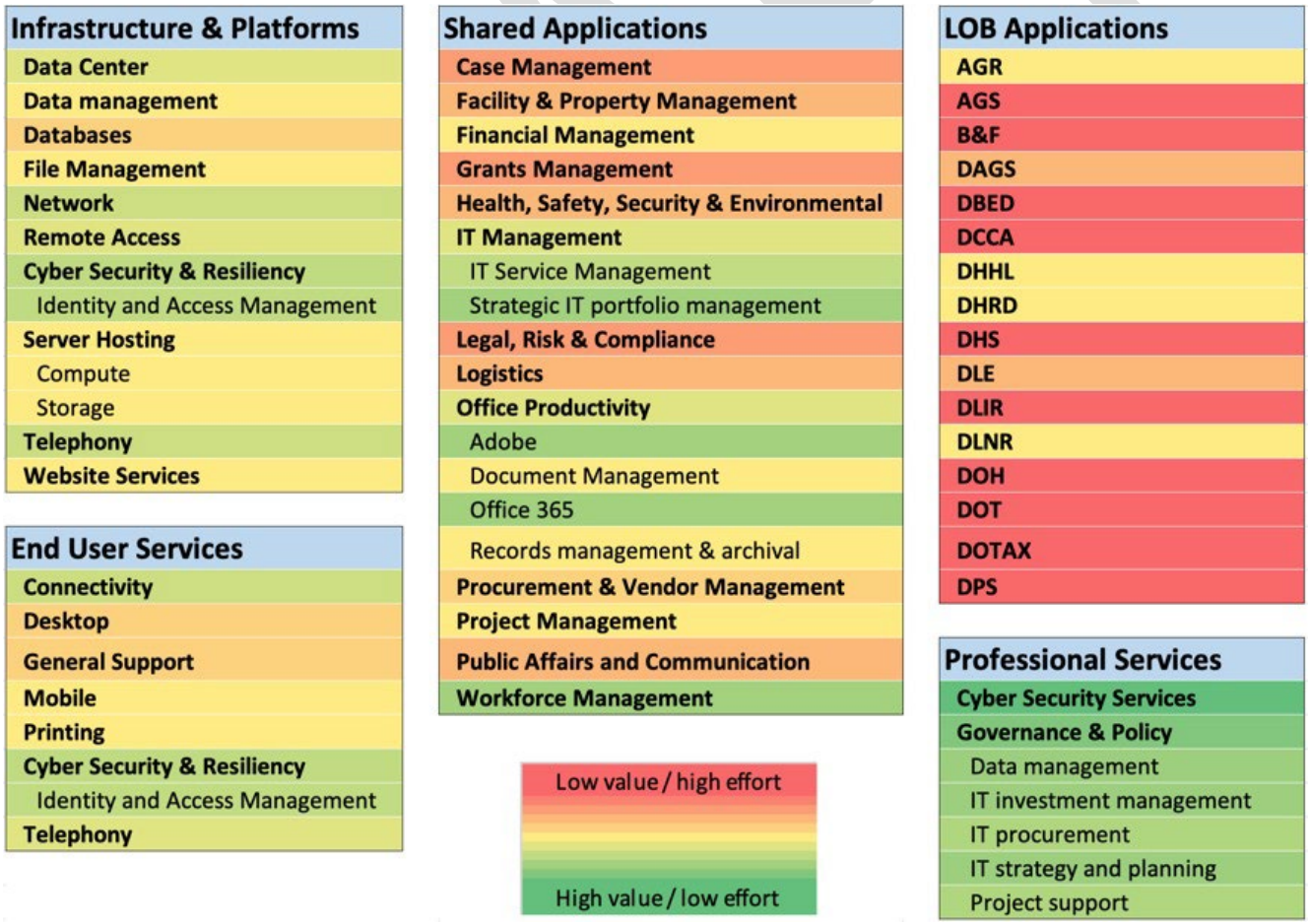


Figure 2. Ease / value analysis of service centralization, per category and sub-category.

Below sections summarize the Committee's recommendations on *extending centralization* of services per service categories.

The priority indicates both the cost reduction and service improvement potential if the service is centralized. The complexity indicates the effort, cost and risks involved in the centralization.

7.1 Infrastructure and Platform Services

These are the foundational IT building blocks common to all departments.

Infrastructure solutions include the core infrastructure — facilities, compute, storage, and network services — that are required to deliver any technology automation. Typically, these are not directly consumed by users.

Platform solutions include the application infrastructure (database, middleware, etc.) that enables business-facing applications and services. Typically, these are not directly consumed by users. They are components required by the end user, business application and shared application services.

These service types rarely vary in relation to the type of business (department), hence they potentially are one of the more simple and high value (reduction of redundancies) types of services to be standardized and provided centrally.

7.1.1 Considerations for further consolidation

ETS should continue to increase service utilization of current shared services as described in the Service Utilization Management Plan committee report. The majority of items are sourced from that report, which includes further detailed information on each service.

Further centralization of these services would require departments to decommission redundant infrastructure and platforms, and leverage standardized systems that ETS provides.

Some parts of the infrastructure and platforms may need to remain fragmented to fulfill regulatory compliance.

It is also important to consider that the creation of cost centers may be a byproduct of consolidation.

There is insufficient governance and control mechanisms available to centralize public cloud offerings. Public cloud consumption models use an OpEx cost model and costs are reflected by usage and consumption. The largest concern is creating cost centers to recoup consumption costs back from the departments. Non-technical teams would need to be developed to support the billing and contract management pieces of these systems. Technical teams versed in modern cloud environments would need to be developed to support the maturity in public clouds, but the State will find difficulty in finding such workers. This area will most likely need to be outsourced in order to provide enterprise level support.

Category	Service	Priority	Complexity	Sourcing method
General Support	Endpoint Remote Access	High	Low	Insource
Cyber Security Services	Active Directory Monitoring	Medium / High	Low	Insource
Network	Network Monitoring/Config Management	Medium / High	Medium	Insource
Cloud (Compute, Data & Storage, OS)	Virtual Desktop Infrastructure (VDI)	Medium	High	Insource and Outsource

Cloud (Compute, Data & Storage, OS)	Backup Solution	Medium	Low	Insource
Cyber Security Services	Syslog/SIEM/Log Analyzer	Medium	Medium	Insource and Outsource
Network	VPN (Site to Site – Internal/External)	Low	High	Insource and Outsource
Website Services	Online Payment Processing Platform	Low	High	Outsource

7.2 Shared Applications

These services are the types of applications which are not intended to support the departments mission execution directly but are comprised of activities that are common across all departments, such as:

- Financial management
- Human resource transactions
- Travel
- Grants management
- Etc.

Some of these may be feasible and valuable to be standardized and provided centrally, however these would be analyzed and planned with the departments per category, starting in 2023 and continuing into 2024 and 2025.

7.2.1 Considerations for further consolidation

Category	Service	Priority	Complexity	Sourcing method
IT Management	IT Asset Management	High	Medium	Insource
Office Productivity	Microsoft 365 E5/G5	High	High	Insource and Outsource
Office Productivity	Teams Phone/Calling	High	Medium / High	Insource and Outsource
IT Management	Help Desk Ticket System	Medium	Medium	Insource
Office Productivity	Content/Document Management System	Low	Low/Medium/ High	Insource and Outsource
Infrastructure & Platforms	Data Management and Analytics	Med/high	Medium / High	Insource and Outsource

7.3 Professional Services

These services consist of the governance, management and consulting types of service provided centrally.

7.3.1 Considerations for further consolidation

Category	Service	Priority	Complexity	Sourcing method
Governance & Policy	Project Management	Medium	Low / medium	
Governance & Policy	Vendor and offer evaluations	Medium	Low	ETS
Governance & Policy	RFP and BAFO (contract) preparation support	Medium	Low	

7.4 End user Services

These services are the common IT services which IT end users require.

7.4.1 Considerations for further consolidation

End user services support that is critical to the daily operations of the business could be centralized but would better meet the needs of the customer if provided under a shared responsibility model. Many ETS systems are configured to allow decentralized management of administrative tasks, so that departments servicing its users can take immediate action without having to route requests back to ETS. Incident management and trouble request are first triaged by department IT staff with escalations to ETS to provide quicker support to the end user.

End user support requests can be categorized as either *service requests* or *incidents*. The Information Technology Infrastructure Library (ITIL) framework defines a service request as 'a formal request from a user for something to be provided.' These typically have a defined Service Level Agreement (SLA) with expected fulfillment times. An incident, on the other hand, is 'an unplanned interruption to an IT service or reduction in the quality of an IT service.' Incidents typically require immediate responses and quick fixes to restore the service to a working state, and ultimately back to full capacity.

End user support type services may see lower resolution times when consolidated, as requests will bottleneck through the centralized agency and through a centralized ticketing system. Customer urgency and request criticality of issues may not be as imminent without dedicated staff who understand the agency people, culture, and business.

Training end users on how to use shared services provided by ETS has currently followed the "train-the-trainer" model. To provide sufficient training statewide, ETS should continue to use a shared sourcing method to deliver training services. Development of a dedicated service delivery team could be insourced and increase the number and quality of training opportunities provided to end users. ETS can further outsource to strategic vendors to deliver additional trainings and enablement opportunities in alignment with the State organization's vision, standards, and regulations. Continued use of the train-the-trainer model will assist with reaching a larger statewide audience and promote smaller training group sizes that can allow for more attendee participation as opposed to larger statewide trainings provided by ETS.

It is important to note that consolidation of end user support services for specific systems would become much more feasible if standardization across the IT system, platform, and/or infrastructure occur first.

Category	Service	Priority	Complexity	Sourcing method
Security & Resiliency	Employee Accounts Support	High	Low / medium	Insource
Enterprise Application Support	Adobe Software Support	Low	Low / medium	Insource
Enterprise Application Support	Microsoft Office 365 Support	Low	Low / medium	Insource
Enterprise Application Support	HIP (PeopleSoft) Support	Low	Low / medium	Insource

7.5 Line of Business (LOB) Applications

These IT Investments directly support the delivery of a department's mission and are typically highly customized towards those uses, and require specialized support – people, processes, and technology. ETS already provides

applications management support from some LOB applications, and some more can be added, but these will be analyzed and planned on a case by case bases.

SECTION 8 – FINANCIAL MODEL

1 Financial Model Committee Overview

1.1 Mandate and Goals

According to the Act 179 2022, and as stated in the Act 179 IT Consolidation 2022 Preliminary Status Report for the State of Hawai'i Legislature, the mandate and goals of the Financial Model Committee are to:

- Analyze current state funding approaches for IT expenditures.
- Determine if there are effective and whether they support a shared services model.
- Study possible funding models and determine the pros/cons of each option and make a recommendation for the best model/method available.
- Ensure sustainability of ETS' budget to deliver on shared services.

1.2 Members and Activities

The Financial Model Committee started its work on April 6, 2023. The committee members and participants consisted of IT professionals and an Administrative Services Officer.

Member	Department	State Role
Tracy Ban	Budget and Finance	Administrative Services Officer
Amy Saito	Transportation	IT Professional
Robert Hiltner	Commerce and Consumer Affairs	IT Professional
Robert Sequeira	Transportation	IT Professional
Phan Sirivattha	Human Services	IT Professional
Garret Murayama	Attorney General	IT Professional
Lena Wang	Transportation	IT Professional
Antonio Querubin	Department of Defense	IT Professional

The work consisted of three main components, conducted in the following order:

- Analysis of current ETS funding approaches;
- Analysis of possible funding models with pros/cons of each option; and
- Recommendations for a future model.

2 Analysis of Current ETS Funding Approaches

Currently, ETS is funded via four means of financing as follows:

Means of Financing	Description
General Funds	Appropriated by the legislature through annual budget request process.
CIP Funds	Appropriated by the legislature through annual budget request process.
Interdepartmental Funds	Service chargeback to recover costs through service rates prepared by MAXIMUS Consulting Services, Inc. from federal sources of allowable costs for mainframe services. Currently from DLIR, AG, DBEDT, and DOH.
Special Funds	ETS collects 3% of central services fees

3 Analysis of Possible Funding Models

The committee reviewed various available means of financing and noted the pros/cons of each as follows:

Method	Pros	Cons
Legislative Request / Form A Budget Request	• Funds are in ETS' base budget • Less paperwork, billing • Works for economies of scale	• Leg may reduce department budgets • Timeframe to make changes is inflexible • Unclear how it would work for special funds versus G-funds
Maximus	• Rates are generated by a consultant	• Limited to only federal funds sources
Charge Backs/Direct Billing	• Services are "a la carte" • Opportunities for discounts • Works for economies of scale • Less waste • More accountability	• Lots of paperwork and billing administration • Delayed/non-payments occur
Enterprise Contracts (procurement focus)	• Execute projects quickly • No procurement issues	• Possible waste/no accountability
Negotiate Contract Vehicle (procurement focus)	•	•

4 Recommendations for a Future Model

The Financial Model Committee, based on the general direction the consolidation plan is taking, the committee felt the existing financial model would continue. The committee did mention several financial constraints, such as federal grant limitations or changes in statute that may be required, if more extensive consolidations were recommended.

SECTION 9 – IT NETWORK AND COMMUNICATIONS PLAN

1 IT Network and Communications Plan Committee

1.1 Mandate and Goals

According to the Act 179, SLH 2022, and as stated in the Act 179 IT Consolidation 2022 Preliminary Status Report for the State of Hawai'i Legislature, the preliminary goals of the IT Network and Communications Committee were to:

- Assess the State's current network utilization and network infrastructure assets (voice, video support, telecommunications, etc.)
- Identify current pain points and cost inefficiencies and recommend steps to address those.
- Identify any opportunities for third party management.
- Recommend a strategic plan for the optimization of network infrastructure.

The committee agreed to also include IT Security since no other committee was covering matters related to this topic.

1.2 Members and Activities

The IT Network and Communications Plan Committee started its work on January 17, 2023, and concluded meeting on February 17, 2023. The committee convened weekly/bi-weekly. The committee members reviewed the initial goals and over the next few weeks discussions on the scope of the deliverables transpired. Members included:

Committee Member	Department
Darren Cantrill	Department of Transportation - Administration
Jeffrey Ferrer	Department of Human Services
Vincent Hoang	Enterprise Technology Services
Garret Murayama	Department of Attorney General
Sheila Oliveira	Enterprise Technology Services
Antonio Querubin	Department of Defense
Steve Sakamoto	Department of Health
Derek Sodetani	Department of Accounting and General Services

2 Executive Summary

The IT Network and Communications Committee recommends that a phased approach is used to:

(1) Determine what should be consolidated with regards to telecommunications, network, and security;

(2) Identify what are the requirements, risks, and parameters to consider when evaluating that specific area or scope to consolidate; and

(3) Determine based on the factors above what can ultimately be consolidated and to what degree.

As part of the phase-in schedule provided for in the Act, the first year will include all shared services designated as "Low" complexity in the matrix below under 4.2 "Recommendations for Existing Shared Services".

All other services in the 4.2 matrix with a complexity rating other than "Low" will be evaluated in the subsequent years to determine what will be managed by ETS, what will be managed by the departments, and which will be hybrid responsibilities based on factors such as resources, cost, risk, capability, cost savings, and feasibility.

- NETWORK
  - ETS plans to continue providing Wide Area Network (WAN) to internet support to the departments.
  - Future goal: To extend WAN support for department remote offices, create reasonable network

service level agreements based on 3rd party support which will be reimbursed by departments.
  - Evaluate for future service deliver (1) “remote hands” – service from colocation providers or outsourced professional services (2) 24x7 network monitoring.

- COMPLIANCE
  - ETS will continue to provide statewide minimum network and security requirements.
  - Future goal: Ramp up compliance requirements based on organization’s maturity.
  - Department with federal requirements have the compliance highest standards and those specific departments will continue to align with those standards and not drive other departments to meet the same standards.

- SECURITY
  - ETS plans to uphold providing enterprise services as they do currently.
  - ETS will continue to provide statewide minimum security requirements.
  - Future goal: Assess how ETS security can expand 24x7 monitoring utilizing 3rd party professional services along with State workers for awareness and layered support.

3 Scope of Work

The IT Network and Communications Committee members and participants work consisted of the following primary elements:

- IT Security - reviewed current state services and processes.
- Network and Telecommunications - reviewed current state services and processes.
- Discuss areas of improvement related to Security and Network/Telecommunications.
- Identify standards, processes, and policies to include on roadmap for improvement initiatives within the Security and Network branches.

4 Assessment of the State’s Current Network Utilization and Assets, and Recommended Strategic Plan for Optimization

4.1 Analysis Methods and Scope

Committee recommendations are found in section 3.2.

Recommendations primarily stem from discussion related to current pain points and other benefits that may be realized such as potential cost savings, streamlining efforts, reducing workload, and was focused on core IT offerings given the foundational roles and benefits they typically provide with consolidation efforts. Benefits included singular identities, increased stability, and implemented standards, more integration capability between applications/services, all of which could allow for further increases and successes in consolidation efforts. Other common benefits sought after were potential cost savings/economies of scale, reduction of duplicative systems, and recommendations towards more modern offerings.

4.2 Recommendations for Existing Shared Services

Committee recommendations at a glance:

Existing ETS Shared Service	Priority	Complexity
IT Security – Policies and Procedures	Hight	Low/Medium
IT Security Monitoring	High	Low
IT Security Incident Response	High	Low
IT Security Compliance	High	Low
IT Security – Mobile Devices	High	Medium/High
Network - Internet	Medium/High	Medium
Network - Firewalls	Medium/High	Medium/High
Network – Virtual Private Network (VPN)	Medium/High	Medium/High
Network - Bandwidth Utilization	Low/Medium	Low/Medium
Network - Policies and Procedures	Low/Medium	Low/Medium
Network – Core Services	Medium	High
Network – Service Levels	Medium/High	High
Additional Areas of Enhancement – Service Requests and Escalation Procedures	Medium	Medium
Communication Equipment (e.g. business telephones, voice/video conferencing, satellite phone, etc.)	Medium/High	Low

Priorities are ranked low, medium, high based on how important the resulting realization of benefits would be to the State of Hawai'i. Complexities are ranked low, medium, high based on the difficulty level it would be to reach the future, recommended state.

IT Security Monitoring

CURRENT STATE:

1. ETS Cyber Security provides security monitoring over the internet as an enterprise service for departments interconnected by ETS over the NGN.
    a. Gray area – remote access VPNs and site-to- VPNs. Some managed by ETS and some managed by departments.
2. ETS utilizes enterprise security products for monitoring, managing, mitigating, and resolving any security issues.

RECOMMENDATIONS:

1. ETS Cyber Security will continue to provide security monitoring over the internet as an enterprise service for departments interconnected by ETS over the NGN.
    a. Gray area – remote access VPNs and site-to- VPNs. Some managed by ETS and some managed by departments.
2. ETS will continue to use enterprise security tools and offer these as a shared service.

PRIORITY: Low

COMPLEXITY: Low

IT Security Incident Response

CURRENT STATE:

1. ETS Cyber Security provides a majority of the support for IT security incident response for network infrastructure and transport.

RECOMMENDATIONS:

1. ETS Cyber Security will remain the primary group to manage IT security incident response.

PRIORITY: Low

COMPLEXITY: Low

IT Security Compliance

CURRENT STATE:

1. Department agencies (System Owners) are responsible for managing and maintaining specific compliance requirements for both statewide policies and procedures. In addition, the System Owners are responsible for any policies and procedures unique to their unit such as various federal laws and regulations applicable to the agency as a whole.

RECOMMENDATIONS:

1. ETS will continue to provide and update statewide security policies and procedures.
2. Department agencies (System Owners) will continue to be responsible for managing and maintaining specific compliance requirements for statewide policies and procedures and any compliance requirements applicable to their department/agency. There may be some System Owner-to-ETS overlap especially with regards to any shared services or commercial data centers.
3. Departments/agencies that are not required to fulfill additional security requirements other than those in a statewide released policy and/or procedure will follow department/agency specific policies if mandated by federal requirements.

PRIORITY: Low

COMPLEXITY: Low

IT Security – Policies and Procedures

CURRENT STATE:

1. ETS provides guidelines, policies, and procedures for Information Technology (IT) Security aligned with State laws and best practices.

RECOMMENDATIONS:

1. ETS will continue providing standardized guidelines, policies and procedures related to IT Security.
2. Update ETS Policy No. 508.01: Secure Device Standards.
3. ETS will provide updated IT Security standardized recommendations, policies and procedures and post online (public view) as well as having a shared repository (private access) for current and historical guidelines.
4. ETS security framework will continue to align with the best practices and guidelines from the National Institute of Standards and Technology (NIST) and Cybersecurity and Infrastructure Security Agency (CISA).

PRIORITY: Low/Medium

COMPLEXITY: Low/Medium

IT Security – Mobile Devices

CURRENT STATE:

1. ETS has a specific policy (Policy No. 508.01: Secure Device Standards) published to address the recommendations and requirements for mobile devices.
2. Mobile Application Management (MAM) is standardized and mandatory.

RECOMMENDATIONS:

1. Policy No. 508.01: Secure Device Standards to be updated.
2. Mobile Device Management (MDM) continues to be standardized and mandatory.
3. Define Mobile Information Management (MIM) standards.

PRIORITY: High

COMPLEXITY: Medium/High

Network – Internet

CURRENT STATE:

1. ETS Network Management Section (NMS) manages the Next Generation Network (NGN) which is the State of Hawaii's network that securely interconnects state agencies to the internet.
2. Some departments obtain internet from an Internet Service Provider (ISP). Primary reason is because the site is remote and NGN is not available at the desired location.

RECOMMENDATIONS:

1. ETS will continue to manage the NGN.
2. ETS will expand shared services to manage the equipment in the field (remote sites) and explore a third-party contract to fulfill services.
3. See "Streamlining Efforts" section for additional recommendations.

PRIORITY: Medium

COMPLEXITY: Medium

Network – Firewalls

CURRENT STATE:

1. Hybrid method where ETS manages firewall rules for NGN and some departments manage their own firewall rules. For some departments it is their preference to manage their own VPNs. Those managed by ETS is mainly based on resources of both the departments and of ETS.
2. Many varying firewall appliances deployed and utilized by departments.

RECOMMENDATIONS:

1. Decide best path forward regarding firewall management, contingent upon funds of the department to potentially replace some equipment.
2. Reduce number of varying appliances.
3. Departments that have stringent compliance requirements and have the personnel should continue to manage their own firewalls. Smaller departments with staff constraints, ETS to continue to support.

PRIORITY: Medium/High

COMPLEXITY: Medium/High

1. Depends on departments capacity and ability to provide this inventory.
2. Gathering necessary data would allow ETS to start planning for this effort.

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Network – Virtual Private Network (VPN)

CURRENT STATE:

1. Hybrid method where ETS manages some department VPNs while several other departments manage their own. For some departments, it is their preference to manage their own VPNs. Those managed by ETS is mainly based on resources of both the departments and of ETS.
2. Too many varying VPN appliances deployed and utilized by departments.

RECOMMENDATIONS:

1. Decide best path forward regarding firewall management.
2. Reduce number of varying appliances and make remote access VPN and site-to-site VPN connections easier and more scalable for ETS to offer as a core enterprise service.
3. Documentation on standardization (i.e., equipment, process, provisioning, etc.) to help with budgeting and procuring.
4. Some members suggested a "network-as-a-Service" approach, but with current constraints such as qualified personnel shortage, funding, etc., this may not be achievable in the short-term future.

PRIORITY: Medium/High

COMPLEXITY: Medium/High

1. Depends on departments capacity and ability to provide this inventory.
2. Gathering necessary data would allow ETS to start planning for this effort.
3. Contingent upon funds of the department to potentially replace some equipment.
4. Need careful and proper planning to cutover to new solution(s) in a phased approach.
5. Infrastructure change would likely require routing changes.

Network -- Bandwidth Utilization

CURRENT STATE:

1. ETS Managed Internet:
    a. ETS managed internet bandwidth (egress points) at two locations is constantly being monitored. Annually prior to contract renewals for these circuits, the utilization is assessed to ensure circuits are of the optimal bandwidth size.
    b. The daily monitoring and services utilized allows flexibility for some critical circuits where ETS can add capacity on specific circuits in real time if there is an immediate need to do so.

RECOMMENDATIONS:

1. ETS currently does not foresee changing the bandwidth utilization monitoring for internet as it facilitates the utilization planning and forecasting.
2. Identify which resources/sites are mission critical.
3. Implement resilience via power supply and connectivity, so that critical sites can maintain continuity and performance.

PRIORITY: Low/Medium

COMPLEXITY: Low/Medium

Network – Policies and Procedures

CURRENT STATE:

1. ETS provides standardized guidelines related network requirements, but generally for Institutional Network (INET) connections.

RECOMMENDATIONS:

1. ETS will continue providing standardized guidelines, policies and procedures related to Network, but revise the guidelines.
2. Make guidelines easy to access, simple to find and documents are kept updated for relevant information.

PRIORITY: Low/Medium

COMPLEXITY: Low/Medium

Network – Service Levels

CURRENT STATE:

1. After hours/weekends no ETS personnel are officially staffed.
2. No formalized service level commitment. Therefore, there is a misunderstanding from various departments/leadership on escalation procedure. Presently based on professional courtesy/best effort.

RECOMMENDATIONS:

1. Define and document network service levels.
2. Improve network resiliency.

PRIORITY: High

COMPLEXITY: High

Ideal State:

1. Create, document, and publish agreed upon service level agreements based on priority levels.
    a. From priority levels and maturity model, expand service level support in a phased approach.
    b. Strive to have primary support come from State personnel with secondary support from 3rd party vendors.
    c. 3rd party support funded through one source (ETS) to reduce multiple procurement efforts.
    d. If a site is deemed critical, do analysis and provide options:
        i. Possibly augmenting with a commercial circuit for additional support and monitoring.
        ii. Improve resiliency (INET ring vs. spur)

Network – Core Services

CURRENT STATE:

1. ETS Network Branch manages the following:
    a. Wireless access for state owned and managed devices.
    b. Guest wireless network access.
    c. Remote access virtual private network (VPN)
    d. State Next Generation Network (NGN) – Statewide network that runs over INET, state owned dark fiber, carrier circuits, etc. Network securely interconnects state agencies to the internet.

RECOMMENDATIONS:

1. Work towards expanding network core services

PRIORITY: Medium

COMPLEXITY: High

Additional Areas of Enhancement – Service Requests and Escalation Procedures

CURRENT STATE:

1. Varying service request intake flows for each department (Assistance Center, ETS Network Management Services, ETS Service Desk, contact individuals directly, etc.)

RECOMMENDATIONS:

1. ETS will remodel service request process and escalation procedures.

PRIORITY: Medium

COMPLEXITY: Medium

STREAMLINING EFFORTS

- ISSUE: Expand core services to allow department personnel to focus on their line of business(es).

- RESOLUTION TARGET: "Network-as-a-Service" approach (equipment funded, purchased, programmed/prepped, etc.) and end-users would simply plug in the equipment.
  - Small sites more possible, but not larger
  - Only achievable with additional funds and resources (both network and procurement/administration).
  - Would require method to identify what sites qualify and which do not.

Communication Equipment (e.g. business telephones, voice/video conferencing, satellite phone, etc.)

CURRENT STATE:

1. Numerous varying equipment, infrastructure, and providers. Technology is ever evolving and assessing departments current business needs can potentially see cost savings by employing.

RECOMMENDATIONS:

1. Voice/Video - Departments assess their current voice/video conferencing needs and usage to determine if Microsoft Teams is the solution they can migrate to.
2. Voice/Video - Normalize use of Microsoft Teams calling (recommend and not mandate).

PRIORITY: Medium/High

COMPLEXITY: Low

4.3 Risks, Potential Issues, Disclaimers

The committee noted the following:

1. All recommendations would be subject to SMEs reviewing potential workload/usage increases and identify necessary hardware/software/licenses to accommodate accordingly.

2. All recommendations would be subject to sufficient funding and staffing to support expanded usage and/or new offerings.

3. All recommendations were provided via high-level data captures from departments, hence further review may be needed to confirm existing functional requirements are met when migrating to an existing or potentially new shared service.

4. Some departments have higher compliance requirements (ex: IRS 1075, CJIS, HIPAA, etc.) which would be required to be in place for their adoption.

5. Some departments may have functional requirements that these existing or potentially new shared services might not meet. If that's the case, departments may have to resort to other solutions meeting or exceeding recommendation standards and be vetted by ETS ITG for approval before procurement.

5 Recommendations to Address Current Pain Points/Cost Inefficiencies

1. ETS Policy No. 508.01: Secure Device Standards must be updated.
2. ETS will provide updated IT Security standardized recommendations, policies and procedures and post online (public view) as well as having a shared repository (private access) for current and historical guidelines.
3. Mobile Device Management (MDM):
    a. Assess the possibility of ETS funding the solution/tenant and departments managing it themselves.
    b. Develop a policy from ETS with enforcement at department level.
    c. Issuance and inventorying of devices at department/division level. Each department/division responsible for ensuring issued device is registered in the ETS mandated MDM solution.
    d. Further discuss and evaluate potential for a common platform/technology from a central authority/group to manage and set-up.
4. Release survey to departments to evaluate:
    a. Which departments have firewalls that they manage on their own.
    b. If they would prefer (1) to have ETS manage their firewalls or (2) if they prefer to continue managing their own firewalls.
5. Gather inventory from all departments related to firewall appliances and include product specific elements including establishing interoperable protocol standards and reference implementations. With data collect start phased approach to working with departments to replace these appliances and discuss funding the replacement effort. Based on survey determine if additional resources are required. ETS to strategize on additional ways to make it simpler and more scalable for ETS to offer site-to-site VPNs and not just remoted access VPNs. Create document on standardization (equipment, process, provisioning, etc.) to help with budgeting and procuring.
6. ETS will obtain bandwidth utilization report for ETS managed internet egress points at two locations.
    a. Inventory – critical locations
    b. Measure and ensure site is in ETS network monitoring and management tool
    c. Summary of reports
7. Expand network guidelines to include:
    a. Equipment to purchase to keep network equipment consistent.
    b. Standard should include equipment to purchase, processes, provisioning, etc. Provide several options for equipment for those with funding concerns.
    c. Providing several options based on technical, business and funding requirements and constraints.
    d. ETS will provide updated Network standardized recommendations, policies and procedures and store in a shared repository (private access) for current and historical guidelines.
8. Priority levels are necessary to define network service levels. Therefore, collect priority levels from remaining department/agencies for each of their sites (already done with members of this committee).
    a. Build out maturity model.
    b. Primary support from 3rd party vendors, secondary support from State personnel.
    c. 3rd party support funded by each department.
    d. For site deemed critical, build out redundancy where feasible.
9. Create a matrix of current network services provided by ETS Network Branch. (This is being done currently as part of the IT Consolidation effort within the Shared Service Committee.)
    a. What additional network service could be offered by ETS Network Branch.
    b. RACI matrix for both current core services and future service offerings. Include which are required to be managed by ETS and which are hybrid.
10. ETS will implement a consolidated and simplified service request intake mechanism (email, direct phone number or web interface). Identify gaps and phase approach to resolve.
11. ETS already has a “Teams Calling Overview” document, which should be updated and redistributed. ETS to create a question-and-answer format that can be used by departments to see high-level if Teams calling is the suitable solution for them to utilize. Example: some departments that have specific compliance requirements where VoIP is audited. Create a

standard (reference building) so departments/agencies who may need other communication equipment (if not Microsoft Teams) have a guide of narrowed down options they can build from.

6 Opportunities for Third Party Management

Departments are currently responsible for the management of the network within the building that they occupy. As an expansion of shared services, ETS would assume centralized responsibility for the network architecture end-to-end, and manage network issues and incidences via a third-party contract.

To that end, Memorandums of Agreement between ETS and departments need to be codified to:

1. Ensure ETS has access to take local networks down in order to address a neighbor-building incident/issue;
2. Define service level requirements for up-time and after-hours support; and
3. Define costs to fund higher service levels.

Document Control

Date	Version	Status	Author/Organization	Change Description
7/1/2023	Facilities Strategy and Management Plan - Report_070123_r8	Draft	Jim Miwa / ETS	Initial draft for committee review/comment
7/10/2023	Facilities Strategy and Management Plan - Report_071023_r9	Draft		Accepted Darren Cantrill's comments
7/17/2023	Facilities Strategy and Management Plan - Report_071023_r10	Draft		Added "State of Hawaii – Confidential" in header section
7/28/2023	Facilities Strategy and Management Plan - Report_072823_r11	Draft		Updated section 7.1.3 – added references 7Rs and TIME model in the scope, and modified verbiage for viable option 1
11/7/2023	Facilities Strategy and Management Plan - Report_110723_r13	Final		Incorporated content from Kyndryl's Application Disposition Study

FACILITIES STRATEGY AND MANAGEMENT PLAN

Table of Contents

1 Executive Summary

Pursuant to Act 179 IT Consolidation 2022 Preliminary Status Report for the State of Hawai'i Legislature, the **Facilities Strategy and Management Plan Committee** was created to deliver on the stated mandate and goals.

The **scope** of this committee is to:

- Assess the State's current footprint for people and physical assets, including data center utilization, and any future plans for cloud utilization and third-party Infrastructure-as-a-Service (IaaS).
- Recommend a strategic plan for the optimization of office space and data centers.
- Identify current pain points and cost inefficiencies and recommend steps to address those.

The following **studies** were commissioned by ETS in partnership with Kyndryl to deliver on the stated scope:

- **Data Center Inventory Study** (completed – May 2023)
- **Application Disposition Study** (completed – October 2023)

The **Data Center Inventory Study** targeted 25 physical locations comprising of 34 Agency "IT spaces", including Kalanimoku, that resulted in the following observations:

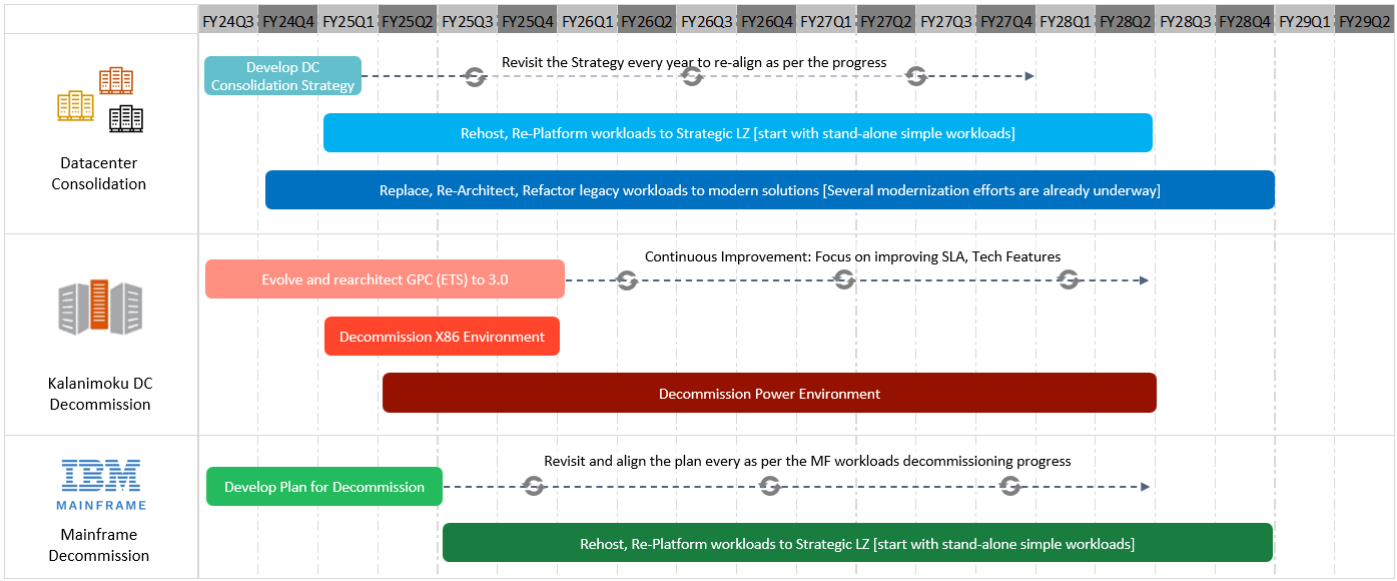
- Identified were 469 physical devices targeted for decommissioning with an additional 26 devices identified as past EOL but not currently slotted for decommissioning.
- Data Center Consolidation estimates include reductions in overall space of 9,800sf and power of 38KW, resulting in annual power and cooling savings of $180K and $150K, respectively.
- With continued rationalization and modernization efforts to move perhaps even more application workload to various cloud service providers, it's quite possible that the data center consolidation estimates would result in further reduction in required space and power, thus realizing increased savings over time.
- ETS is targeting complete decommissioning of the Kalanimoku Data Center by 2026. Remaining computer systems, communication networks, and high-volume printing services are in the process of migrating out to transform the data center floor space into general office space, hotel office space, conference room, and cyber security room.

The **Application Disposition Study** targeted 666 applications that resulted in the following observations:

- **Cloud Adoption:** More than 45% of the State-wide application workloads reside on Cloud – Percentage of workloads on:
  - Public Cloud – 21%
  - Government Cloud – 0.3%
  - Private Cloud (Co-Locations) – 12%
  - ETS Government Private Cloud (GPC) – 13%
- **Modernization Efforts for Legacy Systems:** 66 mission critical systems reside on mainframe (57) and power (9).
  - For ~55% of the applications, either modernization/replacement is in progress or planning is underway to finalize the future solution and/or vendor.
- **Inventory of Application and Infrastructure:** ETS' LeanIX tool manages and maintains application portfolios. However, not all applications are listed here. Apart from applications, the repository also contains several IT cost items which are not necessarily applications.
  - LeanIX is missing robust CMDB capabilities (e.g., OS, DB and Application technical details)
  - Infrastructure to Application dependency mapping not readily available. Of the 3625 devices, 234 devices match an application in LeanIX, and 252 devices do not match an application in LeanIX
  - Impacts the detailed plan and effort of modernization program and decommission effort
- **Business Criticality of Applications**: Over 2/3rd of the applications are tagged as 'mission critical' or 'business critical'.
- **Retired/Abandoned:** ~11% of the applications retired or abandoned but have not been decommissioned and use valuable Infrastructure.
- **SaaS Applications:** 32% of active applications utilize SaaS solutions
  - 1/3rd managed by Tyler Technologies and hosted from AWS

- **Shared Services Infrastructure (ETS GPC):** Only 13% of the workloads utilize internal state-owned shared services infrastructure
    - Of the larger departments (in terms of application counts) HMS, HTH and TRN should explore ways and opportunities to move more On-premises or CoLo workloads to ETS GPC
    - Existing hardware nearing end of lifecycle (less than 12 months) and located completely on Oahu
    - Support staff located locally (e.g., no out of region support, typical recommendation resources distributed 100+ miles in event of disaster)
- **Additional infrastructure cost savings**: Possible with consolidated shared infrastructure services, hyperconverged infrastructure and removal of physical equipment targeted for decommission
- **EOL OS**: 54 servers running EOL OS
    - Applications are from HTH, TAX, DEF, AGR

The Five-Year Roadmap for Application and Infrastructure Consolidation:



Recommended Next Steps:

1. **Application Portfolio Rationalization – Identify Applications & Infrastructure ➔ Completed – October 2023.**
    a. Full Application Portfolio Discovery & Analysis (R-Factor analysis).
    b. Determine Readiness for Cloud or retirement to plan the MF/DC Exit.
2. **Establish an Enterprise Governance Strategy & Structure**
    a. Create Strategic Steering Committee and link to program strategic vision to ensure goals are met (ensure all key stakeholders are represented).
    b. Program management office to orchestrate multi-stream migration and modernization efforts.
3. **Start PoC and Break Application Migration Execution into Manageable 'Chunks' (e.g., Wave Plans)**
    a. Execute a PoC for 3-5 agencies; establish blueprint for remaining agencies.
    b. Next level deep dive on application affinity and wave planning across Mainframe, Power and each agency.
4. **Define the Cloud Operating Model of the Day 2 Services and Supporting Workforce**
    a. Cloud Support organization, methods, tools and overall AMS & Infra Approach.
    b. Upskilling current state workforce (Infrastructure, NW and Application).
    c. Automated Platforms, application on-boarding patterns & developer experience.
5. **Define Application Landing Zone / Re-architecting the GPC from 2.0 to 3.0**

a. Leverage 3rd party Hyperscalers for economies of scale to reduce hardware costs and real estate requirements.
b. Address communication channels between HI and CONUS in NGN new strategic design utilizing direct connect or satellite options to support geographically dispersed GPC 3.0 model.
c. Limit the scope of GPC 3.0 to latency dependent or legal requirements to host on island.
d. Allow an opportunity for State staffing resources upskilled to support automation, compliance, disaster recovery and SLA support for critical workloads while removing the requirement to administrate low level tasks like facilities, hardware and operating systems.

6. **Finalize Next Generation NW Strategy and Build Execution Plan**
    a. NGN Assessment, Strategy & Roadmap.

2 Members

The Facilities Strategy and Management Plan committee began meeting in January 2023 and is expecting to conclude its work in October 2023. The committee meets every Wednesday via Microsoft Teams.

The committee members are:

- Al Bonilla, ETS Facilitator (primary)
- Jim Miwa, ETS Facilitator (backup)
- Sonny Kekipi, ETS Timekeeper/Note Taker
- Gerald Ouchi, ETS
- Mario Rigor, ETS
- Darren Cantrill, DOT-Admin CSS
- Amy Saito, DOT-Airports
- David Keane, DHRD
- James Castro, DHS
- Lena Wang, DOT-Harbors
- Brandon Kim, DLIR
- Ryan Buillard, DLIR
- Garrett Murayama, AG-CSEA (added June 2023)
- Derek Miyasato, AG-CSEA (added June 2023)

3 Assumptions

Operating under the following premise, drivers, and working assumptions:

1. State of Hawaii Cloud First Policy
2. All computing/storage infrastructure and dependent application workload at the Kalanimoku Data Center to be retired or modernized/migrated to the Public Cloud, Government Cloud, and/or Private Cloud, as illustrated in Figure 14.
    a. B30 Main Data Center Floor
        i. PSD (x86 cabinet – planning to relocate to Keoni Ana and decom some servers)
        ii. ATG -JJIS (x86 cabinet – migrating to the GPC)
        iii. DLIR (Network cabinet)
        iv. DAGS – State Archives (x86 cabinet)
        v. ETS Cybersecurity (x86 cabinet)
        vi. ETS GPC Connector (x86 cabinet)
        vii. ETS IBM Power (DCCA, ATG -HCJDC and DAGS – State Archives)

   b. Assistance Center
      i. DOE (Decommission in progress)
      ii. ERS (Backup system only)
   c. NCIC Room
      i. ATG-HCJDC ABIS (planning to relocate to local colocation hosting data center)

3. Upon completion of the Application Disposition Study, all Departments and Agencies are expected to support and work in accordance with the statewide data center consolidation strategy. As with the Kalanimoku Data Center, the assumption is that Department/Agency computing/storage infrastructure and dependent application workload will be retired or modernized/migrated to the Public Cloud, Government Cloud, and/or Private Cloud, as illustrated in Figure 14.
4. The statewide data center consolidation strategy should include the following IT Modernization success factors:
   a. Service Delivery
      i. Quality
      ii. Resiliency and Performance
      iii. Reliability (DR/COOP)
      iv. Scalability
   b. Security & Compliance
      i. Audit
      ii. Regulatory
   c. Cost-Effectiveness
   d. Human Capital
      i. Investments in Training and Upskilling
   e. Governance
      i. Continuous Monitoring, Management, and Optimization

4 Process

The process by which the committee is operating under is to factor in their own experience and subject matter expertise within and beyond their respective Department/Agency, while leveraging the following to achieve the stated scope:

- Kyndryl (https://www.kyndryl.com/ca/en) consulting services to assess and make recommendations as it pertains to:
  - Kalanimoku Data Center Renovation – redesign and improvement of existing footprint into office space (general and hotel), conference room, security/network operations center, staff and distribution areas, and UPS refresh.
  - Data Center Consolidation – inventory of 25 locations and 34 agency IT computing spaces to determine the amount of space that would be required to consolidate the State into a single data center.
  - Application Disposition – analysis and recommendations that include end-state application disposition, application and IT infrastructure consolidation and target sate migration five-year roadmap, steady sate hybrid (cloud /on-premises) resource role recommendations.
- ETS' deployment of LeanIX to be used as baseline information on the applications currently captured in this tool.
- Other committee reports, specifically the IT Network and Communication Plan and Service Utilization Management Plan where there might be logical intersection and convergence points.
- Independent Technology Research (e.g., Gartner, Forrester, IDC, InfoTech, etc.) – ETS has an active InfoTech account.
- Consolidation efforts and various shared services models utilized by sister states (Minnesota, North Carolina, Maryland, and Louisiana).
- CIO's affiliation with the National Association of State CIO's (NASCIO).

5 Findings, Results, and Recommendations

5.1 Application Portfolio/Infrastructure Findings

5.1.1 Data Discovery and Assessment Methodology

Kyndryl employed a three-phase methodology to develop the application dispositions. This approach leverages Kyndryl's experience, knowledge of State's existing environments, and "best practices" for data collection and analysis. Using Kyndryl's methodology and with available inputs, Kyndryl's experience and capabilities enabled us to provide an enterprise disposition view of the State's application portfolio and supporting IT infrastructure. The Kyndryl team of experienced resources in partnership with SoH deployed a well-defined, consistent methodology. The key features of each phase are provided below:

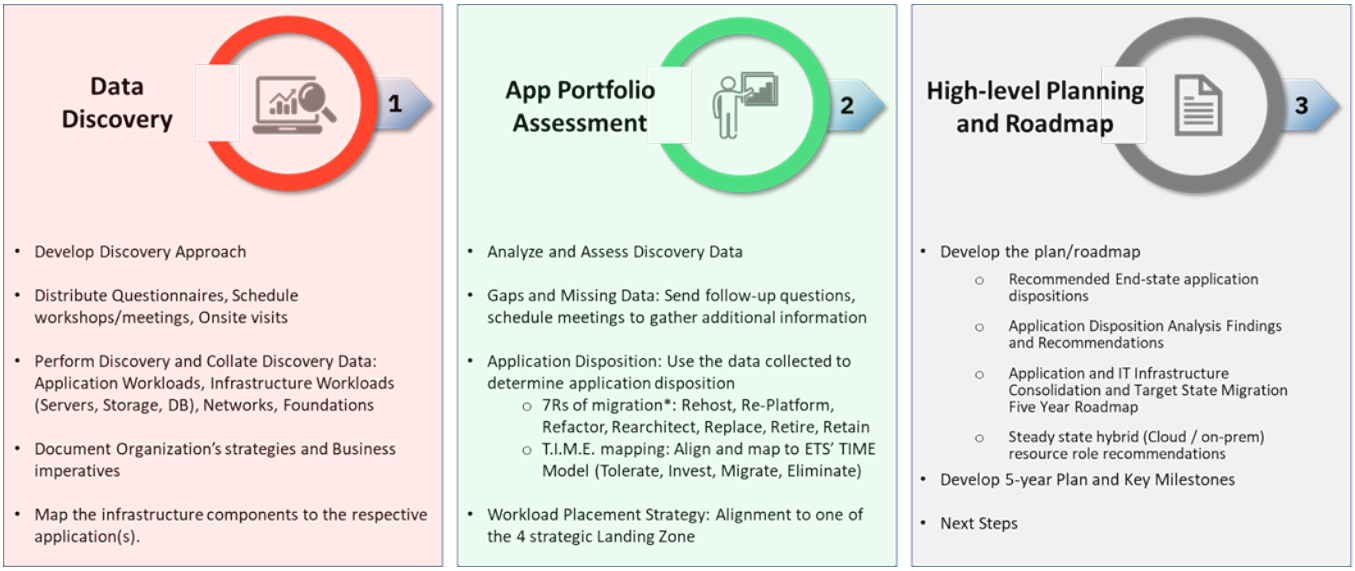


Figure 1: Discovery, Assessment & High-Level Planning

Data Discovery:

- Only manual methods were employed, and no data discovery tools were used
- LeanIX extract (taken on 6th July 2023) was the starting point of the data collection exercise
- Questionnaires pre-populated with LeanIX extract were used to gather key attributes
- The survey questionnaire was circulated to all Dept IT Coordinators
- All the collected information was reviewed, cleansed and normalized as per the data repository needs

Application Assessment:

- During assessment, additional data gaps/missing data were identified and sent back to the IT Coordinators
- A comprehensive data repository of all collected application and infrastructure workloads and their mapping was developed and baselined
- Application Disposition (TIME, 7R) and Workload Placement (Strategic LZ) for all applications/infrastructure components with available data were done

Develop Final Report:

- The final deliverable as defined in scope and was created after data collection and application assessment

5.1.2 Application Overview

666 applications identified as scope (**647** from LeanIX) for the study. However, during data collection the Kyndryl team received information for only **645** applications.

5.1.2.1 Observations

Application specific data/information was collected and analyzed for 645 applications and listed below are the key observations for state-wise and by department.

1. **Cloud Adoption**: More than **45%** of the State-wide application workloads reside on Cloud
    a. %age of workloads on Public Cloud – 21%
    b. %age of workloads on Government Cloud – 0.3%
    c. %age of workloads on Private Cloud (Co-Locations) – 12%
    d. %age of workloads on ETS Government Private Cloud (GPC) – 13%
2. **Modernization Efforts for Legacy systems**: 66 mission critical systems reside on mainframe (57) and power (9).
    a. For **~55%** of the applications, either modernization/replacement is in progress or planning is underway to finalize the future solution and/or vendor.
3. **Inventory Application and Infrastructure**: LeanIX manages and maintains application portfolios. However, not all applications are listed here. Apart from applications, the repository also contains several IT cost items which are not necessarily applications.
    a. LeanIX is missing robust CMDB capabilities (e.g. OS, DB and Application technical details)
    b. Infrastructure to Application dependency mapping not readily available. Of the 3625 devices, 234 devices match an application in LeanIX, and 252 devices do not match an application in LeanIX.
    c. Impacts the detailed plan and effort of modernization program and decommission effort
4. **Business Criticality of Applications**: **2/3rd** of the applications tagged as 'mission critical' or 'business critical'.
5. **Retired/Abandoned**: **~11%** of the applications retired or abandoned but have not been decommissioned and use valuable Infrastructure.
6. **SaaS Applications**: **32%** of active applications utilize SaaS solutions.
    a. **1/3rd** managed by Tyler and hosted from AWS.
7. **Shared Services Infrastructure (ETS GPC)**: Only **13%** of the workloads utilize internal state-owned shared services infrastructure.
    a. Existing hardware nearing end of lifecycle (less than 12 months) and located completely on Oahu
    b. Support staff located locally (i.e. no out of region support, typical recommendation resources distributed 100+ miles in event of disaster)
    c. Of the larger departments (in terms of application counts) HMS, HTH and TRN should explore ways and opportunities to move more On-premises or CoLo workloads to ETS GPC.
8. **Additional cost savings** possible with consolidated shared infrastructure services, hyperconverged infrastructure and removal of physical equipment targeted for decommission.
9. **EOL OS**: 54 servers running EOL OS.
    a. Applications are from HTH, TAX, DEF, AGR.
10. **Department specific observations**:

Department	%age Cloud Adoption	Mainframe + Power Applications	Observations
AGR	8.3%	0	• 11 out of the 12 applications are hosted from on-premises department servers. Recommending rehost from Cloud.
AGS	48.4%	14	• Cloud adoptions high compared to overall adoption rates. • Has 14 mainframe applications including the mission critical FAMIS application. • Leverages Power environment for backup of State Archives.
ATG	37.9%	5	• Cloud adoption low compared to overall state-wide adoption rates. • KEIKI system, along with Customer and Agency Portal, targeted as the first system hosted from Government Cloud. • CJIS and Sex Offender Registration System use DB2 databases on Power.
BED	54.5%	4	• Cloud adoption high, only one application hosted from on-premises. • 3 applications are on mainframe, no current plans for modernization. • HFTZIPS written on AS/400 and hosted on Power. Federal approval required for new application which results in long project duration for migration.
BUF	54.2%	7	• 7 critical applications hosted on mainframe. No modernization plans are currently underway. • Cloud adoption higher than state-wide adoption rates with extensive use of ETS GPC.
CCA	88.2%	3	• Salesforce: 9 applications using Salesforce and planning underway to migrate another 10 applications that currently use Lotus Notes or Power. • 1/3rd of the applications in LeanIX retired/abandoned. • BRIMS and HIDS use Oracle databases hosted on Power.
DEF	70.0%	0	• Cloud adoption, including ETS GPC, at 70% but opportunities to move additional workloads remains. • WebEOC: Migrate from Department servers to GPC and reevaluate SaaS solutions for latency concerns.
ETS	55.2%	8	• Only 20% of the ~50 applications identified as business applications. • 6 of the 8 mainframe applications identified as supporting infrastructure applications to sunset with mainframe.
HHL	85.7%	0	• Applications deployed on ETS GPC or are SaaS solutions. • 5 of the 9 applications not optimal which results in making programming changes difficult. (Applicant/Lessee, Mortgage Loan, Recordation, etc.)
HMS	55.6%	10	• Cloud adoption (public and private) above 55%. Google Cloud Platform preferred cloud service provider.

Department	%age Cloud Adoption	Mainframe + Power Applications	Observations
			• Modernization efforts are underway or recently completed for BES, CCWIS, and AWARE. • Container as a Service (CaaS) in Google Cloud targeted for BES.
HRD	66.7%	1	• Cloud adoption exceeds overall statewide adoption. • Human resource functions utilized on PeopleSoft. • Mainframe applications abandoned and ready for decommission.
HTH	44.4%	4	• Cloud adoption in line with state-wide average with ~40% of the applications being SaaS solutions. • On-premises applications identified as good candidates for cloud adoption due to the lack of sensitive data or latency concerns. • On-premises workloads hosted from multiple data centers and identified as suitable candidate to consolidate into ETS GPC.
LBR	20.8%	7	• Low cloud adoption rate versus overall statewide adoption. • Seven (7) mainframe applications with modernization plan underway for DCIS.
LNR	71.4%	0	• Eleven (11) of the thirty (27) applications are Tyler hosted.
PSD	18.2%	0	• Corrections Collaboration System identified as replacement for three (3) legacy systems within two (2) years. • Staff ID Cards system identified to be retained AS-IS and on-premises.
TAX	66.7%	0	• All five systems identified to be retained as-is including on-premises scanners. • Shared Services: IVR solution and AD – evaluate other solutions for opportunity to consolidate.
TRN	14.3%	3	• Cloud hosted applications at 14%. • Thirty-one (31) applications (33%) identified as PC/Desktop applications. • Mainframe and AS/400 applications targeted to be replaced by H-4.

Table 1: Department Specific Observations

5.1.2.2 Summary

Some of the key numbers/findings from the Data Collection/Application Assessment

- **Total Applications Assessed: 645**
- **New Builds:** Twenty-five **(25)** applications are under active development or in the procurement process and are expected to be available in 6 months to 3 years.
- **Retired**: Seventy-four **(74)** of these applications are retired or abandoned.
- **End-Of-Life:** Of the applications which are being actively used, **15%** have been tagged as end-of-life or ready to be phased out. Nearly half of these are Mainframe and Power applications.
- **Poor Business/Technical Fit: 16%** of applications are tagged as 'poor' or 'insufficient' for business and/or technical fit.

5.1.2.3 Application Types

Below are applications by application type and by dept. Excluded are retired/abandoned applications.

[SaaS – 31%, IaaS/PaaS – 30%, Power – 2%, Mainframe – 10%, On-Premises – 27%].

Department	SaaS	IaaS	PaaS	Private Cloud	Mainframe	Power	On-Premises	Grand Total
AGR			1				11	12
AGS	7	1		14	14		2	38
ATG	18	3		8	1	4	13	47
BED	8	3	1	2	3	1	1	19
BUF	4	3		10	7		4	28
CCA	17	7	7	16		3	1	51
DEF	7	1		6			3	17
ETS	23	10		6	8		5	52
HHL	2			6			1	9
HMS	11	6		14	10		6	47
HRD	5			2	1			8
HTH	32	22		2	4		26	86
LBR	6	1	3	1	7		12	30
LNR	13	7		3			4	27
PSD	2	1		1			9	13
TAX	2			2			1	5
tbd							4	4
TRN	26	8		1	2	1	51	89
Grand Total	**183**	**73**	**12**	**94**	**57**	**9**	**154**	**582**

Table 2: Application Distribution by Application Type

5.1.2.4 Application by Current LZ

The application distribution below is by current landing zone. SaaS, Desktop, Mainframe and Power applications are included in the table for completeness.

Departments	Public Cloud	Govt Cloud	Private Cloud	GPC	On-Premises	SaaS	Desktop	M/F, Power	Grand Total
AGR					11	1			12
AGS	1		3	12	1	7		13	37
ATG	2	1	1	2	11	16		1	34
BED	3			2	1	9		3	18
BUF	3			10	3	4	1	7	28
CCA	13		17	1		19		4	54
DEF	1			6	3	7			17
ETS	11			6	4	22		8	51
HHL				6	1	2			9
HMS	6		14		4	11		10	45
HRD			2			5		1	8
HTH	22		1	1	22	27		4	77
LBR	1		1		11	6		7	26
LNR	7			3	4	13			27
PSD	1		1		9	2			13
TAX			2			2	1		5
TRN	8		2		14	25	31	2	82
Grand Total	**79**	**1**	**44**	**49**	**99**	**178**	**33**	**60**	**543**

Table 3: Distribution of Applications by Current Landing Zone

5.1.3 Common COTS/SaaS Solutions

Different products and/or instances of COTS/SaaS solutions offering similar business functions are in use across departments/agencies.

Solution/Business Function*	Comments	Products/Vendors
Document/Content Management	• Sixteen (16) different applications used in varying capacity to perform	IBM, OpenText, iManage, Salesforce, Revacomm, etc.

Solution/Business Function*	Comments	Products/Vendors
	document and/or content management functions.	
Case Management	• For Case Management, thirteen (13) different applications are used by the different departments and are home-grown solutions.	Salesforce, Thomson Reuters, Conduent, etc.
Customer Service Management	• Eight (8) different systems for ticketing, call center, helpdesk, etc.	ServiceNow, Salesforce, Talkdesk
Employee Service Management	• Eleven (11) applications for HR and other ERM functions including PeopleSoft Applications.	PeopleSoft, ISF
Application Portfolio Management, Collaboration and Storage Solutions	• Eight (8) different solutions identified: 2 for portfolio management, 2 for storage and 4 for collaboration including Lotus Notes.	LeanIX, eBuilder, Lotus Notes

Table 4: Common COTS/SaaS Solutions

* Details of all such COTS/SaaS applications are given Appendix (Section 9.2)

5.1.4 Infrastructure Overview

5.1.4.1 Physical Data Centers

Incorporated in data center roadmap was data collected from 25 physical locations comprising of 34 Agency "IT spaces", including Kalanimoku. This data was collected from the "Data Center Inventory Study (completed – May 2023)" that was developed earlier this year by another Kyndryl team. Identified were 469 physical devices targeted for decommissioning with an additional 26 devices identified as past EOL but not currently slotted for decommissioning.

Data Center Consolidation estimates include reductions in overall space of 9,800sf and power of 38KW, resulting in annual power and cooling savings of $180K and $150K, respectively.

With continued rationalization and modernization efforts to move perhaps even more application workload to various cloud service providers, it's quite possible that the data center consolidation estimates would result in further reduction in required space and power, thus realizing increased savings over time.

The data center scope and assessment focused on following departments/agencies and their respective IT infrastructure:

								PRODUCTION ENVIRONMENT				TEST / DEV / DR ENVIRONMENT				DECOMMISSIONED EQUIPMENT			
#	BUILDING NAME	Address	Total Square Footage	Number of Existing Racks	Total Number of Devics	Total Number of Active Devices	Total Active U-Space	TOTAL PROD DEVICES	TOTAL PROD U-SPACE	EST POWER FOR PROD (KW)	EST NEW RACKS	TOTAL TEST/DEV/DR DEVICES	TOTAL TEST/DEV/DR U-SPACE	EST POWER Test/Dev/DR (KW)	EST NEW RACKS	TOTAL NUMBER OF DEVICES	SPACE UTILIZED BY DCOMM EQUIP	ESTIMATED TOTAL NEW RACKS PLUS NET	TOTAL ESTIMATED IT POWER
1	Kalanimoku	1151 Punchbowl Street, Honolulu, HI 96813	7239	56	420	328	576	274	519	73.6	18	31	57	14.8	2	92	208	23	88.4
2	Kalanimoku - DAGS	1151 Punchbowl Street, Honolulu, HI 96813	160	5	43	42	65	39	65	5.77	3	0	0	0	0	1	4	4	5.77
3	Kalanimoku DLNR	1151 Punchbowl Street, Honolulu, HI 96813	208	4	39	39	66	33	56	10.47	2	6	10	1.9	1	0	0	4	12.37
4	University of Hawaii IT Center	2520 Correa Road, Honolulu HI 96822	612	25	342	316	493	158	282	55.87	10	158	211	65.55	8	26	38	21	121.42
5	DR Fortress	3375 Koapaka St., Honolulu HI 96819	928	30	372	270	536	239	503	95.59	17	31	33	10.54	2	102	103	22	106.13
6	Kinau Hale	1250 Punchbowl Street, Honolulu, HI 96813	643	11	98	71	131	65	131	12.65	5	0	0	0	0	27	50	6	12.65
7	Queen Liliuokalani Building DOE	1390 Miller Street, Honolulu, HI 96813	603	13	134	85	179	85	179	33.79	6	0	0	0	0	49	76	7	33.79
8	Queen Liliuokalani Building DHS	1390 Miller Street, Honolulu, HI 96813	988	12	85	73	104	73	104	23.7	4	0	0	0	0	12	19	5	23.7
9	King Steet - Dept of Agr	1428 S. King Street, Honolulu, HI 96814	129	3	19	17	22	16	22	3.49	1	0	0	0	0	2	3	2	3.49
10	Hawaii State Hospital	45 710 Keaahala Road, Kaneohe HI 96744	150	5	34	32	46	30	46	6.26	2	0	0	0	0	2	5	3	6.26
11	Kakuhihewa AG CSEA / DOH	601 Kamokila Blvd, Kapolei, HI 96707	96	3	18	16	23	16	23	6.56	1	0	0	0	0	2	4	2	6.56
12	Kakuhihewa ADAD	601 Kamokila Blvd, Kapolei, HI 96707	30	1	9	5	10	5	10	0.78	1	0	0	0	0	4	4	2	0.78
13	Department of Health/CAMHD	601 Kamokila Blvd, Kapolei, HI 96707	35	3	8	8	11	8	11	1.04	1	0	0	0	0	0	0	2	1.04
14	Keelikolani - Dep of Labor	830 Punchbowl Street, Honolulu, HI 96813	705	10	47	45	65	45	65	15.28	3	0	0	0	0	2	10	4	15.28
15	Keelikolani - Dep of Tax	830 Punchbowl Street, Honolulu, HI 96813	140	7	67	34	42	34	42	6.62	2	0	0	0	0	33	45	3	6.62
16	Aliiaimoku Building - DOT	869 Punchbowl, Honolulu, HI 96817	752	9	90	90	118	90	118	27.67	4	0	0	0	0	0	0	5	27.67
17	Kekūanaō'a - ATG JHCJDC	465 South King St, Honolulu, HI 96813	686	6	32	29	45	29	45	8.85	2	0	0	0	0	3	7	3	8.85
18	Kekūanaō'a - Public Utilities	465 South King St, Honolulu, HI 96813	154	4	36	31	66	26	66	7.83	3	0	0	0	0	5	9	4	7.83
19	Kekūanaō'a - Leg Audit	465 South King St, Honolulu, HI 96813	35	1	4	3	5	3	5	1.4	1	0	0	0	0	1	7	2	1.4
20	Birkhimer EOC Building 306 DOD / HIEMA	4204 Diamond Head Rd., Honolulu, HI 96816	324	10	48	43	65	31	65	4.2	3	0	0	0	0	5	6	4	4.2
21	HNL Airport - DOT	400 Rodgers Blvd, Honolulu, HI 96819	294	4	22	20	38	20	38	4.58	2	0	0	0	0	2	4	3	4.58
22	HPHA Campus - DHS	1002 N. School Street, Honolulu, HI 96817	355	5	37	23	34	21	34	7.61	2	0	0	0	0	14	19	3	7.61
23	QAD / PQ - Dept of Agr	1851 Auiki Street, Honolulu, HI 96819	140	2	21	17	22	15	22	2.98	1	0	0	0	0	4	11	2	2.98
24	City Financial Tower - ERS	201 Merchant Street, Honolulu, HI 96813	553	8	111	98	159	89	142	12.76	5	7	17	2.47	1	13	23	7	15.23
25	Hawaii State Capitol -Legislature/Senate	415 South Beretania Street, Honolulu, HI 96813	397	7	39	29	36	27	36	5.37	2	0	0	0	0	10	19	3	5.37
26	Hawaii State Capitol -Legislature Reference Bureau	415 South Beretania Street, Honolulu, HI 96813	20	1	1	1	1	1	1	0.202	1	0	0	0	0	0	0	2	0.202
27	Hawaii State Capitol -Governor	415 South Beretania Street, Honolulu, HI 96813	150	3	25	23	22	21	22	4.11	1	0	0	0	0	2	4	2	4.11
28	Aloha Stadium, Aloha Stadium Admin Office - DBEDT	99 500 Salt Lake Blvd, Honolulu, HI 96818	80	2	9	9	17	7	17	2.03	1	0	0	0	0	0	0	2	2.03
29	Hemmeter -ETS		145	5	44	29	97	29	97	7.5	4	0	0	0	0	15	17	5	7.5
30	Cades Schutte - DOCD	1000 Bishop, Suite 200, Honolulu, HI 96813	238	2	7	6	19	6	19	0.767	1	0	0	0	0	1	1	2	0.767
31	State Office Tower - Leopapa a Kamehameha Bldg. DOH	235 South Beretania Street, Honolulu, HI 96813	358	7	37	11	17	9	15	1.93	1	1	2	0.035	1	26	54	3	1.965
32	Kamauleule DOH Labs	2725-27 Waimano Home Road, Pearl City, HI 96782	380	9 (4 DC)	64	51	79	51	79	12.26	3	0	0	0	0	13	20	4	12.26
33	King Kalakaua Bldg - Dep of Commerce	335 Merchant Street, Honolulu, HI 96813	395	8	22	18	58	18	58	19.54	2	0	0	0	0	4	10	3	19.54
34	ServPac	200 Kahelu Ave, Mililani, HI 96789	60	1	12	11	11	11	11	3.26	1	0	0	0	0	1	2	2	3.26
	TOTALS		18182	273	2396	1923	3278	1624	2948	486.319	116	234	330	95.295	15	473	782	171	581.614

Consolidated Data Center Space Requirements:

Space and Rack Requirements

- Non-Consolidated environment will require up to **120-130** Racks (Un-Merged Environment) for Production environment
- These estimates do not include Disaster Recovery. It is assumed and recommended this equipment is housed in an alternate location for DR planning. Additional Space and racks may be required for DR plans. Not all state Agencies have implemented Disaster Recover strategies for IT equipment
- Racks have **20%** space buffer included for Equipment Refreshes every 3-5 years.
- Exterior Space includes Generator, External Fuel Tank, Chillers/Heat Rejection Equipment and Storage tanks as required.
- Additional space may be required for staff, offices, conference rooms, break rooms, etc. A Complete architectural programming should be completed.

Estimated Space Requirements

Description of Area	Estimated Space (sq. ft.)
Data Center Space	3625
Data Center Infrastructure Equipment (UPS/Cooling/ Electrical/ Fire)	3045
Command Center	500
Staging, Lab Room	500
Print Services	2200
Total Interior Space	**9870**
External Mechanical Electrical Equipment	**4000**

Consolidated Data Center Power and Cooling Requirements:

Estimated MEP

UPS / Critical Load Power	Estimated Max
Maximum UPS Loads	875 KW
Non UPS Data Center Loads	5 KW
Lighting, Shell Loads, Power Distribution	125 KW
Cooling Equipment Loads	669 KW
Total Data Center Power	**1674 KW**
Recommended Genset Size	2 MW
Recommended Heat Rejection (Tons)	300 Tons

Estimated Power & Cooling Requirements

- Target level of Redundancy is a Tier 3
- Dual Power Paths from Electrical Service to the Rack PDU's
- UPS system will be an 2N
- Cooling in the data center and UPS rooms will be N+1
- Chiller – Stand alone dedicated to the Data Center
- Generator – Will be new diesel dedicated to the data center
- Current average Rack power density is 2kW per Rack. Estimates are based on average of 5kw per rack.
- Maximum estimates are based upon a 5% Growth Rate over 10-years.
- Estimates assume no consolidation of infrastructure or network.

Below is a further breakdown of the of the devices identified within the physical data centers:

Type	Quantity	Source
Physical	2368	Data Center Inventory Findings
	2461	Infrastructure Discovery (Survey Questionnaire)
Virtual	1155	RVTools & Infrastructure Discovery (Survey Questionnaire)
Power9	6 LPARs	Infrastructure Discovery (Survey Questionnaire)
IaaS & Storage appliances	9	Infrastructure Discovery (Survey Questionnaire)

Table 5: Types of Devices in Physical DC

Note: Duplicates exist for some devices documented during Discovery

5.1.4.2 Kalanimoku Data Center

ETS is targeting complete decommissioning of the Kalanimoku Data Center by 2026. Remaining computer systems, communication networks, and high-volume printing services are in the process of migrating out to transform the data center floor space into general office space, hotel office space, conference room, and cyber security room.

5.1.4.3 Mainframe

Previously, mainframe applications hosted in Kalanimoku and UHM-ITC were relocated to a cloud instance under a Mainframe-as-a-Service (MFaaS) arrangement with Kyndryl/FNTS. Production is in Omaha, NE with the disaster recovery site located in Lisle, IL. As part of the roadmap, the mainframe applications will be targeted to no longer depend on the current environment, resulting in the decommission of the MFaaS arrangement – target is FY 2028.

5.1.4.4 Power9

The current Power9 environment is located in DRFortress (production) and Kalanimoku (disaster recovery). Currently, the systems are used to host application databases and tape backups for three (3) tenants – DAGS-Archives, CCA, and ATG-HCJDC.

The Power9 components are contemporary systems, but some components are EOL. From the following table, the SAN Switches are EOL but still serviceable up to 2025 – ETS plans to replace this equipment in Q4 FY24. To reduce the annual cost, ETS made arrangements with the vendor (Sirius-CDW) to allow them to repurpose existing switches and extend the maintenance. For the other items on the list such as HMC and Disk Enclosures, these were refreshed in 2021.

In addition to the Power9 production and disaster recovery sites, as part of the Power lease, there is Cloud Object Storage (COS) infrastructure hosted at all three (3) sites, which includes UHM-ITC data center, where the COS is being used as storage for the Spectrum Protect application. The Spectrum Protect backup system is being utilized to provide operational backup/recovery for all three (3) Power9 tenants, as well as for the ETC-SOC servers.

Note, ETS is also investigating whether to use the COS to expand the scope and requirements to meet the needs of State archiving in general. In doing so, resources will need to be identified and committed to plan, implement, and support this service offering.

Device Type	Location Name	Device Type/Make	Serial No.	Asset Tag	EOL
Power Systems - DRF (Production)					
SAN Switch	DR Fortress	IBM System Storage SAN48B-5 (Upgraded with SFP+ Transceiver 16 Gbps SW 8-Pack. Include extended 5 year 24X7 support for all parts	10161DC	Lease equipment-no State Asset Tag	EOL-5/28/2020 EOSL-5/31/2025
SAN Switch	DR Fortress	IBM System Storage SAN48B-5 (Upgraded with SFP+ Transceiver 16 Gbps SW 8-Pack. Include extended 5 year 24X7 support for all parts	10418GE	Lease equipment-no State Asset Tag	EOL-5/28/2020 EOSL-5/31/2025
KVM	DR Fortress	IBM 7316-TF5	06A1334	Lease equipment-no State Asset Tag	
Hardware Management Console	DR Fortress	IBM 7063-CR2	787F41D	Lease equipment-no State Asset Tag	
Server	DR Fortress	IBM Power9 9009-42G S924	78FDD50	Lease equipment-no State Asset Tag	
Server	DR Fortress	IBM Power9 9009-22G S922	78FDD40	Lease equipment-no State Asset Tag	
Storage Control Enclosure	DR Fortress	IBM Flash System 7200 2076-824	78E37ZX	Lease equipment-no State Asset Tag	
Storage Control Enclosure	DR Fortress	IBM Flash System 7000 2076-92G	789A5PR	Lease equipment-no State Asset Tag	
Storage Manager	DR Fortress	IBM Cloud Storage Manager 4957-M10	781AB22	Lease equipment-no State Asset Tag	
Storage Accesser	DR Fortress	IBM Cloud Storage Accesser 4957-A10	782AE83	Lease equipment-no State Asset Tag	
Storage Accesser	DR Fortress	IBM Cloud Storage Accesser 4957-A10	782AE84	Lease equipment-no State Asset Tag	
Storage Controller	DR Fortress	IBM Cloud Storage Controller 4957-C10	783AO70	Lease equipment-no State Asset Tag	
Storage Disk Enclosure	DR Fortress	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYD	Lease equipment-no State Asset Tag	
Storage Controller	DR Fortress	IBM Cloud Storage Controller 4957-C10	783AO71	Lease equipment-no State Asset Tag	
Storage Disk Enclosure	DR Fortress	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYE	Lease equipment-no State Asset Tag	
Storage Controller	DR Fortress	IBM Cloud Storage Controller 4957-C10	783AO72	Lease equipment-no State Asset Tag	
Storage Disk Enclosure	DR Fortress	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYC	Lease equipment-no State Asset Tag	
Storage Controller	DR Fortress	IBM Cloud Storage Controller 4957-C10	783AO68	Lease equipment-no State Asset Tag	
Storage Disk Enclosure	DR Fortress	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYH	Lease equipment-no State Asset Tag	
Storage Controller	DR Fortress	IBM Cloud Storage Controller 4957-C10	783AO75	Lease equipment-no State Asset Tag	
Storage Disk Enclosure	DR Fortress	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYG	Lease equipment-no State Asset Tag	
Storage Controller	DR Fortress	IBM Cloud Storage Controller 4957-C10	783AO69	Lease equipment-no State Asset Tag	
Storage Disk Enclosure	DR Fortress	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYF	Lease equipment-no State Asset Tag	

Storage Base Frame	DR Fortress	IBM Tape Library TS4500 3584-L25	78AB649	Lease equipment-no State Asset Tag	
Storage Base Frame	DR Fortress	IBM Tape Library TS4500 3584-S24	78S2585	Lease equipment-no State Asset Tag	
Storage Tape drive	DR Fortress	IBM Tape Drive TS1160 3592-60F	784814A	Lease equipment-no State Asset Tag	
Storage Tape drive	DR Fortress	IBM Tape Drive TS1160 3592-60F	784815A	Lease equipment-no State Asset Tag	
Storage Tape drive	DR Fortress	IBM Tape Drive TS1160 3592-60F	7847A1A	Lease equipment-no State Asset Tag	
Storage Tape drive	DR Fortress	IBM Tape Drive TS1160 3592-60F	78472AA	Lease equipment-no State Asset Tag	
Storage Tape drive	DR Fortress	IBM Tape Drive TS1160 3592-60F	784819A	Lease equipment-no State Asset Tag	
Power Systems - KB (Disaster Recovery)					
SAN Switch	Kalanimoku	IBM System Storage SAN48B-5 (Upgraded with SFP+ Transceiver 16 Gbps SW 8-Pack. Include extended 5 year 24X7 support for all parts	10418GY	Lease equipment-no State Asset Tag	EOL-5/28/2020 EOSL-5/31/2025
SAN Switch	Kalanimoku	IBM System Storage SAN48B-5 (Upgraded with SFP+ Transceiver 16 Gbps SW 8-Pack. Include extended 5 year 24X7 support for all parts	10418GW	Lease equipment-no State Asset Tag	EOL-5/28/2020 EOSL-5/31/2025
KVM	Kalanimoku	IBM 7316-TF5	06A7344	Lease equipment-no State Asset Tag	
Hardware Management Console	Kalanimoku	IBM 7063-CR2	787F1ED	Lease equipment-no State Asset Tag	
Server	Kalanimoku	IBM Power9 9009-42G S924	78FD0D0	Lease equipment-no State Asset Tag	
Server	Kalanimoku	IBM Power9 9009-22G S922	78FD0C0	Lease equipment-no State Asset Tag	
Storage Control Enclosure	Kalanimoku	IBM Flash System 7200 2076-824	78E37VG	Lease equipment-no State Asset Tag	
Storage Control Enclosure	Kalanimoku	IBM Flash System 7000 2076-92G	789A5R0	Lease equipment-no State Asset Tag	
Storage Accesser	Kalanimoku	IBM Cloud Storage Accesser 4957-A10	782AE82	Lease equipment-no State Asset Tag	
Storage Accesser	Kalanimoku	IBM Cloud Storage Accesser 4957-A10	782AE81	Lease equipment-no State Asset Tag	
Storage Controller	Kalanimoku	IBM Cloud Storage Controller 4957-C10	783AO64	Lease equipment-no State Asset Tag	
Storage Disk Enclosure	Kalanimoku	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYY	Lease equipment-no State Asset Tag	
Storage Controller	Kalanimoku	IBM Cloud Storage Controller 4957-C10	783AO65	Lease equipment-no State Asset Tag	
Storage Disk Enclosure	Kalanimoku	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYW	Lease equipment-no State Asset Tag	
Storage Controller	Kalanimoku	IBM Cloud Storage Controller 4957-C10	783AO61	Lease equipment-no State Asset Tag	
Storage Disk Enclosure	Kalanimoku	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYX	Lease equipment-no State Asset Tag	
Storage Controller	Kalanimoku	IBM Cloud Storage Controller 4957-C10	783AO67	Lease equipment-no State Asset Tag	

Storage Disk Enclosure	Kalanimoku	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYV	Lease equipment- no State Asset Tag	
Storage Controller	Kalanimoku	IBM Cloud Storage Controller 4957-C10	783AO62	Lease equipment- no State Asset Tag	
Storage Disk Enclosure	Kalanimoku	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYT	Lease equipment- no State Asset Tag	
Storage Controller	Kalanimoku	IBM Cloud Storage Controller 4957-C10	783AO66	Lease equipment- no State Asset Tag	
Storage Disk Enclosure	Kalanimoku	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYZ	Lease equipment- no State Asset Tag	
Power Systems - UHM-ITC (COS)					
Server	UH-ITC	IBM Power9 9006-22P LC922	1312WBA	Lease equipment- no State Asset Tag	
Storage Controller	UH-ITC	IBM Cloud Storage Controller 4957-C10	783A058	Lease equipment- no State Asset Tag	
Storage Disk Enclosure	UH-ITC	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYM	Lease equipment- no State Asset Tag	
Storage Controller	UH-ITC	IBM Cloud Storage Controller 4957-C10	783AO56	Lease equipment- no State Asset Tag	
Storage Disk Enclosure	UH-ITC	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYP	Lease equipment- no State Asset Tag	
Storage Controller	UH-ITC	IBM Cloud Storage Controller 4957-C10	783AO55	Lease equipment- no State Asset Tag	
Storage Disk Enclosure	UH-ITC	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYR	Lease equipment- no State Asset Tag	
Storage Controller	UH-ITC	IBM Cloud Storage Controller 4957-C10	783AO57	Lease equipment- no State Asset Tag	
Storage Disk Enclosure	UH-ITC	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYL	Lease equipment- no State Asset Tag	
Storage Controller	UH-ITC	IBM Cloud Storage Controller 4957-C10	783AO60	Lease equipment- no State Asset Tag	
Storage Disk Enclosure	UH-ITC	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYN	Lease equipment- no State Asset Tag	
Storage Controller	UH-ITC	IBM Cloud Storage Controller 4957-C10	783AO59	Lease equipment- no State Asset Tag	
Storage Disk Enclosure	UH-ITC	IBM Cloud Storage Small Disk Enclosure 4957-J10	784AAYK	Lease equipment- no State Asset Tag	

Table 6: EOL Power Devices

The long-term strategic plan is to migrate all workloads and decommission the Power environment by the end of the current lease (June 2026). On August 17, 2023, ETS notified the impacted departments of this plan and provided the following guidance:

- Department's plans to migrate off the current Power9 and/or storage system including tape library from all environments (Prod, back-up, secondary back-up, etc.) / all locations (e.g., KB, DRF)
- The current lease contract that ETS manages expires June 2026.
  - Section 8.4 identifies the Power Series applications hosted on the Power Series/Spectrum Protect environment.
  - Departments should have a migration plan in place no later than June 2024, which should include the migration plan and projected migration dates for each application.
  - Departments should be migrated off the current system no later than May 1, 2026, which will allow for some time to ensure each department's replacement systems are and running successfully prior to ETS decommissioning the current systems by June 2026.

5.1.4.5 ETS Government Private Cloud Infrastructure

The ETS Government Private Cloud (GPC) deployed to function as IaaS for application teams in state departments by supplying Windows/Linux including hardware, patching, backups and disaster recovery. The primary hosts (19) are located in University of Hawaii data center and secondary hosts (19) located in DRFortress data center. A third site (Kalanimoku data center) contains the hosts (3) for the witness servers. At this time, the witness servers will temporarily remain within Kalanimoku building (in the telecom room) even after the data center is shutdown. They will eventually be re-located out of the building at a later time.

Servers (551) divided between three clusters: Tier 1 (102), Production (323) and Test/Dev (126). Tier 1 hosts public facing virtual machines which are isolated by subnets and virtual firewalls. All three clusters are stretched between the two sites with Tier 1 and Production sharing a VCenter.

Departments	ETS GPC	On-Premises	Total	%age on GPC
AGR		11	11	0%
AGS	12	1	13	92%
ATG	2	11	13	15%
BED	2	1	3	67%
BUF	10	4	14	71%
CCA	1		1	100%
DEF	6	3	9	67%
EDN		1	1	0%
ETS	6	4	10	60%
HHL	6	1	7	86%
HMS		4	4	0%

Departments	ETS GPC	On-Premises	Total	%age on GPC
HTH	1	22	23	4%
LBR		11	11	0%
LNR	3	4	7	43%
PSD		9	9	0%
TAX		1	1	0%
TRN		45	45	0%
Grand Total	**49**	**133**	**182**	**27%**

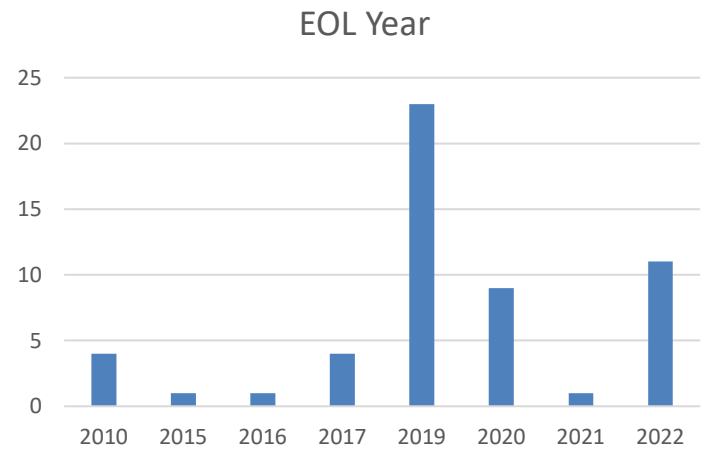
Table 7: Departments Hosted from GPC

5.1.4.6 VM Operating System EOL

End of life (EOL) operating systems (OS) increase support costs, increase instability and open environments to security exploits. Systems identified with EOL OS are summarized below:

EOL Operating Systems	Quantity
CentOS 4/5/6/7/8 (64-bit)	5
ESXi 6.5 / 6.7	2
Other 2.6.x & 3.x or later Linux (64-bit)	5
Red Hat Enterprise Linux 6 (64-bit)	2
SUSE Linux Enterprise 11 (64-bit)	23
SUSE Linux Enterprise 12 (64-bit)	2
vSphere 6	1
Windows Server 2003	1
Windows Server 2008 R2	4
Windows Server 2016	9
Grand Total	**54**

Table 8: EOL Operating Systems



5.1.4.7 Hyperconverged Infrastructure (HCI)

The following departments use Hyperconverged Infrastructure (HCI) to host a subset of their applications.

Sl No.	Hyperconverged Infrastructure	Department	Contacts
1	Nutanix	ATG (CSEA)	Garret Murayama
2	Nutanix	TRN	Darren Cantrill
3	VxRail	TAX	Ryan Abe
4	VxRail	ATG (HCJDC)	Pauline Sheng
5	VxRail	CCA	David Shak
6	VxRail	PSD	Cody Kagawa
7	VxRail	HTH	Steve Sakamoto

Table 9: Hyperconverged Infrastructure

5.2 Workload Disposition Results

5.2.1 Application Disposition – Assessment Strategy

Kyndryl used a strategic and methodical approach to determine the TIME Category and 7 Rs for each of the in-scope applications. The key business/technical considerations that were applied include, but not limited to, the following factors:

- **Business Considerations**: Business Drivers, Time Constraints, Security requirements, Data Sensitivity
- **Technical Considerations**: Infrastructure/Application lifecycle, Landing Zone, Technical Fit, Application Architecture, Legacy Systems, COTS/SaaS, Cloud First

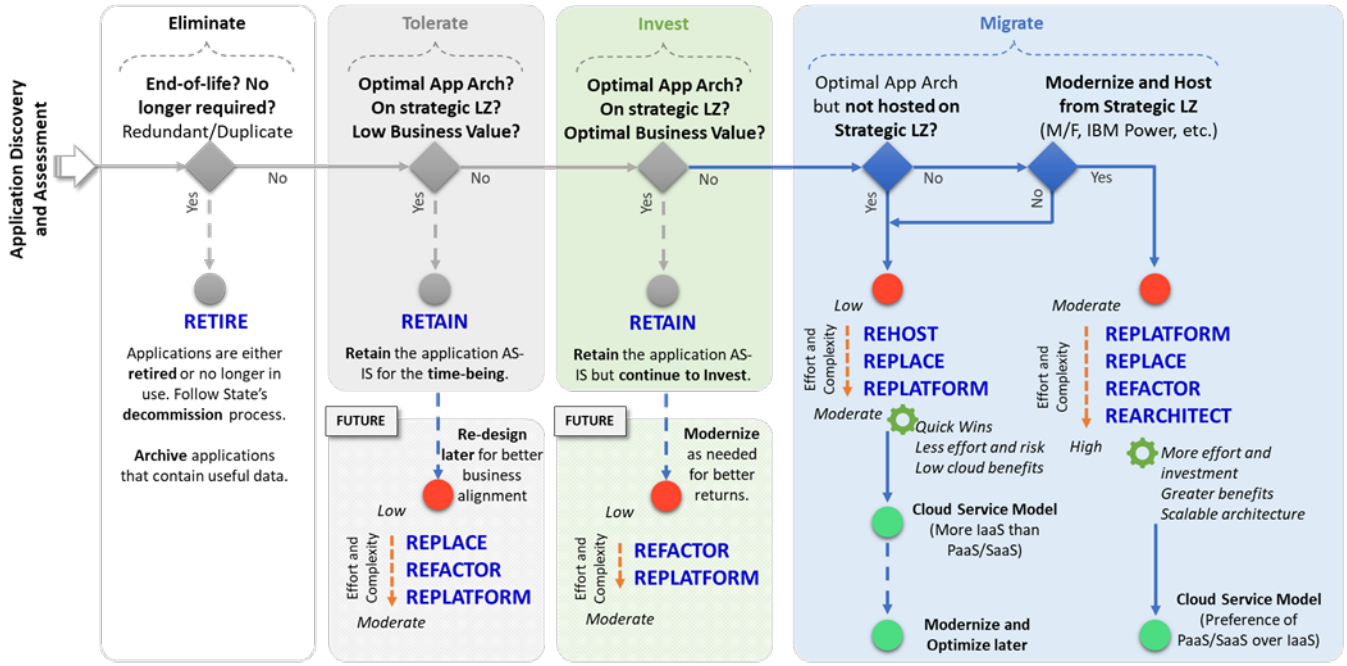


Figure 2: Decision Tree - T.I.M.E and 7R Disposition

5.2.2 Use-Cases (TIME vs R-Factor)

Mapping of TIME categories and 7-R factors remain straightforward for applications, but a few special use-cases are listed below:

Use-Case	TIME	R-Factor	Notes
Application is currently in - Active use in production - but needs modernization (end-of-life, Mainframe, not the best fit)	Migrate	Refactor, Rearchitect or Replace	The R-factor depends on the proposed solution, but essentially requires a new replacement system.
Application is currently in - Active use in production - Needs modernization (end-of-life, Mainframe, not the best fit) - Procurement/development of replacement application is in progress	<u>Old App</u> Eliminate <u>New App</u> Migrate	<u>Old App</u> Retire <u>New App</u> Rearchitect or Replace	Rearchitect or Replace for the best fit R-Factor are used for new applications.
Application is currently in - Active use in production - But not the best fit and teams are managing with workarounds	Tolerate	Retain	Retain the application as-is but continue to evaluate new and better options for replacement/consolidation.
Application is currently in - Active use in production - Is an excellent fit and meets all functional and technical	Invest	Retain	'Invest' and 'Retain' together is to retain the application and continue to invest on it as needed to adopt newer

Use-Case	TIME	R-Factor	Notes
requirements			technologies.

Table 10: TIME vs R-Factor use-cases

5.2.3 T.I.M.E. Model

Alignment/mapping of Applications to T.I.M.E. category was done as per the guidelines/definitions provided by SoH.

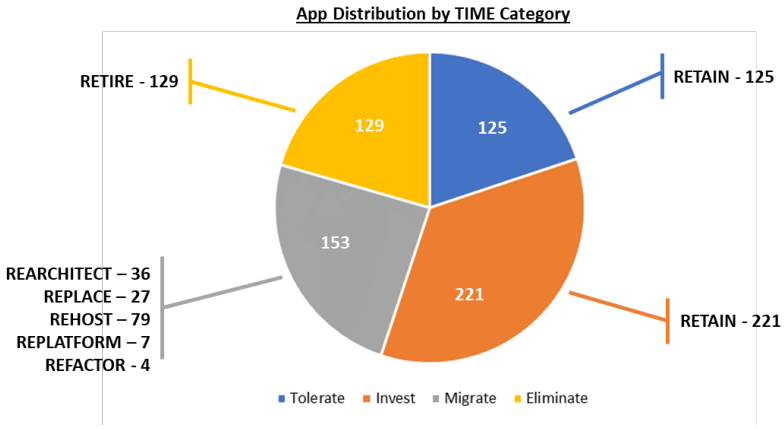


Figure 3: Application Distribution

1. **Tolerate** (125): The applications are hosted from the strategic landing zone, but not in the long-term plan for use or not the best functional/technical fit.
2. **Invest** (221): Excellent technical fit with high business value. No immediate change is required; however, SoH should continue to invest in future modernization.
3. **Migrate** (153): Applications identified on-premises, on legacy systems, or with a poor functional/technical fit.
4. **Eliminate** (129): Applications retired or to be retired as soon as the replacement solutions are ready for use in production.

5.2.4 Application Distribution by T.I.M.E. Category

Application T.I.M.E. distribution by departments:

Departments	Tolerate	Invest	Migrate	Eliminate	NA - Duplicate	Grand Total
AGR		1	11			12
AGS	2	20	4	14	1	41
ATG	5	14	24	8	1	52
BED	2	13	3	5		23
BUF	2	14	11	5		32
CCA	11	23	3	47		84

Departments	Tolerate	Invest	Migrate	Eliminate	NA - Duplicate	Grand Total
DEF	4	11	2	6		23
ETS	6	36	3	8		53
HHL		2	6	1		9
HMS	9	15	15	9		48
HRD		4	1	3		8
HTH	24	20	29	10	3	86
LBR	2	9	16	2		29
LNR	2	21	4			27
PSD		5	6	4		15
TAX	2	3				5
TRN	54	10	15	7		86
Grand Total	**125**	**221**	**153**	**129**	**5**	**633**

Table 11: Application Distribution by TIME Category

5.2.5 Enterprise Workload Disposition Summary (7R Analysis)

Based on the application assessment, 7 different migration paths are available in SoH's workload consolidation and cloud journey.

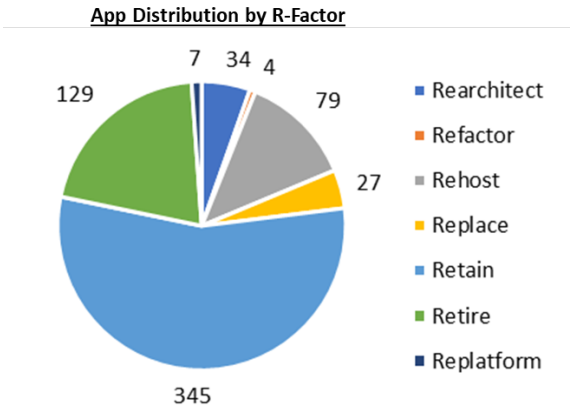


Figure 4: R-Factor Application Distribution

- More than **50%** of the applications identified to be **Retained** as-is for the immediate future.
  - Hosted from strategic landing zone, meet all the current functional and technical requirements.
  - Identified to need improvement but can continue to serve the needs until a suitable redesigned solution is available.

- Around **20%** of the applications identified as **Retired**.
    - The state is developing or procuring a replacement and existing applications retired after replacement.
    - Application is no longer required/used.
- Approximately **14%** of applications not hosted in a strategic landing zone will be **Rehosted** or **Re-platformed** to a suitable landing zone.
- SaaS solutions identified as poor fit or reached end-of-life will be **Replaced** with solutions that fit business and technical requirements.
- Legacy applications targeted to be **Rearchitected** or **Refactored** to modern solutions for the applicable business functions.

5.2.6 Application Distribution by R-Factor

Application R-Factor distribution by departments:

Department	Rearchitect	Refactor	Rehost	Replace	Retain	Retire	Replatform	Grand Total
AGR			10	1	1			12
AGS	2		2		22	14		40
ATG	3		14	3	19	8	4	51
BED	3				14	5		22
BUF	6		3	2	16	5		32
CCA					34	47	3	84
DEF			2		15	6		23
ETS	2		1		42	8		53
HHL				6	2	1		9
HMS	6	1	1	6	24	9		47
HRD				1	4	3		8
HTH	4		18	7	44	10		83
LBR	6		10		11	2		29
LNR			4		23			27
PSD	1	3	2		5	4		15
TAX					5			5
TRN	1		12	1	64	7		85
Grand Total	**34**	**4**	**79**	**27**	**345**	**129**	**7**	**625**

Table 12: Application Distribution by R-Factor

5.2.7 IT Infrastructure Consolidation (Strategic Landing Zones)

The "Kalanimoku Data Center" and "Department/Agency State Data Centers" are expected to develop and execute plans to retire or migrate on-premises applications to the cloud.

Applicable target options for the cloud include:

1. Internal Cloud Shared Service offerings – ETS Government Private Cloud 3.0
2. Cloud Service Providers (Continental US)
    a. Public Cloud IaaS/PaaS/SaaS cloud service offerings (e.g., Azure, AWS, Google, Oracle, Vendor Specific)
    b. Government Cloud IaaS/PaaS/SaaS cloud service offerings (e.g., Azure, AWS, Google, Oracle, Vendor Specific)
3. Cloud Service Providers (Hawaii)
    a. Private Cloud colocation hosting services at a local commercial data center (e.g., DRF, ServPac, AlohaNAP, UHM)

5.2.8 Workload Placement Decision Tree

Guiding principles used to determine the target landing zone:

- Cloud First Strategy – Cloud optimization not considered in this study
- Exit Mainframe and Power – Replace with Saas, Rearchitect or Retire
- Minimize Touches – Retain AS-IS if a workload is in strategic landing zone
- SaaS Solutions – Retain AS-IS if meeting business and technical requirements

The following diagram identifies current and target application workload landing zones.

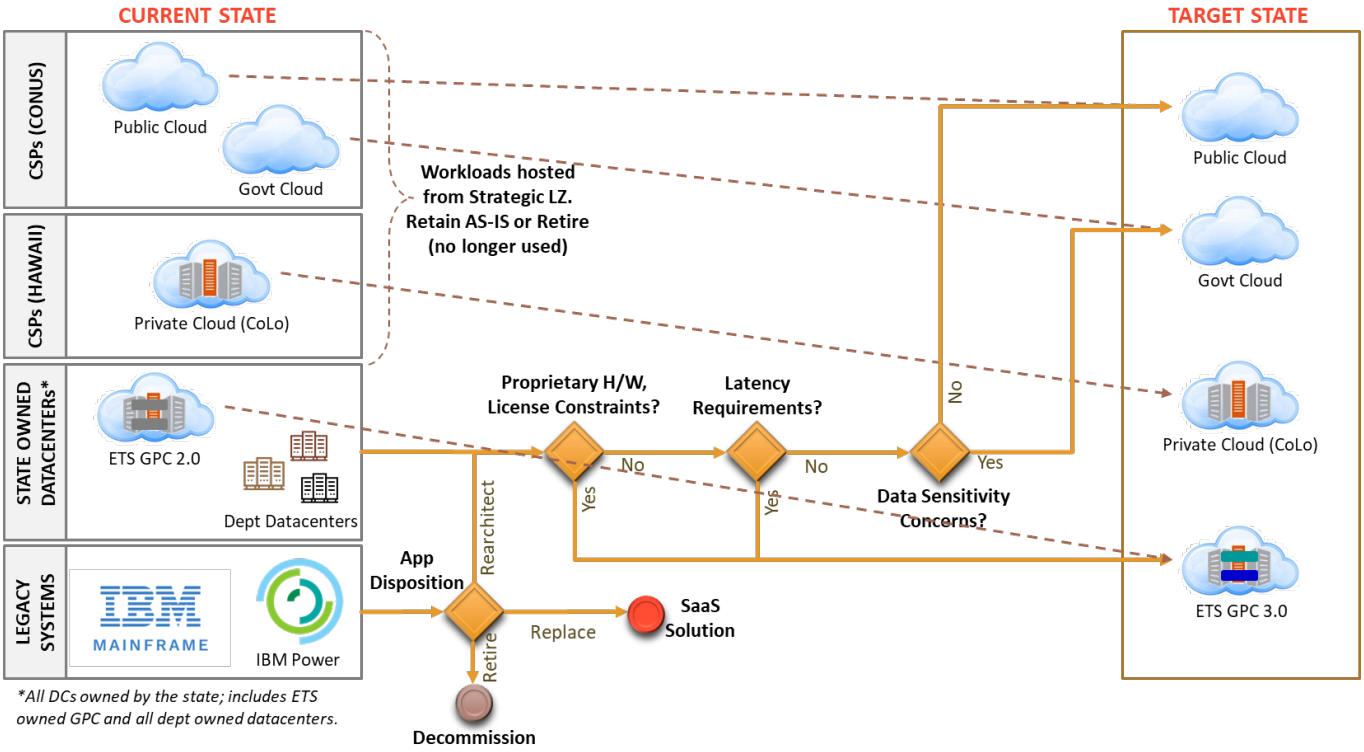


Figure 5: Decision Tree - Landing Zone Disposition

5.2.9 Workload Distribution – Current vs Target

A comparison of workload distribution in the current and target (future state) environment:

Current State:

- SaaS and Mainframe applications not considered in this distribution.
- Cloud adoption (CSPs (Cloud Service Providers) at CONUS and Hawaii) is at **40%**
- State owned GPC footprint is **16%**
- Opportunity to increase GPC footprint and third-party cloud adoption

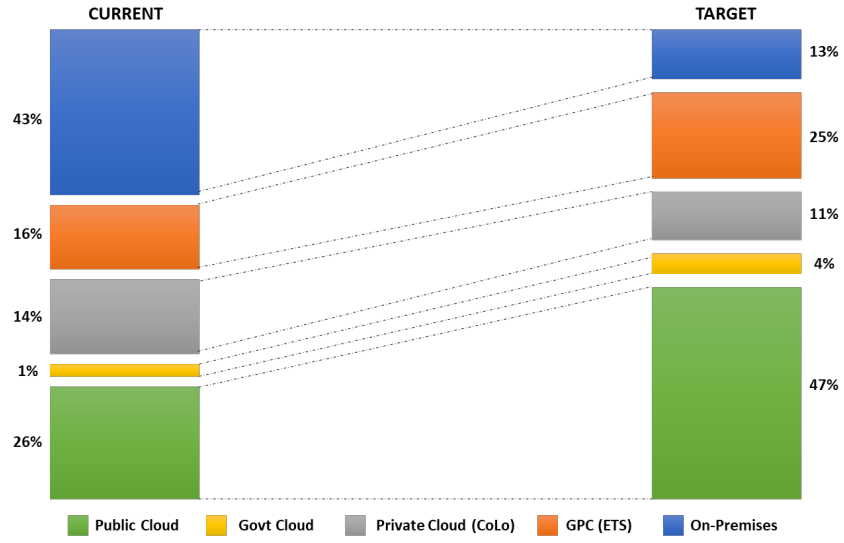


Figure 6: Current and Target LZ

Target State:

- With modernization and migration of application workloads, on-premises workloads decreased to **~13%** (~10% of the 13% are desktop applications)
- Increase of ETS GPC driven by on-premises workload migrations
- Reduction of private cloud driven by retired or replaced applications
- Approximately **3%** of applications targeted for migration from on-premises to government cloud
- Increase of **21%** workloads on public cloud based upon on-premises applications migrations

5.2.10 Workload Distribution

The table below is the target workload distribution by departments including:

- SaaS and desktop applications
- Applications retired or targeted for decommissioning

Departments	Public Cloud	Govt Cloud	Private Cloud	GPC	On-Premises	SaaS	Desktop	Eliminate	Grand Total
AGR	11					1			12
AGS	1	1	3	13		8		14	40
ATG	5	11	5	3		14		8	46
BED	7			2		8		5	22
BUF	10			13		3		5	31
CCA	13		6	1		18		45	83
DEF	1			8	1	7		6	23
ETS	12			10	3	20		8	53
HHL				6		2		1	9
HMS	11		13		3	12		9	48
HRD			2			3		2	7
HTH	35	2	1	6		28		11	83
LBR	13		1	4		9		2	29
LNR	7			7		13			27
PSD	4		1	3	1	2		4	15

TAX			1		1	2	1		5
TRN	18		1	3		26	31	7	86
Grand Total	**146**	**14**	**34**	**79**	**9**	**176**	**32**	**127**	**619**

Table 13: Workload Distribution by Landing Zone

5.2.11 Mainframe Applications

Eight (8) departments actively engaged in planning and implementing modernized solutions for the legacy mission critical applications on the mainframe.

- **Modernization in Progress** – Nine (9) applications including new solutions for KEIKI, BES, H-4 (Highways), and DLIR eCMS
- **Planning in Progress –** Twenty-one (21) applications including consolidation into EFS and CWISS
- **No Plans as Yet** – No evidence provided for plans of twenty (20) applications
- **Mainframe Utility –** Decommission with mainframe

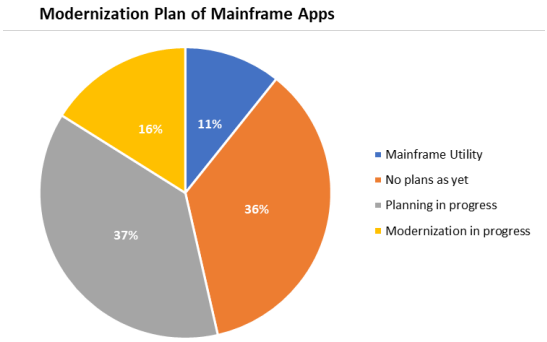


Figure 7: Mainframe Applications

The recommendation is to migrate applications from the mainframe to cloud-based solutions. A complete list of mainframe applications and disposition is in Appendix 9.3.

5.2.12 Power Applications

The Power systems used to host ten (10) applications, databases and tape backups for State Archives. DAGS-Archives, CCA, and ATG-HCJDC are the three tenants of the Power environment managed by ETS. Apart from these BED has a critical federally approved AS-400 application (HFTZIPS) hosted on Power from BED's on-premises location.

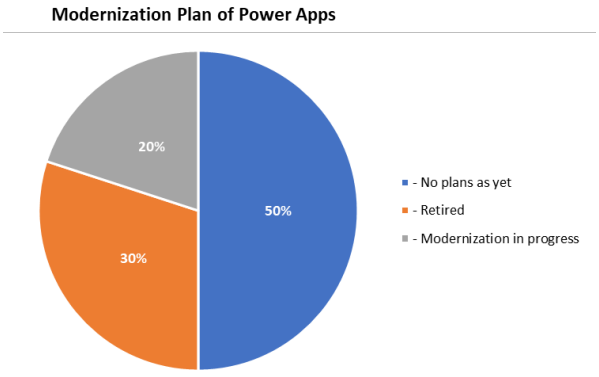


Figure 8: Power Applications

- **Retired** – Three (3) CCA applications no longer used and targeted for retirement
- **Modernization in Progress** – HIDS and BRIMS Oracle DB from CCA
- **No Plans as Yet** – DB2 databases used by CJIS and HFTZIPS
    - DB2 Database migration out of Power environment
    - HFTZIPS requires federal approval

The recommendation is to migrate all legacy applications and databases from Power to cloud-based solutions. A complete list of Power applications and disposition is in Appendix 9.4.

5.3 Next Generation Network (NGN)

5.3.1 Observations

The State's Next Generation Network Framework (NGN) has served well but requires transformation to meet digital demands including cloud-native networking.

- NGN is over twenty years old without any fundamental change in design and architecture.
- State has additional complexity of sprawling hybrid technology environments.
- Scarcity of specific network skills in a cloud-native network environment.
- Need for simplified management and high degree of automation.
- Requires efficient, diverse, and high performance between CONUS CSPs and local Co-Location Data centers.
- Plans to leverage existing investments while also capitalizing on new technologies.
- Deploy policy-based access, security, and controls

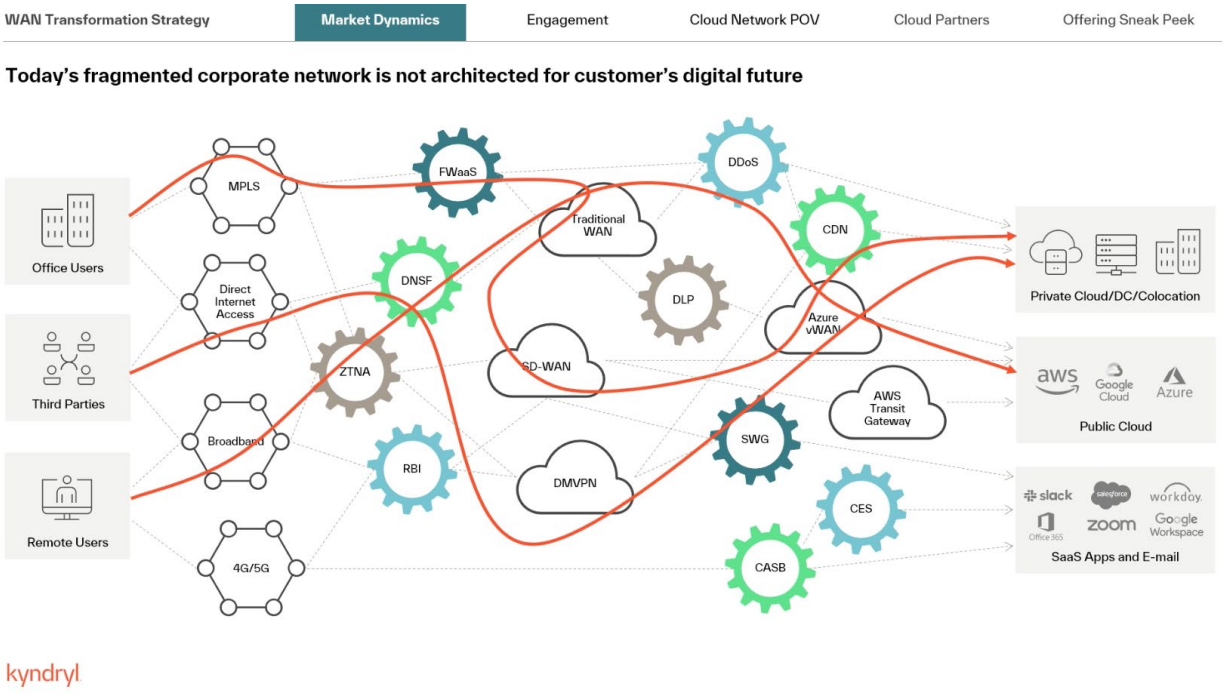


Figure 9: Illustration of a Fragmented Network Architecture

5.3.2 Key Considerations

Key considerations to building a resilient and redundant network

1. **Security**: Policy-based access, security, and controls are essential requirements for network. The network should be purpose-built for identity before access (Zero Trust). Design safeguards, Kill Switches and isolation policies to encircle and eliminate security threats.
2. **Connectivity**: Connectivity requires efficient, diverse, and high-performance infrastructure between SoH sites and U.S. mainland Hyperscaler. SoH should leverage existing investments while also capitalizing on new technologies. **Priorities:** Upgrade optics for more performance and enhance architecture to leverage satellite communications.
3. **Management**: Simplified management, better visibility and high degree of automation are requirements for modern networks. Integrated management including customizable, modular and catalog-based remote network monitoring, management and reporting services to support cloud-native networking environments.
4. **Disaster/Recovery**: Recent Maui Wildfires have tested the IT infrastructure resiliency. Several factors have been identified for improvement areas by internal SoH teams as a result. These factors should be design principles and requirements into the updated SoH Next Generation Network. **Priorities:** More fiber and power resilience.

5.3.3 Recommendations

Like many successful organizations, State is moving to a multi-cloud strategy for their IT infrastructure services. This multi-cloud strategy relies on the shift of traditional networking to a cloud-native networking. A future ready network for the State would support a target state of multi-cloud environment: Public Cloud, Government Cloud, Private Cloud (CoLo) and ETS GPC 3.0. A – consulting led approach to help develop a forward-looking network strategy by identifying any gaps between the current state and proposed target state.

Kyndryl recommends a Network Transformation Assessment and Network Reference Architecture for the State. Modernization of State's Next Generation Network framework in partnership with a qualified 3rd party consulting organization would provide a blueprint to support cloud-native networking for the State.

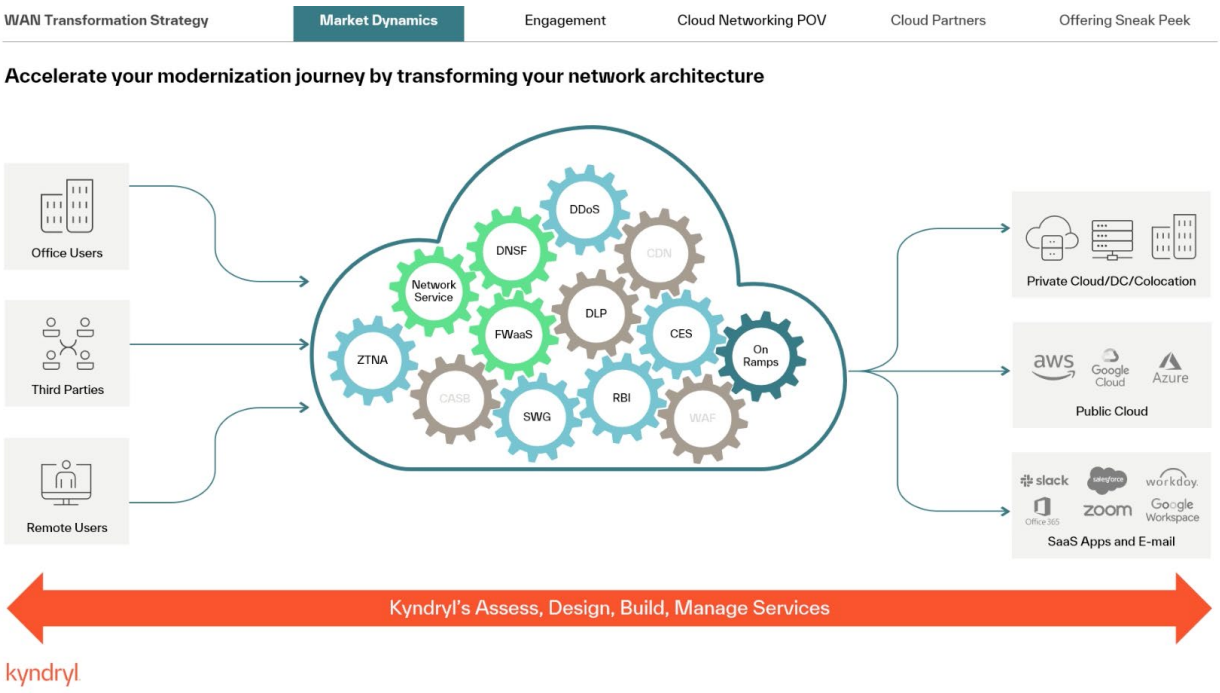


Figure 10: Illustration of a Transformed Network Architecture

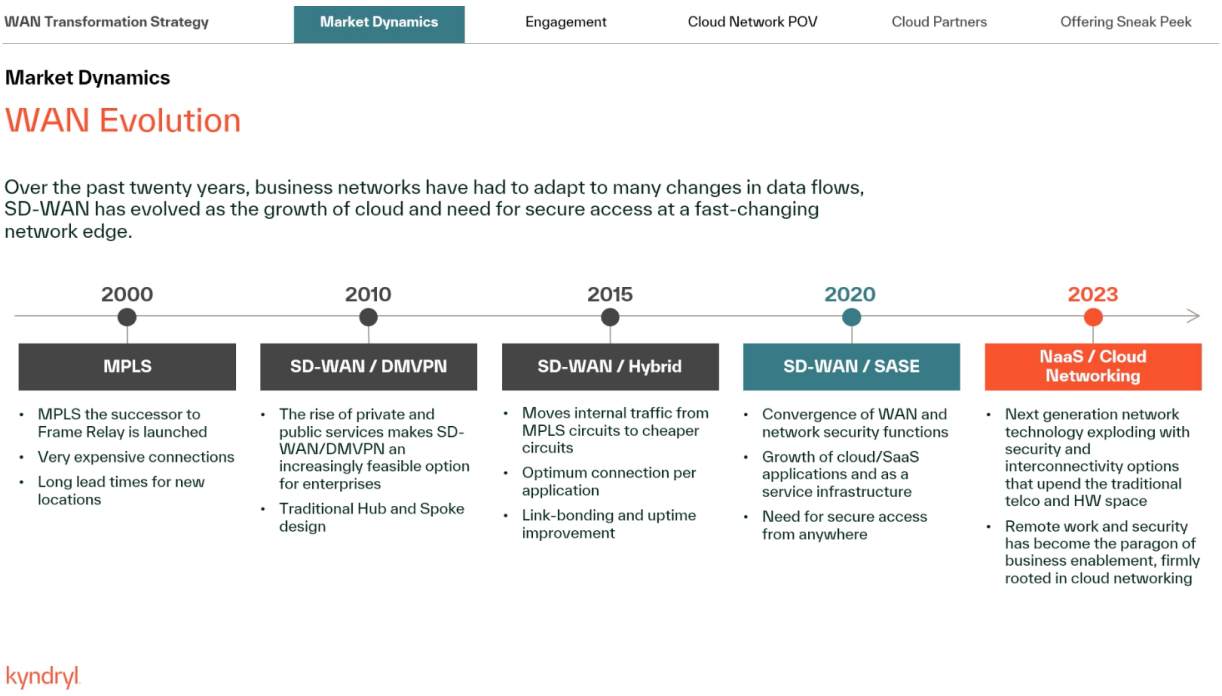


Figure 11: WAN Evolution to Support Hybrid Cloud

5.3.4 Outcome

The desired result of interconnected applications and users in a secure multi-cloud architecture with security, improved performance, increased agility, and better resiliency.

5.4 Hybrid Cloud – Steady State Roles

5.4.1 Roles and Description

Recommended resource role with descriptions to support a steady state hybrid (Cloud / on-premises) operating model:

Sl #	Resource Role	Description
1	Program Manager	• Coordinate meetings, workshops, communications with various parties • Project roadmap definition and budget management • Review of cloud migration roadmap and plan dependencies • Monitor progress of various activities to ensure successful completion as per schedule
2	Project Manager	• Owns the migration/cutover plan and is responsible for managing the coordination of tasks and resources
3	Senior Cloud Architect	• Coordinate cloud readiness & provide leadership • Review target architecture on cloud environment
4	Cloud Architect	• Design cloud architecture/design validation.

Sl #	Resource Role	Description
		• Develop best fit cloud architecture by leveraging cloud platform services • Support onsite / offshore Chief Cloud Architect • Provide technical guidance to the team.
5	Cloud/DevOps Engineer	• Infrastructure provisioning & configuration on Cloud, OS hardening in cloud • Application & data migration as per requirements using tools • Unit testing, Server configuration, Middleware and database setup
6	Cloud Specialist	• Perform application configuration for all the integration points • Perform data migration for the respective applications. • Batch Processing -Job Scheduling • Build, Deploy & Test application as required, Troubleshooting • Assess compatibility/integration of proposed components to ensure an integrated architecture
7	Windows/Intel SME	• Expert knowledge of Microsoft Windows Operating systems. • Strong knowledge of Active Directory concepts (i.e. Roles of Domain Controllers, DNS, DFS, WINS, GPO, etc.) • Strong knowledge of Microsoft Windows security (Firewalls, IPSec, ACLs, Authentication, etc.) • Familiar with the Windows registry, odbc, IIS and other methods used for application hosting and connectivity • Familiar with VMWare and Citrix-based technologies. • Solid understanding of TCP/IP and port configurations.
8	Linux/Unix SME	• Expert knowledge of Linux/Unix Operating systems (RedHat, CentOS, Fedora, Suse, Ubuntu, etc.) • Strong knowledge of Directory concepts (i.e.. LDAP, Kerberos, Active Directory integration) • Strong knowledge of Linux/Unix security (Firewalls, ACLs, Authentication, etc.) • Knowledge of security as it applies Web, Application and Database servers • Familiar with various application stacks (LAMP, ESX/i, WebSphere, etc.) • Solid understanding of TCP/IP and port configurations.

Sl #	Resource Role	Description
9	Storage SME	• Expert knowledge of Storage technologies, topologies and deployments (EMC, Tivoli, Veritas, NetApp, XIV, etc.) • Understanding of factors governing reliability and performance of Datacenter hardware and software • Strong knowledge of roles played by SAN/NAS in heavily virtualized environments (ESX hosts, Raw Data Mapping, LUN Management and limitations, etc.) • Strong knowledge of storage security and data management (Firewalls, ACLs, QTREEs, CIFS/SMB/NFS, Authentication, etc.)
10	Network SME	• Expert knowledge of Networking technologies, topologies and deployments (Network Addressing/Routing, Subnetting/Supernetting, Segments/VLANS/Trunking, QoS, VIPs/LB, etc.) • Expert knowledge of network security (Firewalls, ACLs, VPN, etc.) • Understanding of factors governing reliability and performance of Datacenter hardware and software
11	DBA	• Perform and support database installations, configurations and deployments including data extraction, transformation, and loading • Create and maintain database standards and policies, capacity planning and performance monitoring • Support database incident and problem management, backup and recovery, security and authentication
12	Security Architect	• Define the security controls as per the laws/regulations and prevailing industry standards and best practices • Plan, research and design security architecture for the IT systems • Review and approve installation requirements for all network devices (LANs, WANs, VPNs, firewalls, routers, etc.)

Table 14: Steady State (Hybrid Cloud) Roles and Description

5.5 Roadmap

5.5.1 Key Elements of a Long-Term Plan

Multi-year strategic plans allow organizations to plan and work towards long-term goals. Technology changes rapidly which makes planning in five (5) year increments challenging. Defining the objectives/goals/KPIs of an organization and taking a year-over-year iterative approach helps organizations keep pace with the rapid technology changes and stay on track.

Key elements of long-term strategic plans:

- **Objectives –** A high–level overview of the organization's objectives lets leaders visualize and track goals as met
- **Strategic Goals** – Allows leadership to visualize and develop multiyear plans with milestones
- **Annual Targets for Key KPIs** – A visualization of annual targets for key KPIs is necessary in a three-to-five-year dashboard as it allows leaders to track progress
- **Iterative Approach** – Conduct yearly review to ensure organization's strategic plan remains on target

5.5.2 Five-Year Plan

The high-level consolidation and decommissioning plan will be iterative in nature and will focus on continuous improvement utilizing lessons learned from each event.

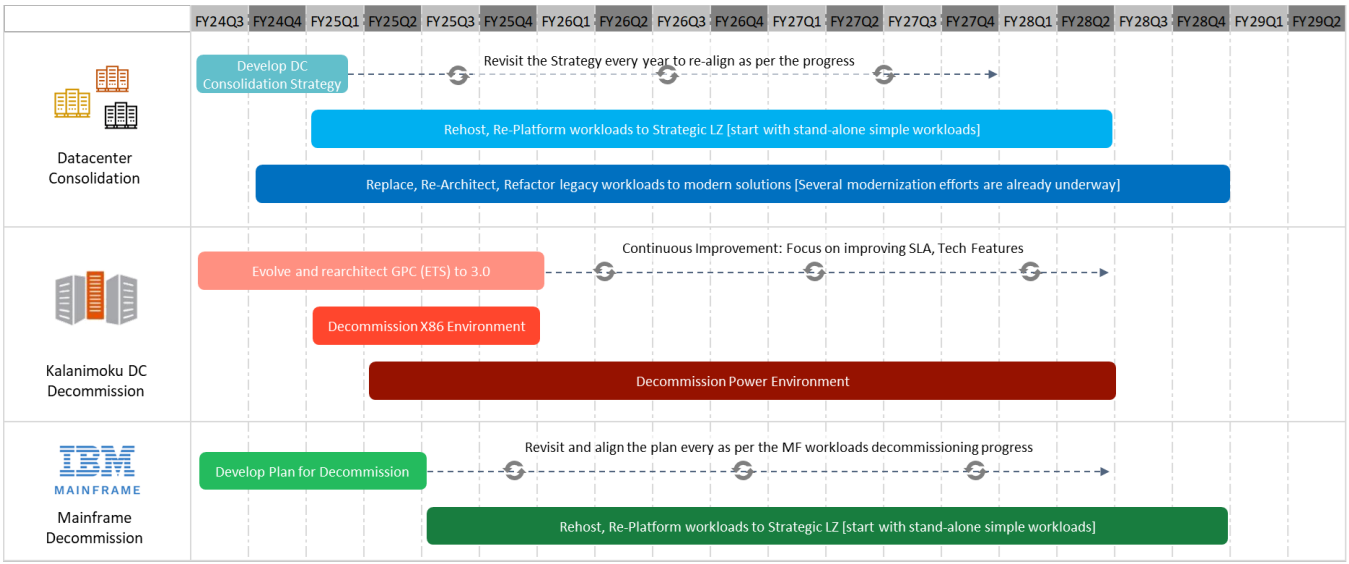


Figure 12: Five-Year Roadmap

5.5.2.1 Datacenter Consolidation

Develop a detailed strategy/plan in collaboration with the different departments. These plans will be refined, reviewed with stakeholders and executed over the next four years.

1. **Develop DC Consolidation Strategy** – Leverage the Application Disposition Study findings and recommendations to develop the detailed DC consolidation strategy
    a. Revisit and realign the strategy every year based on the progress made and taking into consideration other parallel initiatives in the State
2. **Migrate Workloads to Strategic Landing Zone** – Rehost or Re-platform workloads from On-premises data centers to one of the strategic cloud-based landing zones
    a. Develop migration patterns for different types of workloads
    b. Start with simple and stand-alone workloads (minimal application interfaces and dependencies)
    c. Plan for in-place OS/DB upgrades as needed to make workloads cloud ready
    d. Work closely with and provide continuous feedback to ETS on GPC 3.0 (new technical features needed, SLA/support concerns, upcoming requirements, etc.)
3. **Modernize Workloads** – Legacy applications will be re-architected/refactored to new modern systems or replaced by better-fit SaaS solutions:
    a. There are several ongoing modernizing projects and these should be included and tracked in the overall modernization initiative
    b. SaaS Solutions – Several departments use the same or similar solutions. Review such solutions and look for synergies (leverage findings from Application Disposition Study)

c. Bulk of these modernization would be for the mainframe systems. Provide continuous feedback to streamline the mainframe decommissioning process

5.5.2.2 Kalanimoku DC Decommission

1. **Evolve and rearchitect ETS GPC (from 2.0 to 3.0)** – An improved GPC will be a key piece in the State's overall cloud environment and will bring in a lot of synergies (e.g. Shared Services, less redundancy).
    a. Leverage 3rd party Hyperscalers for economies of scale to reduce hardware costs and real estate requirements
    b. Address communication channels between HI and CONUS in NGN new strategic design utilizing direct connect or satellite options to support geographically dispersed GPC 3.0 model
    c. Limit the scope of GPC 3.0 to latency dependent or legal requirements to host on island.
    d. Allow an opportunity for State staffing resources upskilled to support automation, compliance, disaster recovery and SLA support for critical workloads while removing the requirement to administrate low level tasks like facilities, hardware and operating systems.
2. **Decommission the Power Environment** – A limited number of critical workloads are hosted in this environment and still need to be migrated. Current plan is to migrate them within 42 months.
3. **Decommission the X86 environment** – These are department specific.

5.5.2.3 Mainframe Decommission

Mainframe decommissioning is one of the primary goals of the State's consolidation initiative. Currently all workloads are hosted from Mainframe Cloud (MFaaS) and the goal is to migrate/modernize all these workloads from mainframe to other suitable environments within 48 months, plus 6 months for decommission.

- **Handshakes with Modernization Projects** – Work closely with Mainframe modernization projects to efficiently plan the decommissioning of mainframe workloads.

5.5.3 Five-Year Roadmap Overview

To balance the resource requirements and to minimize risk for workloads migration/consolidation, each of the migration paths (7Rs) will progress at a different speed and volume over the five years.

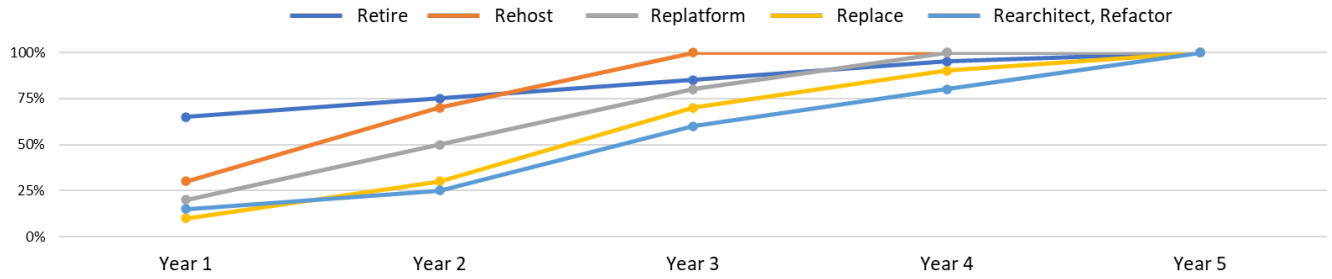


Figure 13: Roadmap Overview

5.5.4 Year 1 - Roadmap

5.5.4.1 Goals

R-Factor ---->	Retire	Rehost	Re-Platform	Replace	Refactor, Re-architect
%age Complete	65% *	30%	20%	10%	~15%

* There are 2 categories in applications tagged for retirement; Retired (no longer used) and To be retired (will be decommissioned as soon replacement is ready. 100% of the applications that are no longer in use will be decommissioned in the first year.

5.5.4.2 Activities/Events

The focus in Year 1 will be to develop the detailed consolidation strategy, build the migration/modernization patterns and benefit from the quick wins.

1. **Develop Consolidation Strategy** – Develop a detailed consolidation strategy in collaboration with the different departments. While the strategy/plan will be created at the very beginning of Year 1, it will need reevaluation and revision at least once every year.
2. **Application workloads**
    a. **Retire** – About 11% of the applications are either retired or no longer used. The current status of all such applications should be revalidated and then decommissioned using the State's processes. The goal is to complete decommissioning of **all** such applications in Year 1.
        i. There will be more applications added to this list of Retired/to be retired applications as new modern replacement applications become available for use. These will be decommissioned when the new application is satisfactorily available for use.
    b. **Rehost** – All pure lift and shift should be planned in the first 3 years.
        i. Execute POCs to develop the different migration patterns
        ii. Plan to complete rehosting **30%** of the workloads. The best candidates are:
            1. the stand-alone Tier 3 and Tier 4 applications
            2. applications hosted from EOL servers
            3. simple access-based applications
    c. **Re-Platform** – Re-platforming may require in-place OS/DB upgrades (cloud readiness) and/or code changes. So, unlike rehost, this would need a longer lead time to plan and complete the migration.
        i. The number of applications which will potentially require re-platforming would be around 10 applications. These should also be planned for and completed in the first 3 years.
        ii. The numbers can increase if some of the workloads planned for simple rehost can't be done due to technical limitations.
        iii. Goal should be to get through **20%** of the re-platforming in the first year.
    d. **Replace** – For some, the evaluation and procurement process are underway. But for others which are yet to start, evaluation and assessment typically adds 3-6 months to the overall process.
        i. In the first year, the focus will be on completing the ones that are already in progress.
        ii. Start the planning for the ones that are yet to be started.
        iii. Goal should be to complete 2-3 applications (~10%).
    e. **Refactor/Re-Architect** – This is the most time consuming and complex migration path and requires reinvestments.

i. Realistically, deployment of newly refactored or re-architected solutions can start only from Year 2. However, there are already some which are in progress and are expected to be ready in 3rd or 4th quarter of 2024 (Year 1).

* The initial table for roadmap details is available in Appendix 9.5.

5.5.5 Year 2 - Roadmap

5.5.5.1 Goals

R-Factor ---->	Retire	Rehost	Re-Platform	Replace	Refactor, Re-architect
%age Complete	75%	70%	50%	30%	30%

5.5.5.2 Activities/Events

The focus in Year 2 will be to build on the previous year's progress and continue the migration and/or consolidation journey.

1. **Revisit Strategy** – Review the progress made in the previous year, document the lessons learnt and replan (if needed) the activities for the current year. If there were delays, realign the goals keeping in consideration the runway remaining.
2. **Application workloads**
    a. **Retire** – Few applications to be decommissioned from Year 2 onwards. Most of these will be the ones for which a new replacement application is being built or procured.
        i. Will be tagged with applications being replaced, refactored or re-architected. Applications will be decommissioned as per the State's processes when the replacements are ready for use.
    b. **Rehost** – The first year was mostly focused on running POCs and rehosting simple and stand-alone workloads. In the second year
        i. Plan to complete rehosting **70%** of the workloads by year end.
            1. Tier 1 and Tier 2 applications will be rehosted.
            2. Departments with significant refactoring or rearchitecting work underway will be avoided to balance resource allocation.
    c. **Re-Platform** – Re-platforming volume will be slightly more in Year 3 and migration patterns will be available for different workloads.
        i. Another 2-4 applications will be planned for migration but will depend on the size of each Application.
        ii. The goal should be to get through **50%** of the re-platforming in the second year.
    d. **Replace** – In the second year, there should be a plan for every application that will potentially require a replacement. As the end-to-end timelines for replacing an application by COTS/SaaS solution is high, all planning should be done before the end of second year.
        i. Ensure the planning for all potential replacements is completed.
        ii. Complete replacement for the ones that were in progress.
        iii. The goal should be to complete ~5 applications (**30%** overall).

e. **Refactor/Re-Architect** – The plans for replacing all legacy applications should be ready by the start of Year 2. If some are still pending that should be the priority.

   i. Ensure planning process is complete for all legacy applications requiring rearchitect, preferably in the first couple of quarters.

   ii. By the end of Year 2, 30% of the workloads should be ready for production use. This includes the ones that are already in progress.

* The initial table for roadmap details is available in Appendix 9.5.

5.5.6 Year 3 - Roadmap

5.5.6.1 Goals

R-Factor ---->	Retire	Rehost	Re-Platform	Replace	Refactor, Re-architect
%age Complete	85%	100%	80%	70%	60%

5.5.6.2 Activities/Events

The focus in Year 3 will be to build on the previous year's progress and continue the migration and/or consolidation journey.

1. **Revisit Strategy** – Review the progress made in the previous year, document the lessons learnt and replan (if needed) the activities for the current year. If there were delays, realign the goals keeping in consideration the runway remaining.
2. **Application workloads**
   a. **Retire** – Few applications to be decommissioned in Year 3. Most of these will be the ones for which a new replacement application is being built or procured. Applications will be decommissioned as per the State's processes when the replacements are ready for use.
   b. **Rehost** – Bulk of the rehosting of workloads should be done by the end of Year 2. By the end of Year 2, all diverse types of workloads would have been successfully migrated. In the third year
      i. Plan to complete rehosting of all the remaining workloads by year end (**100%**).
   c. **Re-Platform** – As per the data available, few applications targeted for Re-platforming.
      i. Another 2-4 applications will be planned for migration but will depend on the size of each Application.
      ii. The goal should be to get through **80%** of the re-platforming in the third year.
   d. **Replace** – Majority of the replacement should be completed by the end of third year.
      i. The goal should be to complete 5-7 applications (**70%**).
   e. **Refactor/Re-Architect** – Majority of the remaining applications should be completed in the 3rd year to reduce the volume for the last two years.
      i. By the end of Year 3, 60% of the workloads should be ready for production use. This includes the ones that are already in progress.

* The initial table for roadmap details is available in Appendix 9.5.

5.5.7 Year 4 - Roadmap

5.5.7.1 Goals

R-Factor ---->	Retire	Rehost	Re-Platform	Replace	Refactor, Re-architect
%age Complete	95%	100%	100%	100%	80%

5.5.7.2 Activities/Events

The focus in Year 4 will be to build on the previous year's progress and continue the migration and/or consolidation journey.

1. **Revisit Strategy** – Review the progress made in the previous year, document the lessons learnt and replan (if needed) the activities for the current year. If there were delays, realign the goals keeping in consideration the runway remaining.
2. **Application workloads**
    a. **Retire** – Like Year 3, few applications to be decommissioned in Year 4. Most of these will be the ones for which a new replacement application is being built or procured. Applications will be decommissioned as per the State's processes when the replacements are ready for use.
    b. **Rehost** – As per the plan/goals, no workloads remaining for Rehosting. However, it would be good to reassess the remaining workloads hosted from on-premises servers.
    c. **Re-Platform** – Plan to complete all the remaining re-platforming workloads.
        i. 2-4 applications at most should remain for the fourth year.
        ii. The goal should be to get through **100%** of the re-platforming in the fourth year.
    d. **Replace** – Only a handful of solutions should be remaining for replacement.
        i. The goal should be to complete all applications (**100%**).
    e. **Refactor/Re-Architect** – Majority of the remaining applications should be completed in the 3rd year to reduce the volume for the last two years.
        i. By the end of Year 4, 80% or more of the workloads should be ready for production use. This includes the ones that are already in progress.

* The initial table for roadmap details is available in Appendix 9.5.

5.5.8 Year 5 - Roadmap

5.5.8.1 Goals

R-Factor ---->	Retire	Rehost	Re-Platform	Replace	Refactor, Re-architect
%age Complete	100%	100%	100%	100%	100%

5.5.8.2 Activities/Events

The focus in Year 5 will be to review what has been accomplished so far and try to satisfactorily complete all remaining tasks.

1. **Revisit Strategy** – Review the progress made in the previous year, document lessons learnt and replan (if needed) the activities for the current year. The goal will still be to complete all planned activities before the end of this year.
2. **Application workloads**
    a. **Retire** – Like Year 3 and 4, likely few applications to be decommissioned in Year 5. Most of these will be the ones for which a new replacement application is being built or procured. Applications will be decommissioned as per the State's processes when the replacements are ready for use.
    d. **Rehost, Re-Platform** and **Replace** – As per the plan/goals, no workloads remaining for rehosting, re-platforming or replacing. However, it would be good to reassess the remaining workloads.
    e. **Refactor/Re-Architect** – Majority of the remaining applications should be completed by the 4th year. The few remining would be in the last stages of the development/deployment.
        i. By the middle of Year 5, **100%** of the workloads should be ready for production use.
        ii. The remaining 2 quarters can be used for application and infrastructure decommissioning.

* The initial table for roadmap details is available in Appendix 9.5.

5.5.9 Next Steps

Kyndryl's point of view on mitigating challenges and what Agencies need to get right

1. Application Portfolio Rationalization - Identify Applications & Infrastructure
    - Full Application Portfolio Discovery & Analysis (R-Factor analysis)
    - Determine Readiness for Cloud or retirement to plan the MF/DC Exit
2. Establish an Enterprise Governance Strategy & Structure
    - Create Strategic Steering Committee and link to program strategic vision to ensure goals are met (ensure all key stakeholders are represented)
    - Program management office to orchestrate multi-stream migration and modernization efforts
3. Start PoC and Break Application Migration Execution into Manageable 'Chunks' (e.g. Wave Plans)
    - Execute a PoC for 3-5 agencies
    - Next level deep dive on wave planning across each agency
4. Define the Cloud Operating Model of the Day 2 Services and Supporting Workforce
    - Cloud Support organization, methods, tools and overall AMS & Infra Approach
    - Upskilling current state workforce (Infrastructure, NW and Application)
    - Automated Platforms, application on-boarding patterns & developer experience
5. Define Application Landing Zone / Re-architecting the GPC from 2.0 to 3.0
    - Leverage 3rd party Hyperscalers for economies of scale to reduce hardware costs and real estate requirements
    - Address communication channels between HI and CONUS in NGN new strategic design utilizing direct connect or satellite options to support geographically dispersed GPC 3.0 model
    - Limit the scope of GPC 3.0 to latency dependent or legal requirements to host on island.

- Allow an opportunity for State staffing resources upskilled to support automation, compliance, disaster recovery and SLA support for critical workloads while removing the requirement to administrate low level tasks like facilities, hardware and operating systems.

6. Finalize Next Generation NW Strategy and build execution plan
    - NGN Assessment, Strategy & Roadmap

6 Potential Savings

Consolidation, migration and optimization of workloads may result in one-time and recurring cost savings. However further due diligence is required to estimate projected savings.

1. Applications: Migration, Consolidation and Optimization
    - Reduce **on-premises footprint** and move application workloads to Cloud
    - **Decommission** all applications (74) and associated infrastructure that have been retired or are no longer used
    - Increase application footprint in ETS GPC to leverage **economies of scale**
    - Attempt to **consolidate SaaS/COTs** solutions across departments/agencies
        - Application Portfolio Management
        - Document Management
        - Case Management
        - Customer Service Management
        - Employee Service Management
        - Travel Software
    - Additional areas for **consolidation/retirement** - evaluate functionality that can be moved to some of the consolidated application platforms/system
    - Potential Savings of **~15-20**% of existing operational costs based on actual migration from On-premises to one of the cloud landing zones.
2. Infrastructure: Consolidation and Decommissioning
    - **Reduction** in CoLo sites used today
    - Decrease footprint in department data centers to reduce costs in power and cooling
    - **Cost savings** can be realized with consolidated shared infrastructure services, hyperconverged infrastructure and removal of physical equipment targeted for decommission.
    - Potential Savings of **~10**% of existing infrastructure and software licensing costs based on actual consolidation and decommissioning.
3. Lower recurring costs, improve cost controls and transparency
    - **Realign operations model** (with shift of workloads to cloud)
    - Improve work productivity and **resource utilization**
    - Lower Infrastructure expenses (including licenses) from reduced footprint
    - Potential Savings of **~5-10**% of existing operational costs based on actual migration from On-premises to one of the Cloud landing zones and to-be support model.

4. Reduce Business and IT Risks: Application Portfolio stability will be improved resulting in fewer business disruptions and less support cost.
    - **Migrate from legacy systems**: Invest in scalable, agile infrastructure to leverage modern technologies to support new business applications
    - **Documentation**: Improved documentation will help in reducing response time and result in better planning of software/hardware lifecycle management
    - Reduction in **end-of-life** software/infrastructure components
    - Potential Savings of **~5**% of incremental application resiliency and redundancy.

7 Appendix

7.1 Glossary of Terms and Definitions

7.1.1 T.I.M.E. Model

Tolerate – An application with high technical quality, but sub-optimal functional business value. The applications should be redesigned for better business alignment.

Invest – An application with high technical and business value. There is an attributable and recognizable value - and high and/or critical usage. The application is worth continued investment to get even better returns or reduce more costs.

Migrate – An application has high business value, but a poor technical fit. Discard the application but migrate its data and users to a new application or to a better-fit existing application.

Eliminate – Eliminate useless Applications with low business value and a poor technical fit (possible reasons: no business value, not used, low utility, based on obsolete software).

7.1.2 7R Migration Paths

R-Factor	Service Model	Description
Rehost	IaaS	"*Lift and Shift*" – leveraging cloud IaaS, moving on-premises workloads to the cloud without changing the core infrastructure, easy to perform, cloud expertise not required.
Replatform	IaaS	*"Lift, Tinker and Shift"* – move an application to the cloud while employing some form of platform optimization to leverage cloud-native capabilities, source code and architecture remain unchanged, while leverage cloud-based compliance, security, automation.
Replace, Repurchase	SaaS	*"Drop and Shop"* – swapping internally administered systems for 3rd party managed services from CSPs, helps to retire legacy systems and move to SaaS subscription model.
Refactor	PaaS	*"Containerize"* – redesign portions into containers or microservices to add scalability, speed, performance
Rearchitect	IaaS, PaaS	*"Re-write/Remediate"* – most complex, large investment, involves re-architecting workloads to support cloud native capabilities from the ground up, breaks down a monolithic application into microservices to achieve HA

		and enhanced automation, considered most future proof.
Retain	NA	*"Do nothing & revisit"* – Applications that cannot be retired and should continue to operate in their existing framework, if workloads rely on another application that needs to be migrated first or when there's no immediate business value in moving the application to the cloud.
Retire	NA	*"Decommission"* – terminating or downsizing applications that are no longer useful or no longer used in production.

Table 15: R-Factor (Migration Paths)

7.1.3 Application Types

The definitions given below are in context of how these terms have been used and how the applications have bene classified in this application disposition study.

Software-as-a-Service (SaaS) – On-demand access to ready-to-use, cloud-hosted application software. Solutions which are end-to-end managed and hosted by the vendor.

Platform-as-a-Service (PaaS) – On-demand access to a complete, ready-to-use, cloud-hosted platform for developing, running, maintaining and managing applications. For example, Salesforce, Office365

Infrastructure-as-a-Service (IaaS) – On-demand access to cloud-hosted physical and virtual servers, storage and networking. Custom/COTS applications hosted from Cloud (Public or Private).

Power – Applications or certain components (like databases) are hosted from the IBM Power Systems.

Mainframe – Applications running on IBM Mainframe (Hosted MFaaS).

On-Premises – All home-grown/custom or COTS applications hosted from on-premises data centers.

7.1.4 Strategic Landing Zones

CSPs (CONUS)

- **Public Cloud** – Includes all commercial Hyper-scalers (AWS, Azure, Google Cloud, Oracle Cloud)
- **Govt Cloud** – Federally certified and accredited to meet the compliance and security requirements of government enterprises (AWS, Azure, Google Cloud, Oracle Cloud)

CSPs (Hawaii)

- **Private Cloud (CoLo)** – The local co-location commercial sites located within the state and provide hosting services (DRFortress, ServPac, UHM, AlohaNap).

State Owned

- **ETS GPC** – State owned shared cloud computing environment providing Windows & RedHat Enterprise Linux virtual servers to departments as needed.

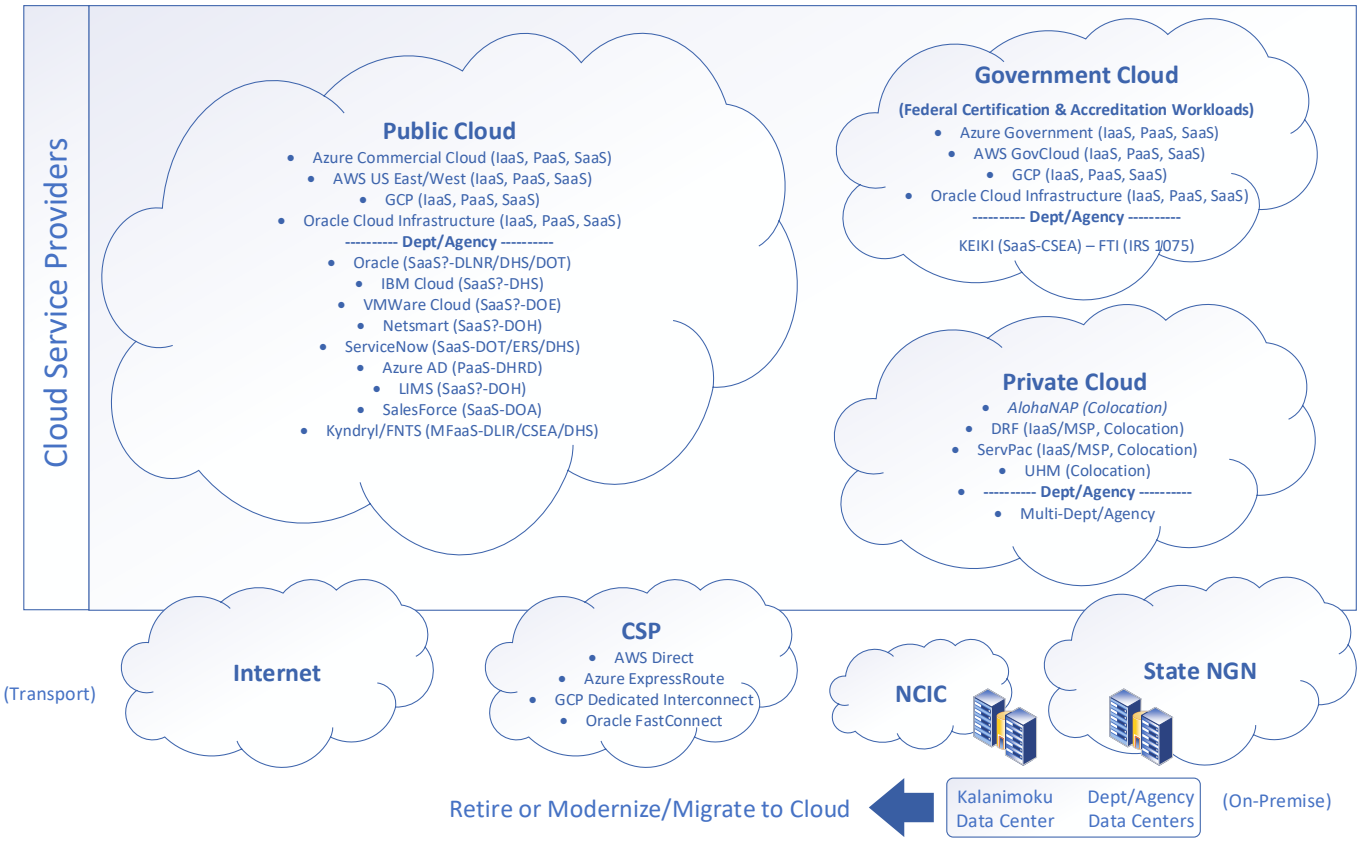


Figure 14: Cloud Service Providers, Transport, and On-Premises Landscape

7.2 COTS/SaaS Solutions

Solution/Business Function	Department	Application Name	Product/Vendor
Document/Content Management	HHL	ApplicationXtender Web Access	ViaTRON
	AGS	Archives Greenstone	University of Waikato
	ATG	ATG-CSEA DataCap/FileNet	IBM
	CCA	BREG - Records Document Processing and Management System (RDPMS)	OpenText
	HRD	Kofax AutoStore - DHRD Worker's Compensation Scanning	
	HTH	DOH-ASO Contracts Management System	Revacomm
	HTH	DOH-ASO Document Management System	Information Capture Solutions
	TRN	DOT-ADMIN DOT Document Management System (FY22)	IBM

Solution/Business Function	Department	Application Name	Product/Vendor
	ATG	iManage	iManage
	HHL	Recordation	APPX Software
	CCA	PUC-Case & Document Management System (CDMS)	Salesforce
	CCA	PUC-Document Management System (DMS)	
	TAX	TAX OpenText Captiva Capture	Information Capture Solutions
	LBR	DLIR-DCD FileNet	IBM
	HTH	DOH-ASO Contract Genie	Homegrown
	PSD	PSD-Law Enforcement Records Management System	
Case Management	CCA	PUC-Case & Document Management System (CDMS)	Salesforce
	HMS	RiteTrack	Handel
	DEF	ArkCase	ArkCase/Armedia
	ATG	ATG-CSEA KEIKI Child Support Enforcement System (Cloud)	Homegrown
	HMS	DHS-BESSD HANA (Hawaii Automated Network for Assistance Application)	Homegrown
	HMS	DHS-MQD AHCCCS MMIS	
	HMS	DHS-SSD CCWIS (Comprehensive Child Welfare Information System)	Homegrown
	HMS	DHS-SSD CPSS (Child Protective Services System)	Homegrown
	HMS	DHS-SSD SHAKA (State of Hawaii Automated Keiki Assistance)	Homegrown
	LBR	DLIR-DCD eCMS	eCMS
	HTH	DOH Electronic Disease Surveillance System	Conduent

Solution/Business Function	Department	Application Name	Product/Vendor
	HTH	DOH Women, Infant Child (WIC) Food vouchering system (HiWIC)	RSM
	ATG	ProLaw	Thomson Reuters
Customer Service Management	BUF	BUF - ERS ServiceNow IT Service Management	ServiceNow
	HHL	DHHL - Salesforce Contact Center	Salesforce
	HHL	DHHL - Talkdesk Contact Center	Talkdesk
	CCA	DO - Referral System Replacement	Salesforce
	ETS	ETS - HawaiiPay Help Desk (hipservice.hawaii.gov)	Salesforce
	TRN	ServiceNow	ServiceNow
	HMS	ServiceNow: Ticketing System	ServiceNow
	ETS	ETS - ITRS Helpdesk	Homegrown
Employee Service Management	AGS	DAGS-HiMod Statewide Payroll	
	AGS	DAGS-HiMod PeopleSoft HRMS	PeopleSoft
	HRD	PeopleSoft HRMS - Workers Compensation Module	PeopleSoft
	AGS	DAGS-HiMod Time and Leave Management	PeopleSoft
	CCA	DO - Personnel - PeopleSoft Time and Leave	PeopleSoft
	ETS	ETS - Time Accounting and Billing System	
	ETS	ETS - Time and Leave System (TLS)	
	HRD	PeopleSoft HRMS - State of Hawaii Executive Branch Departments	PeopleSoft
	PSD	PSD-Corrections Time & Attendance	Homegrown
	DEF	ARRO	ISF

Solution/Business Function	Department	Application Name	Product/Vendor
	HTH	DOH-ASO Employee and Position Management System (HRMS)	Homegrown
Application Portfolio Management/Collaboration	AGS	Archives - Confluence	
	TRN	DOT-HAR-E Project Management Solution - eBuilder	eBuilder
	ETS	ETS - Box.com	
	ETS	ETS - Dropbox.com	
	ETS	ETS - LeanIX	LeanIX
	CCA	ISCO - Infra - Doc Lib	Lotus Notes/IBM
	CCA	RICO/OAH - Citation Log	Lotus Notes/IBM
	TRN	DOT-AIR Duty Manager Log	Notes/HCL

Table 16: List of common COTS/SaaS solutions

7.3 Mainframe Applications

Department	Application Name	Modernization?	TIME Category	R-Factor Disposition	Findings and Recommendations
AGS	1099 Reporting	- Planning in progress	Eliminate	Retire	- This mainframe application is at EndOfLife and will be replaced by the new EFS system. - Planning and procurement process for EFS is in progress.
AGS	Bond Fund	- Planning in progress	Eliminate	Retire	- This mainframe application is at EndOfLife and will be replaced by the new EFS system. - Planning and procurement process for EFS is in progress.
AGS	Business Office System	- No plans as yet			- Is a legacy mainframe application
AGS	Central Warrant Writer	- Planning in progress	Eliminate	Retire	- This mainframe application is at EndOfLife and will be replaced by the new EFS system.

Department	Application Name	Modernization?	TIME Category	R-Factor Disposition	Findings and Recommendations
					- Planning and procurement process for EFS is in progress.
AGS	Collateral and Securities Inventory	- Planning in progress	Eliminate	Retire	- This mainframe application is at EndOfLife and will be replaced by the new EFS system. - Planning and procurement process for EFS is in progress.
AGS	DAGS-DataMart	- Planning in progress	Eliminate	Retire	- This mainframe application is at EndOfLife and will be replaced by the new EFS system. - Planning and procurement process for EFS is in progress.
AGS	DAGS-FAMIS Financial Accounting & Management Information System	- Planning in progress	Eliminate	Retire	- This mainframe application is at EndOfLife and will be replaced by the new EFS system. - Planning and procurement process for EFS is in progress.
AGS	Election Payroll	- Planning in progress	Eliminate	Retire	- This mainframe application is at EndOfLife and will be replaced by the new EFS system. - Planning and procurement process for EFS is in progress.
AGS	FAMIS Annual Rpt.	- Planning in progress	Eliminate	Retire	- This mainframe application is at EndOfLife and will be replaced by the new EFS system. - Planning and procurement process for EFS is in progress.
AGS	General Ledger System (KLD)	- Planning in progress	Eliminate	Retire	- This mainframe application is at EndOfLife and will be replaced by the new EFS system. - Planning and procurement process for EFS is in progress.

Department	Application Name	Modernization?	TIME Category	R-Factor Disposition	Findings and Recommendations
AGS	Inventory Management	- Planning in progress	Eliminate	Retire	- This mainframe application still meets all the business and technical requirements. - But the overall plan is to move out of mainframe. It is expected to be replaced by the new EFS system. - Planning and procurement process for EFS is in progress.
AGS	Legislative Reconciliation	- No plans as yet	Migrate	Rearchitect	- This is a legacy mainframe-based application. - Plan for and provision/procure a new replacement system.
AGS	Project Accounting	- Planning in progress	Eliminate	Retire	- This mainframe application is at EndOfLife and will be replaced by the new EFS system. - Planning and procurement process for EFS is in progress.
AGS	Warrant Reconciliation	- Planning in progress	Eliminate	Retire	- This mainframe application is at EndOfLife and will be replaced by the new EFS system. - Planning and procurement process for EFS is in progress.
ATG	ATG-CSEA KEIKI Child Support Enforcement System (MFaaS)	- Modernization in progress	Eliminate	Retire	- New modernized application is being built to replace this Application. - Will be ready in Aug-2025.
BED	DLIR-Research and Statistics ES-202 Employment and Wages Program	- No plans as yet	Migrate	Rearchitect	- Mainframe application which is at EndOfLife. - Poor satisfaction and poor fit. - Plan for and migrate to a more modern solution.
BED	DLIR-Research and Statistics ES-203 Unemployment Insured	- No plans as yet	Migrate	Rearchitect	- Mainframe application which is at EndOfLife. - Poor satisfaction and poor fit.

Department	Application Name	Modernization?	TIME Category	R-Factor Disposition	Findings and Recommendations
	Characteristics Research				- Plan for an migrate to a more modern solution.
BED	DLIR-Research and Statistics ETA-204 Research and Statistics System	- No plans as yet	Migrate	Rearchitect	- Mainframe application which is at EndOfLife. - Poor satisfaction and poor fit. - Plan for an migrate to a more modern solution.
BUF	B&F Reconciliation	- No plans as yet	Migrate	Rearchitect	- Legacy mainframe application. Meets the current needs. - But for long-term, it should be replaced with a modern, cloud-based solution.
BUF	Bond Allocation Tracking System	- No plans as yet	Migrate	Rearchitect	- Legacy mainframe application. - It should be replaced with a modern, cloud-based solution.
BUF	BUF - BPPM - Budget Request System/eBuddi	- No plans as yet	Migrate	Rearchitect	- Mission Critical Application - needed to create the state budget. - Legacy mainframe application. - It should be replaced with a modern, cloud-based solution.
BUF	BUF-BPPM-CIP Budget Summary / eCIP	- No plans as yet	Migrate	Rearchitect	- Legacy mainframe application. - It should be replaced with a modern, cloud-based solution.
BUF	Employers Cost Allocation Plan	- No plans as yet	Migrate	Rearchitect	- Legacy mainframe application. - It should be replaced with a modern, cloud-based solution.
BUF	Interest Allocation	- No plans as yet	Migrate	Rearchitect	- Legacy mainframe application. - It should be replaced with a modern, cloud-based solution.

Department	Application Name	Modernization?	TIME Category	R-Factor Disposition	Findings and Recommendations
BUF	Overtime Study	- No plans as yet	Migrate	Rearchitect	- Legacy mainframe application. - It should be replaced with a modern, cloud-based solution.
ETS	ETS - CA Sort	- Mainframe Utility	Eliminate	Retire	- This mainframe sorting utility will no longer be required. - Can be decommissioned as soon as the primary application is sunset.
ETS	ETS - KOMANDS Financial Management System	- Mainframe Utility	Eliminate	Retire	- Is a software package that is run on the IBM Mainframe. - This can be decommissioned when all m/f applications are retired or modernized.
ETS	ETS - Laser Printer Forms	- Mainframe Utility	Eliminate	Retire	- This mainframe printing utility will no longer be required. - Can be decommissioned as soon as the primary application is sunset.
ETS	ETS - Mainframe VPN	- Mainframe Utility	Tolerate	Retain	- VPN used for mainframe systems.
ETS	ETS - RACF	- Mainframe Utility	Tolerate	Retain	- Will be in use as long as MF applications are in use. Will be decommissioned when all MF applications are retired.
ETS	ETS - SyncSort	- Mainframe Utility	Eliminate	Retire	- This mainframe sorting utility will no longer be required. - Can be decommissioned as soon as the primary application is sunset.
ETS	ETS - Time Accounting and Billing System	- No plans as yet	Migrate	Rearchitect	- Get out of mainframe. - Migrate the current functions, data and users to a new application.
ETS	ETS - ZIP + 4 Project (package)	- No plans as yet	Migrate	Rearchitect	- Is a software package that is run on the IBM Mainframe. - Assists various departments with the verification of

Department	Application Name	Modernization?	TIME Category	R-Factor Disposition	Findings and Recommendations
					addresses primarily for mailing purposes.
HMS	DHS Case Service/Client Demographic System	- Modernization in progress	Migrate	Rearchitect	- This is a mainframe application.
HMS	DHS DSSA Financial and Accounting System (KBF)	- Planning in progress	Migrate	Rearchitect	- Mainframe (JCL) application running against FAMIS.
HMS	DHS-BESSD HAWI (Hawaii Automated Welfare Information)	- Modernization in progress	Migrate	Rearchitect	- This is a 25-year-old mainframe system. Built on COBOL and ADABAS.
HMS	DHS-HARI (Hawaii Accounts Receivable Information)	- Modernization in progress	Migrate	Rearchitect	- This is a 25-year-old mainframe system. Built on COBOL and ADABAS.
HMS	DHS-MQD Cross Match of DHS & UI Wage & Employment Data	- Modernization in progress	Migrate	Rearchitect	- Mainframe based interfaces. - Will be replaced by the new DLIR UI system.
HMS	DHS-MQD DSSH/UI Interface	- Modernization in progress	Migrate	Rearchitect	- Mainframe based interfaces. - Will be replaced by the new DLIR UI system.
HMS	DHS-SSD CPSS (Child Protective Services System)	- Planning in progress	Eliminate	Retire	- Antiquated mainframe system - Replace with a modernized system. - Process is underway to build or procure the new replacement system.
HMS	DHS-SSD CPSS Payment System	- Planning in progress	Eliminate	Retire	- Antiquated mainframe system - Replace with a modernized system.

Department	Application Name	Modernization?	TIME Category	R-Factor Disposition	Findings and Recommendations
					- Process is underway to build or procure the new replacement system.
HMS	DHS-SSD License Resource File System	- Planning in progress	Eliminate	Retire	- Antiquated mainframe system - Replace with a modernized system. - Process is underway to build or procure the new replacement system.
HMS	DHS-SSD Title XX Reporting System	- Planning in progress	Eliminate	Retire	- Antiquated mainframe system - Replace with a modernized system. - Process is underway to build or procure the new replacement system.
HRD	Personnel Records System	- Planning in progress	Eliminate	Retire	- This mainframe application is no longer used and is also at EndOfLife. - Need another verification and can be decommissioned.
HTH	DOH Health Utilization Care System (HXA)	- Planning in progress	Migrate	Rearchitect	- This is a mainframe-based system and should be decommissioned. - The application handles critical payroll processing. - There are already plans in place for the same.
HTH	DOH-ASO FAMIS/ DataMart Financial Reporting System	- Planning in progress	Migrate	Rearchitect	- This is a part of the current FAMIS system. And the upcoming EFS system should replace these functions.
HTH	HISOK (HIS)	- Planning in progress	Migrate	Rearchitect	- It is a FAMIS download so Management Expense Reports can be generated from the FAMIS data. And the upcoming EFS system should replace these functions.

Department	Application Name	Modernization?	TIME Category	R-Factor Disposition	Findings and Recommendations
LBR	DLIR Work Opportunity Tax Credit (WOTC)	- No plans as yet	Migrate	Rearchitect	- Mainframe based application.. - Recommended to migrate to a modern solution.
LBR	DLIR-DCD Disability Compensation Information System (DCIS)	- Modernization in progress	Eliminate	Retire	- Business critical application on mainframe. - Salesforce based replacement solution is in progress (DLIR-DCD eCMS).
LBR	DLIR-UI Benefits System (UIB)	- No plans as yet	Migrate	Rearchitect	- Business critical application on mainframe. - Recommended to migrate to a modern solution.
LBR	DLIR-UI Child Support Enforcement Intercept	- No plans as yet	Migrate	Rearchitect	- Business critical application on mainframe. - Recommended to migrate to a modern solution.
LBR	DLIR-UI Interstate Benefit Internet	- No plans as yet	Migrate	Rearchitect	- Business critical application on mainframe. - Recommended to migrate to a modern solution.
LBR	DLIR-UI Quarterly Wage Reporting System (QWRS)	- No plans as yet	Migrate	Rearchitect	- Business critical application on mainframe. - Recommended to migrate to a modern solution.
LBR	DLIR-UI Tax System	- No plans as yet	Migrate	Rearchitect	- Business critical application on mainframe. - Recommended to migrate to a modern solution.
TRN	DOT-HWY HWYAC	- Modernization in progress	Eliminate	Retire	- New system (h-4) is being built to replace this legacy mainframe system.
TRN	DOT-HWY Legacy Financial System	- Modernization in progress	Eliminate	Retire	- The new replacement system, H-4, is underway. This application will be retired as soon as the new system is ready.

Table 17: Mainframe Applications

7.4 Power Applications

Department	Application Name	Modernization?	TIME Category	R-Factor Disposition	Findings and Recommendations
ATG	CJIS-Hawaii DB2 Production database	- No plans as yet	Migrate	Replatform	- DB2 DB hosted from Power. - Migrate these DB2 databases out of Power to preferably a modern cloud hosted DB.
ATG	CJIS-Hawaii DB2 QA database	- No plans as yet	Migrate	Replatform	- DB2 DB hosted from Power. - Migrate these DB2 databases out of Power to preferably a modern cloud hosted DB.
ATG	CJIS-Hawaii DB2 Test database	- No plans as yet	Migrate	Replatform	- DB2 DB hosted from Power. - Migrate these DB2 databases out of Power to preferably a modern cloud hosted DB.
ATG	CJIS-Hawaii DB2 Dev database	- No plans as yet	Migrate	Replatform	- DB2 DB hosted from Power. - Migrate these DB2 databases out of Power to preferably a modern cloud hosted DB.
BED	Hawaii Foreign-Trade Zone Information Processing System (HFTZIPS) Inventory Management System	- No plans as yet	Tolerate	Retain	- Application is on legacy AS400. - But this is an excellent fit and will last at least another 10 years. - Any new system must be federally approved. So, has a long cycle.
CCA	DFI - Financial Institutions Management System (FIMS)	- Retired	Eliminate	Retire	- Application is retired or no longer used.
CCA	INS - Hawaii Insurance Division System (HIDS)	- Modernization in progress	Eliminate	Retire	- This is a legacy application hosted from the Power environment. - The replacement for this Application is ready but still a few departments use this.

Department	Application Name	Modernization?	TIME Category	R-Factor Disposition	Findings and Recommendations
					- It is recommended to sunset this application.
CCA	PVL - Applicant/ Licensee Integrated Automated System (ALIAS)	- Retired	Eliminate	Retire	- Application is retired or no longer used.
CCA	RICO/OCP/SEB/CATV/DFI - Complaints Management System (CMS)	- Retired	Eliminate	Retire	- Application is retired or no longer used.
CCA	BRIMS - Oracle DB	- Modernization in progress	Eliminate	Retire	- These are the Oracle DBs used by BRIMS. - No longer needed after the replacement system is ready.

Table 18: Power Applications

7.5 Initial Roadmap Table

Migration Path	Count	Ongoing	Recommended
Year 1	**35**		
Rehost	24		- AGR 7 Applications (e.g. ALA, AQSIS, PESTREG) - AGS - Archives - Bamboo - ATG - Vulnerability Scanning Software - BUF-EUTF-Office Suite - DEF - CommanderOne, and WebEOC - ETS - CSB S1 System (request mgmt) - DHS - UiPath - HTH 5 Applications (e.g. EBRS, Birth Defects Registry) - DLIR WOTC eApplication, and DUA - LNR - Public Land Trust Information System - DOT-AIR WINGS - PSD-NED Controlled Substance Registration System

Migration Path	Count	Ongoing	Recommended
Replatform	3		- DFI - NMLS Licensees - PVL - REB - CPR - RICO - State Certified Arbitration Program Database (SCAP)
Replace	4	- AG- Civil Recoveries Division - Online Auction - DHS Vocational Rehabilitation	- DHS-MQD Benefits Portal - ApplicationXtender Web Access
Rearchitect, Refactor	4	- DHS-BES will be ready by 06/24. - New SaaS solution for DOH Clinical License Registry - DOT HWY H-4 System	- Interface Upgrade - DHS-BESSD HANA (Hawaii Automated Network for Assistance Application)
Year 2	**58**		
Rehost	36		- AGR ARMIS, ASO APPX, and Veterinary Laboratory Information System - AGS - Archives Greenstone - BUF - ARO Attorney and Witness Fees, EUTF - Accounting System - Criminal Justice Information System (CJIS) - DLIR 4 Applications (e.g. RTAA, Workforce Development Systems) - DLNR - State Land Information Management System, and Engineering Regulated Dam Safety Program, National Flood Insurance Program Flood Hazard Assessment Tool - DOH 8 Applications (Child Death Review, PRAMS, eTravel, HRMS, LTS) - DOT-HWY 7 Applications (e.g. Database Applications) - ATG - Green Box, HIJIS, LOTC, and RAP Back - DOE - PeopleSoft HRMS DOE - PSD - Law Enforcement Records Management System - DHS - Emphasys Elite
Replatform	4		- CJIS-Hawaii DB2 database (Production, QA, Test, Dev)
Replace	11	- DOH - Clinical Horizon and Environmental Horizon LIMS - DOH-BHA Adult Mental Health Division - EHR Modernization (AMHD) - DOH-BHA INSPIRE+ Case	- ATG - Automated Biometric Identification System - DHS-MQD Case Management, and MQD Reporting - DOH Public Health Nursing Client/Service

Migration Path	Count	Ongoing	Recommended
		Management Solution for added divisions - Application	Tracking System - EDN - Enterprise Learning Management System (LMS) - HHL - Legacy APPX, and Recordation
Rearchitect, Refactor	7	- KEIKI System (including the Agency and Customer portal) - DVR AWARE System	- ETS - ZIP + 4 Project (package) - PSD-Admin FIS - PSD-Corrections Time & Attendance
Year 3	**42**		
Rehost	20		- ATG-CSEA DataCap/FileNet, DSS, HATS - ATG-JJIS, iManage, ProLaw, State Services Portal, Bugzilla 4.4.6 - DLIR-HCRC, QWRS, CARS, WSDIMS - DOH Children w/Special Health Needs, ECDR, ELR, Contract Genie - DOT-ADMIN DOT Document Management System (FY22) - DOT-AIR Duty Manager Log, HWYAC Online
Replace	12	- DOH Hawaii Immunization Registry (HIR)	- AGR - WINWAM - BUF - FAD - Treasury Application - DHS - MQD AHCCCS MMIS, and MQD HPMMIS - DOH - Early Intervention Services - DOT - ADMIN Legacy Lotus Notes/Domino Applications - HHL - Applicant/Lessee, Mortgage Loan, and Utility Star Gold Version 9.0 - ATG - MFI Morpho Face Investigate - BUF - Overtime Study
Rearchitect, Refactor	10	- DHS-SSD CCWIS - PSD-Corrections Collaboration System	- BUF - Bond Allocation, Employers Cost Allocation and Interest Allocation systems DLIR-Research and Statistics ES-202, ES-203 and ETA-204 ETS - Time Accounting and Billing System PSD-Corrections Clinical Works
Year 4	**18**		

Migration Path	Count	Ongoing	Recommended
Rearchitect, Refactor	18	- DAGS-Enterprise Financial System (EFS)	- BUF - Reconciliation, eBuddi, eCIP systems - DHS DSSA KBF, DHS-MQD Cross Match of DHS & UI Wage & Employment Data and DSSH/UI Interface - DLIR-UI Benefits, Child Support Enforcement, Interstate Benefit, QWRS and TAX Systems - DOH HXA, FAMIS/DataMart and HISOK systems - AGS -Legislative Reconciliation - EDN - DOE Personnel and Payroll from VAX
Year 5	**1**		
Rearchitect, Refactor	1		DLIR Work Opportunity Tax Credit (WOTC)

8 Attachments

8.1 Studies & Analysis

8.1.1 Application Modernization, Optimization and Rationalization

8.1.2 ETS Kalanimoku Data Center Renovation Project

8.1.3 Data Center Inventory Findings

8.1.4 Application Disposition

- Application Disposition and Discovery Services – Report
- Application Disposition and Discovery Services – Presentation
- Application Disposition and Discovery Services – Business Critical versus Overall Metrics

8.2 Workgroup Meeting Minutes

SECTION 11 – SERVICE UTILIZATION

1 Service Utilization Committee Overview

1.1 Mandate and Goals

According to the Act 179 2022, and as stated in the Act 179 IT Consolidation 2022 Preliminary Status Report for the State of Hawai'i Legislature, the mandate and goals of the Service Utilization Committee are to:

- Analyze current use of resources, planned use, forecast future use and develop models to best utilize available resources.
- Determine how to use existing assets more efficiently and effectively as well as to plan for more effective future uses of shared services.
- Identify any opportunities to leverage alternative models such as managed services, pooled storage, and virtualization.

1.2 Members and Activities

The Service Utilization Committee started its work on January 13, 2023. The committee members and participants consisted of IT coordinators and leaders from the departments of Attorney General, Business & Economic Development & Tourism, Human Services, Transportation and Accounting and General Services (Enterprise Technology Services). The committee convened weekly and completed designing its questionnaire and sent it out to departmental leads within the IT working group. The committee followed up with departments over the next several weeks to provide guidance where necessary, get responses and copy the individual departmental responses into a comprehensive list. The committee then reviewed the feedback and decided to focus on commonly used and key applications for consolidation into existing and potentially new shared services.

The work consisted of three main components, conducted roughly in the following order:

- Assessing the current state of shared IT services within the state.
- Reviewing other departments' use of IT services/applications.
- Crafting recommendations and high-level procedures towards successful migration into an ideal future state.

2 Standards, and Scope of Work

2.1 Standards

The Service Utilization Committee chose to focus on important and commonly used applications hosted by departments. Specifically, the committee identified those applications and services that could migrate into existing shared services that ETS already provides. The committee also looked for departmental hosted applications & services that could be consolidated into potentially new shared services for ETS to provide. The recommendations made were based on the collective experience & knowledge of committee members, with the goal in mind that adoption of the recommendations would provide an overall increase in efficiency whether using and/or managing the solution. While the focus on this committee was on the technical aspects of consolidating services/applications, some of the recommendations provided were given based on a basic assumption that there would be potential cost savings based on economies of scale.

2.2 Scope of Work

The Service Utilization Committee in the context of the Act 179 SLH2022 limited its efforts to the following scoped tasks:

- Inventory key services hosted by departments.
- Using the key services list, identify opportunities for suitable services to be migrated into existing shared services or potentially new shared services that would result in utilization and/or efficiency gains; examples include virtualization, pooled storage, and managed services.
- Create a list of high-level activities, where possible, that are necessary to move from current to future state.

3 Identifying Key Services Hosted by Departments

Identifying key departmental services as scoped in the previous chapter consisted of the following work activities:

- Committee meetings.
- Review and study of existing shared services that ETS provides.
- Development and distribution of a survey that went out to Consolidation Working Group members representing all executive branch departments.
- Review and study of departmental survey responses for services & applications they host.

The intent of the current state survey questionnaire that was developed was to gather relevant, detailed feedback not only to help define an ideal future state of service utilization but also for use by ETS staff for...

1. Gathering more detailed resource and/or functional requirements on pertinent individual service/application instances such that the shared services intended to absorb them have sufficient capacity and capabilities.
2. Tracking department migration statuses into existing/new shared services, including prioritization based on departmental software/hardware end of life dates, and applicability based on departmental compliance support requirements against how ETS tracks towards meeting those requirements where possible/feasible.

The questionnaire was sent out using an Excel spreadsheet and requested the following information:

- Department Name
- Department Service Name/URL
- Service Function (such as Database, Web, File/Print Server, COTS, Active Directory, Custom)
- Application Name (product name provided by software developer)
- Application Description (further detail to intent/function of the application/service)
- Service/Application Provider (name of software developer/manufacturer)
- Service/System Type (to identify whether physical/virtual server, storage appliance, Infrastructure as a Service, Platform as a Service, or Software as a Service)
- Service Location (to identify whether on-prem in dept building, DRF, UH, AWS, Azure, or SaaS provider)
- Oldest Server OS (amongst group of servers comprising an application/service)
- Hardware End of Life/Service Contract End Date
- Compliance Requirements
- Backup Retention Requirements
- Service Usage Basis (to identify how app/service is billed against, whether per user or some IT resource metric)
- Current Usage Count
- Current Usage Limit
- Usage Estimate in Next 5 Years
- Lifecycle Plans in Next 5 Years
- Department Comments

4 Recommendations & High-Level Steps Towards Future State

4.1 Analysis Methods and Scope

Questionnaire feedback was consolidated to a single spreadsheet and cloned views and pivot tables were created to show duplicative services across departments. Results were further filtered to exclude line items referring to ETS shared services departments were already using. From there, line items were reviewed and discussed by committee members. Collective decisions were made on consolidation recommendations against an existing or potentially new shared service.

Recommendations were focused on core IT offerings given the foundational roles and benefits they typically provide with consolidation efforts. Benefits such as singular identities, increased stability and implemented standards and additional integration capability between applications/services, all of which could allow for further increases and successes in consolidation efforts. Other common benefits sought were potential cost savings/economies of scale, reduction of duplicative systems, and recommendations towards more modern offerings.

4.2 Recommendations with Existing Shared Services

Committee Recommendations at a Glance:

Existing Shared Service	Priority	Complexity
Active Directory	High	Medium/High
Multifactor Authentication	High	Low
Vulnerability Scanner	High	Low
VOIP / Call Center Systems	High	Low/Medium/High
File Shares	High	Low/Medium
Secure FTP (File Sharing)	High	Low
Virtual Private Network (Client)	Medium/High	Low
Virtual Server Hosting	Medium	Medium
DNS	Medium	Low/Medium
Enterprise GIS	Medium	Medium/High
Patch Management	Low	Medium/High

Active Directory

Recommendation: Departments migrate into ETS's Enterprise Active Directory.

Priority: High

Complexity: Medium/High – Depends on department size and use of Active Directory for authenticating against applications.

Reasons:

1. Provides users a better login experience with a single identity for their endpoints, systems, applications, and virtual private networks.
2. Most departments are already using it for their Office 365 access.
3. ETS has redundancies across multiple datacenters.
4. Reduces duplicative resources used to host individual departmental domains.
5. Provides departments the same flexibility they're used to managing their users, computers, and group policy objects.

6. Allows departments to focus on other priorities than provide a service that ETS already provides.

High-Level Steps: ETS in the past has typically recommended departments work with a consulting firm for migration assistance. But basic steps would include getting operating systems for endpoints & servers up to supported versions, reviewing applications/services dependent on AD authentication, work with ETS for a temporary one-way trust, plan and execute migration schedule. Getting money from the LEG to do a mass migration of departments would be the ideal approach for centralized identities.

Multifactor Authentication

Recommendation: Departments utilize Azure AD instance managed by ETS for any multifactor authentication (MFA) needs.

Priority: High

Complexity: Low

Reasons:

1. Already in use across the Executive Branch for logging into Office 365, Adobe Sign, and various other enterprise applications.
2. Many departments already use it for various on-prem & SaaS applications of their own.
3. Departments are already licensed to use Azure AD MFA.
4. Useful for meeting various compliance requirements.
5. Azure AD provides advanced capabilities such as the use of Conditional Access rules which can allow customized allow/block rules that can be applied to one or more applications.

High-Level Steps:

1. Reach out to ETS for further assistance.

Note: Applications must support SAML or OAuth authentication to integrate with Azure AD.

Vulnerability Scanner

Recommendation: Departments utilize the Tenable instance and CISA solution provided by ETS. Tenable.SC and Tenable.IO are licensed together to provide information on scans for internal and external devices (as threat mitigation is different for internal vs external vulnerabilities). A local and cloud-based service which provides asset vulnerabilities with solutions to resolve or mitigate threats. Can be integrated with ServiceNow Security Operations for vulnerability tracking. CISA from the Department of Homeland Security scans external IPs and provides weekly reports.

Priority: High

Complexity: Low

Reasons:

1. Already in use by various departments (some having their own instances, others using ETS instance).
2. Integrates with Active Directory.
3. Provides scanning for internal and external devices.
4. Provides additional vulnerability details to Microsoft Defender for Endpoint (MDE).
5. CISA solution is a free offering.

High-Level Steps:

1. Identify # & type of endpoints needing to be scanned, for purchasing additional licensing.
2. SOC to review existing processes and update them as needed to cover scanning a larger more

diverse group of endpoints.

VOIP / Call Center Systems

Priority: High

Complexity: Low/Medium/High

Reasons:

1. Microsoft Teams Calling is already in use by multiple departments.
2. Ideal for teleworking purposes as user work numbers are tied to their Teams accounts, not a physical handset like traditional phone systems.
3. More cost efficient than traditional phone systems.
4. Provides auto attendant & calling queue capabilities at no additional costs.

High-Level Steps: Consultations with ETS are needed to go over the solution, its capabilities, and review intended use cases. For larger migrations, ETS has a recommended vendor which can provide "white-glove" planning/migration efforts.

File Shares

Recommendation: Departments migrate files to Office 365 (OneDrive, SharePoint, Teams)

Priority: High

Complexity: Low/Medium

Reasons:

1. Already in use by various departments.
2. Ideal for teleworking/mobile workers. Came in handy during the height of the pandemic.
3. Gets users more comfortable with Teams, allowing for increased adoption of various other apps/services that exist in Teams or can integrate within Teams.
4. Provides various benefits versus traditional file servers including but not limited to…
    a. Versioning - Granular restore capabilities on a "per change" incident
    b. Collaboration – Users can edit documents together at the same time.
    c. Longer Retention – Files can be recovered up to 93 days after deletion, typically longer than traditional retention times set up on backup systems that support local file servers.

Known Exceptions/Limitations:

1. Not supported for GIS/ESRI files.
2. Not ideal natively for some file formats such as PDFs (editing wise), Access databases, etc. There are syncing abilities to provide end users with the same file server experience, but it does have limitations depending on how many files exist within the document library and the number of users with access.

Secure FTP

Recommendation: Departments utilize the Axway Secure FTP (SFTP) service provided by ETS.

Priority: High

Complexity: Low

Reasons:

1. Already in use by various departments and heavily used by the MFaaS environment.
2. System is hosted on the GPC.
3. Onboarding process in place.
4. Meets required security compliance standards, encryption at rest and in-transit.
5. Allows secure data exchanges between state departments. Allows secure data exchanges between state departments and private entities (financial institutions, etc)
6. Provides single point of entry for data exchanges.
7. Automated email notifications to account owners.
8. "Test" environment available.

High-Level Steps:

1. Determine participants of the data exchange and contact ETS to apply for accounts.
2. Determine file structure in SFTP environment.
3. Prepare SFTP clients on endpoints.
4. Optional: Build automated process.

Virtual Private Network (Client)

Recommendation: Departments utilize the Palo Alto (Global Protect) Remote VPN service.

Priority: Medium/High

Complexity: Low

Reasons:

1. Already in use by various departments.
2. Onboarding process in place.
3. Meets security compliance standards.
   a. FIPS 140-2
   b. MFA
4. Provides a single point of entry into the State network.
5. Tied into the State EAD for authentication.
6. Redundant design.
7. Assigns local IP's and can drop remote connection into the department's network.
8. Options are technically possible using hardware tokens for MFA where required.
9. Can be used by non-state users but would require Microsoft licensing for multi-factor authentication.

High-Level Steps:

1. Determine method of entry for remote connection. Example – Port off NGN switch into local subnet.
2. Provide IP address pool for remote users to ETS.
3. Prepare internal routing and policy (access) rules.
4. Determine remote user(s) and apply for remote VPN with ETS.

Virtual Server Hosting

Recommendation: Departments migrate virtual server workloads where applicable into GPC.

Priority: Medium

Complexity: Medium

Reasons:

1. ETS's Government Private Cloud (GPC) which is VMware based, is already in use by various

departments.
2. The current configuration provides multiple redundancies and automated failovers between two datacenters.
3. Datacenters used are on-island providing low-latency connectivity over redundant links.
4. Backup systems used allow for instant virtual server restorations and replicated backups between datacenters.
5. Standard configurations and practices are used for the deployment and management of virtual servers and underlying infrastructure providing consistencies in performance and experience.
6. Underlying infrastructure and virtual server OS management is managed by ETS including OS patching allowing for departments to focus on their applications.

High-Level Steps: Consultations with ETS are needed go over GPC capabilities, to identify intended/pertinent servers to migrate over, resources needed, and periodic follow-ups with regards to migration efforts typically to new virtual server instances.

DNS

Recommendation: Departments migrate into ETS's existing DNS service. Typically, this would be done during Active Directory migrations, but it was found some departments are hosting separate domains on their own DNS servers.

Priority: Medium

Complexity: Low/Medium

Reasons:

1. Already in use by various departments.
2. ETS has redundancies with its DNS service across multiple datacenters.
3. Reduces duplicative resources used to host individual departmental domains.
4. Allows departments to focus on other priorities than provide a service that ETS already provides.

High-Level Steps:

1. For Active Directory related domains, that effort is seamless during AD migrations.
2. For standalone domains, departments would work with ETS to transfer DNS records over and repoint queries for the domain to ETS DNS servers.

Enterprise GIS

Recommendation(s):

1. Departments continue using existing Esri Enterprise GIS platform solution (ArcGIS Desktop, ArcGIS Enterprise, ArcGIS Online, ArcGIS Hub, etc.) for GIS mapping, analysis, internal and public-facing GIS applications, etc.
2. Departments consider migrating non-Esri GIS software/applications/solutions to Esri platform, where feasible.
3. ETS, with GIS Program support, research and consider pooled/shared/enterprise servers using RBAC and other tools, improving governance, use of best practices, and potentially reducing licensing costs as well as IT resource usage.

Priority: Medium

Complexity: Medium/High

Reasons:

1. ETS already has an enterprise agreement with Esri to cover the State's usage of ArcGIS.
2. Large existing state-agency user base; Esri ArcGIS is the standard in all 4 counties and federal agencies; de-facto standard in State agencies.
3. Departments are independently implementing their own GIS servers (including ArcGIS Server, ArcGIS Enterprise, ArcGIS Portal) - ETS should manage / oversee / control / implement server and data standards, security, and governance).
4. Most ArcGIS Server/Enterprise/Portal instances are already hosted on the GPC.
5. Will lead to greater ETS awareness of agency GIS applications, projects and activities.

High-Level Steps:

1. There are currently 16 instances of ArcGIS Enterprise or Portal deployments in production (there are additional test and staging instances), spread across 9 departments (DOH, DOT (Air, Harbors and Highways), DAGS (Elections), ETS, DLNR (Engineering, Historic Preservation and Land), DBEDT-OPSD, OHA, DOD (HIEMA and OHS) and OHA. These instances support a wide variety of business needs, from internal lease and asset management systems at DOT (Airports and Highways) to emergency management and critical infrastructure Common Operating Picture tools (DOD HIEMA and OHS) to Flood Hazard and Dam Safety reporting (DLNR Engineering). Some of these ArcGIS Server deployments are mission critical and/or are mandated, including DLNR/SHPD's Hawaii Cultural Resource Information System (all archaeological information and permits in the State are processed through HICRIS) and the Public Land Trust Information system (PLTIS). As the first step towards pooled/shared Enterprise servers using the tools described above, each of these systems and the business processes they support should be inventoried and documented.
2. Research/study feasibility of shared ArcGIS Server/Enterprise/Portal environments for these agencies/business processes/applications, using RBAC, ArcGIS Enterprise roles and groups, etc.
3. Complete needs assessment and system architecture design; migrate existing servers and applications to new architecture, where feasible.

Patch Management
Recommendation: Departments utilize Tanium for patching their user endpoints where applicable.

Priority: Low

Complexity: Medium/High

Reasons:

1. Already in use by various departments.
2. Able to patch devices both on the State network and externally.
3. ETS has a managed patching schedule starting with departmental test groups before remaining client endpoints are upgraded. However departments can have custom schedules as well and roll out patches manually if needed.
4. Provides ETS with good visibility of client endpoints across the Executive Branch with regards to patch status, OS versions, hardware details, etc…

High Level Steps:

1. Inquire with ETS to get onboarded to Tanium.

Note: Tanium currently has an RBAC limitation with delegating management of app packages at the department level. The vendor is expected to come out with an enhancement to that in the Summer of 2023. If needed, ETS can assist with the creation & deployment of app packages in the interim.

4.3 Recommendations for Potentially New Shared Services

Committee Recommendations at a Glance:

Potentially New Shared Service	Priority	Complexity
Asset Management	High	Medium
Endpoint Remote Access	High	Low
Active Directory Monitoring	Medium/High	Low
Network Monitoring/Config Management	Medium/High	Medium
Help Desk Ticket System	Medium	Medium
Virtual Desktop Infrastructure (VDI)	Medium	High
Backup Solution	Medium	Low
Syslog/SIEM/Log Analyzer	Medium	Medium
VPN (Site to Site – Internal/External)	Low	High
Content/Document Management System	Low	Low/Medium/High

Asset Management

Recommendation: Departments utilize various products mentioned within this report to help automate regularly capturing inventory of IT assets.

Priority: High

Complexity: Medium

Reasons:

1. Allows for better visibility to make sure all pertinent assets are being properly monitored.
2. Would improve accuracy of yearly physical inventory checks.
3. Could potentially integrate solutions that scan for devices into an enterprise helpdesk system to replicate known assets for tracking issues and asset lifecycle.
4. Information on assets collected within an enterprise helpdesk system could be forwarded to ETS's LeanIX solution that's being used to track the State's application portfolio and lifecycle.

High-Level Steps:

1. Departments use the following to automate asset discovery:
    a. Tenable.AD for capturing Windows devices.
    b. Tanium secondarily for Windows devices.
    c. SolarWinds for capturing network/Linux devices.
    d. Helpdesk solutions with an asset management module could also be used for scanning/capturing devices and applications residing on them.
2. Integrate monitoring tools with helpdesk solution to forward found assets.
3. Asset data internally captured by helpdesk solution and 3rd party monitoring tools can be merged and become a single source of truth.
4. Application & hardware asset information could then be forwarded to LeanIX.
5. Departments can then reference their inventories within helpdesk solution for yearly inventory checks and creating tickets against.

Departments can review scanned assets within respective monitoring tools to make sure they are properly configured for monitoring capability.

Endpoint Remote Access

Recommendation: Departments utilize a standard set of tools for access/support of endpoint users and devices that meet the following ideal requirements:

- Security Standards:
    - Using encrypted connections between IT and remote user requesting assistance.

- Not storing passwords on the client in clear text.
- Ideally utilizes Azure AD for authentication.
- Ideally have an audit log tracking remote sessions that occur.
- End users are aware of remote connections being made.
- Ideally does not listen on a common listener port.

- Functional Standards:
  - Ability to remote into a computer whether a user is logged in or not.

Priority: High

Complexity: Low

Reasons:
1. A variety of tools is in use by various departments some less secure than others.
2. Some tools are already available for the State.

High-Level Steps:
1. Identify a solution that meets above security compliance standards.
2. Procure sufficient licenses.
3. Rollout the solution.
4. Train IT staff for use on it.

Known Exceptions/Limitations:
1. Teams would be an option, but it is limited to sessions while a user is logged in. There can be some scenarios where IT needs to login remotely with an admin account for troubleshooting, hence Teams would not suffice, and a different product would be needed.

Active Directory Monitoring

Recommendation: Departments utilize Tenable.AD as a fast, frictionless (agentless), active directory security solution that allows you to see everything in your complex AD environment, predict what matters to reduce risk, and eliminate attack paths before attackers exploit them.
Can be integrated into ServiceNow for ticket creation automation. Tenable.AD mitigates existing threats. Maintains hardened security. Detects attacks in real time. Can be used to investigate incidents and hunt for threats.

Priority: Medium/High

Complexity: Low

Reasons:
1. Already in use by various departments.
2. Integrates with Active Directory.
3. Provides scanning for internal and external devices.

Provides additional to Microsoft Defender for Endpoint (MDE).

Network Monitoring/Config Management

Recommendation: Departments utilize the Network Monitoring and Configuration Management service provided by ETS. Departments would utilize SolarWinds in a distributed model that allows each department to monitor their environments with integrations into ServiceNow for automated ticket creation/completion.

Priority: Medium/High

Complexity: Medium

Reasons:

1. Already in use by various departments.
2. Meets security compliance standards.
3. Allows ETS and departments to monitor network activity across multi-vendor devices.
   a. Traffic and device utilization.
   b. Packet/connection loss.
   c. Network discovery and mapping.
   d. Latency testing.
   e. NetFlow Traffic Monitoring.
4. Provides alerts and notifications to the involved parties when issues occur.
5. Supports integration with ServiceNow.
6. Network Configuration Monitoring (NCM) includes backups of router configs.
7. Additional modules available such as Server Application Monitoring (SAM) abilities (monitoring of application services).

High-Level Steps:

1. Determine devices in scope.
2. Setup additional poller servers as needed.
3. Work with ETS to onboard network devices (ICMP, SNMPv3, SSH, eliminate Telnet authentication)

Help Desk Ticket System

Recommendation: Departments utilize ServiceNow as the cloud-based platform for automating IT management workflows. Modules to be implemented include ITSM (helpdesk / change and release management / virtual agent chatbot / workforce and process optimization) which also allows for integration with SolarWinds (network monitoring – see below), Security Operations (security incident and vulnerability response) which allows integration with Tanium (endpoint asset management) and Tenable (vulnerability scanner – see above).

Priority: Medium

Complexity: Medium

Reasons:

1. Already in use by various departments.
2. Integrates with Active Directory.
3. Provides scanning for internal and external devices.
4. Provides additional to Microsoft Defender for Endpoint (MDE).
5. Parent/child instances can allow sharing of data and troubleshooting/service requests across multiple departments for fulfillment in an automated fashion.
6. Additional modules are available for activities such as vendor management, business continuity management, financial management, which could allow for further standard tools to be used across departments.
7. Has many integration capabilities across a variety of IT applications and services.

Virtual Desktop Infrastructure (VDI)

Recommendation: Departments utilize a centralized VDI solution managed by ETS.

Priority: Medium

Complexity: High

Reasons:

1. Improves security posture of the State network by preventing direct connectivity of external devices from external/remote users.
2. Could be used as a replacement for VPN connectivity particularly with external contractors who use devices the State doesn't manage.
3. Beneficial for the scale up of remote workers and departments having limited office space who can't accommodate hosting all their staff on-site.
4. Ideal for the "jump box" use case, requiring users to connect through when accessing sensitive systems.
5. Could be used to "host" departmental applications such that they would no longer need to be installed on departmental endpoints anymore. This would allow for easier management keeping those applications current and up to date.
6. Various departments have differing brands of VDI solutions (on-prem & cloud) currently in place.

High-Level Steps:

1. ETS review existing (and potentially future) use cases departments have with their own VDI solutions.
2. ETS identify and implement a solution that will meet existing and future potential use cases.
3. Departments work with ETS to scale up on their VDI needs once a solution is in place.

<u>Backup Solution</u>

Recommendation: Departments migrate to their own Cohesity instances for those who might continue maintaining their own server environments.

Priority: Medium

Complexity: Low

Reasons:

1. Provides a plethora of security features to protect backed up data against ransomware and other cyber-attacks, including but not limited to:
    a. Using an immutable read-only file system, such that backed up data cannot be overwritten.
    b. Integrates machine learning & artificial intelligence for threat detection.
    c. Multifactor authentication capable including integrations with Azure Active Directory.
    d. FIPS 140-2 encryption certified.
    e. Able to send event/log information to various SIEMs including Azure Sentinel.
2. Supports instant recovery & mass restore of virtual servers in on-prem environments (VMware, Hyper-V, etc…), getting them back online in minutes.
3. Offerings include hardware and cloud-based solutions (including SaaS variations), hence ideal for either on-prem or cloud-based environments.
4. The solution is easy to implement, configure, and maintain.
    a. Hardware-based options come with software preinstalled.
    b. User interface is very intuitive, easy to navigate, and simple to configure.

c. Software upgrades are easy to apply (typically with a few mouse clicks) and once started are performed in a rolling upgrade process that allows backup jobs to continue behind the scenes.

5. Hardware based options are purchased through Cohesity, hence support and maintenance for both hardware and software come from one company, essentially "one throat to choke" if issues arise.

6. Also has the capability of hosting various types of file shares (NFS/SMB/S3) for relevant use cases.
7. Solution is currently used by several departments and has been in place since 2019 for backing up virtual servers in the GPC which has proven to become a very reliable and easy to manage solution.

High-Level Steps:

1. Departments can reach out to ETS for guidance and review of its existing implementation.
2. ETS can redirect interested departments to their Cohesity reps who can go more in depth on the solution and review their environments and requirements to define a custom spec'd solution.

Syslog/SIEM/Log Analyzer

Recommendations: Departments utilize Azure Sentinel, now known as Microsoft Sentinel, centralizes threat collection, detection, response, and investigation efforts. It provides threat intelligence and intelligent security analytic capabilities that facilitate threat visibility, alert detection, threat response, and proactive hunting.

Priority: Medium

Complexity: Medium

Reasons:

1. Multiple departments are already starting to use it.
2. Gets departments out of having to maintain on-prem hardware for hosting their Syslog/SIEM solutions.
3. Provides access to limitless amounts of storage if needed.
4. Has built-in advanced machine learning capabilities that can detect actors of threats and suspicious behaviors that can significantly help security analysts to analyze their environment.
5. Functions as a single solution for alert detection, threat visibility, proactive hunting for potential threats, and threat response. It collects data from different data sources, performs data correlation, and Data Visualization the processed data in a single dashboard.
6. Provides ETS a single pane of glass in reviewing authentication logins from both on-prem Active Directory environments as well as the State's Azure Active Directory, which is used to login to Office 365, Adobe Sign, and other Software as a Service solutions.
7. Azure Sentinel is hosted in Azure Commercial which is FedRAMP High compliant.

High-Level Steps:

1. ETS has been working with Microsoft and a 3rd party integrator (BlueVoyant) who has helped to onboard initial departments so far. ETS can set up the initial Azure Sentinel instance and provide necessary access. An integrator would be ideal to assist with the initial setup and configuration.

VPN (Site to Site – Internal/External)

Recommendation: Departments utilize Site to Site VPN services provided by ETS using centralized VPN concentrators.

Priority: Low

Complexity: High

Reasons:

1. Reduces the number of VPN concentrators managed at the department level increasing cost efficiencies and lessening configurations required on the department end to implement.
2. Meets security compliance standards.
3. FIPS 140-2 from externally to the NGN network.

4. Note: Full end to end encryption would require application-based encryption from the NGN network to the department's internal network (if required).
5. Redundant design capable of having VPN concentrators hosted at multiple centralized datacenters.

High-Level Steps:

1. ETS will work with departments to determine feasible candidates.
2. ETS provides the network devices on NGN.
3. ETS work with individual departments to configure tunnels.
4. ETS ideally review with local ISPs periodically to identify underlying fiber expansions where the NGN network could be expanded such that remote sites could be transitioned to the NGN, benefits here is that it could:
5. Reduce the number of ISP uplinks required with VPN connections.
6. Reduce the potential of internet traffic going out through the department's remote ISP circuit instead of ETS's redundant ISP infrastructure.

Content/Document Management System

Recommendation: Departments utilize the Microsoft SharePoint Document Management System with their optional Syntex add-on.

Priority: Low

Complexity: Low/Medium/High

Reasons:

1. Allows departments to alleviate themselves from managing on-prem hardware, software upgrades.
2. Frees departments from managing on-prem storage capacity given SharePoint basically provides limitless storage.
3. Departments already have access to SharePoint as part of their Office 365 licensing.
4. Eliminates having to support & maintain separate front-end solutions that are typically required with traditional content management solutions.
5. This being a SaaS solution, it can provide higher levels of resiliencies and availability versus traditional content management systems.
6. The optional Syntex solution utilizes artificial intelligence and machine learning for its OCR capabilities.

High-Level Steps:

1. ETS would need to do more research to better identify capabilities, license options.
2. ETS to work with departments in coordination with Microsoft to better identify their use-cases to confirm feature parity with other products used (such as Kofax, IBM DataCap/FileNet) and then identify pertinent licensing requirements, and costs.
3. ETS in coordination with Microsoft to come up with a base framework for onboarding to this solution.

Note: This is a tentative recommendation due to the solution only recently coming to this committee's attention. Some committee members currently have their departments in a Proof of Concept with Microsoft to test the solution out. Further research on its capabilities, licensing requirements, costs, would be needed before it could be considered a new shared service. But the committee felt to point out this solution given the potential benefits it could provide.

5 Risks, Potential Issues, Disclaimers

1. All recommendations would be subject to SMEs review of potential workload/usage increases and identification of necessary hardware/software/licenses to accommodate recommended changes.

2. All recommendations would be subject to sufficient funding and staffing to support expanded usage and/or new offerings.

3. All recommendations were provided via high-level data captures from departments, hence further review may be needed to confirm existing functional requirements are met when migrating to an existing or potentially new shared service.

4. Some departments have higher compliance requirements (ex: IRS 1075, CJIS, HIPPA, etc…) which would be required to be in place for their adoption.

5. Some departments may have functional requirements that these existing or potentially new shared services might not meet. In those cases, departments may need to deploy other solutions meeting or exceeding recommendation standards and be vetted by ETS ITG for approval before procurement.

Workforce Development and Recruiting Committee

(2023)

About

The **Workforce Development and Recruiting Committee** is one of twelve committees created by the Technology Services Consolidation Working Group established by Act 179 SLH2022 relating to the phased consolidation of state executive branch information technology services. The **Workforce Development and Recruiting Committee** reviewed best practices and methodologies from other states, government jurisdictions, and the tech industry that would help to **Recruit**, **Develop**, and **Retain** high-quality information technology professionals for Hawaii State government.

The Technology Services Consolidation Working Group appointed these Department Information Technology Coordinators and staff to serve on the Workforce Development and Recruiting Committee:

- **Tracy Ban**, Department of Budget and Finance
- **Mark Choi**, Department of Human Services
- **Jennifer Halaszyn**, Office of Enterprise Technology Services
- **David Keane**, Department of Human Resources Development
- **Arnold Kishi**, Office of Enterprise Technology Services
- **Elaine Lake**, Department of Health
- **Antonio Querubin**, Department of Defense
- **David Rodriguez**, Department of Labor and Industrial Relations
- **Phan Sirivattha**, Department of Human Resources
- **Bennett Yap**, Department of Labor and Industrial Relations

The committee reviewed material from the National Association of State Chief Information Officers (NASCIO), National Governor's Association (NGA), Hawaii Employers Council, CIO Council of Hawaii, other state governments, and selected IT Professional Certification and Recruitment organizations. Special thanks to **Alan Ito** from the University of Hawaii, who shared the UH's initiatives that bring together Hawaii's businesses, the technology industry, and the education community to build pipelines that ensure Hawaii has workers with the right skills to fill high-demand, high paying tech jobs in Hawaii.

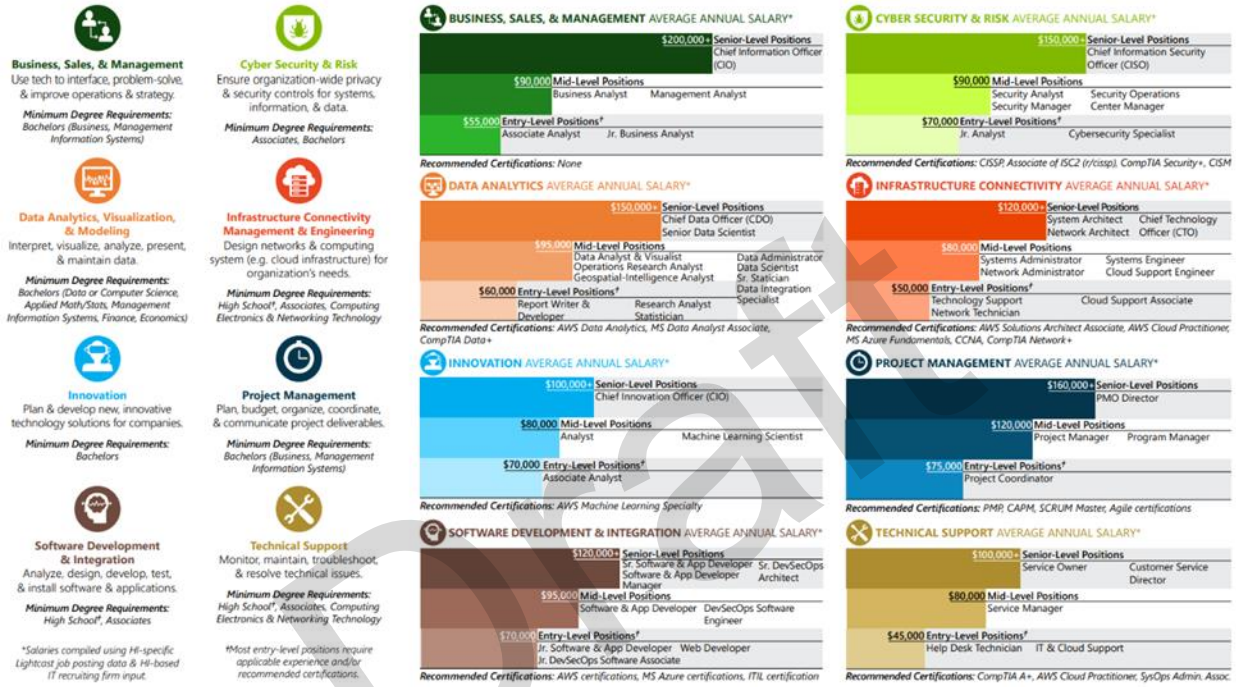
Overall Context

As the number of unfilled technology jobs at all skill and specialty levels continue to grow exponentially, public sector and private industry employers locally and nationally have multi-faceted, interlocking workforce building programs to recruit, develop, and retain technology employees who are in extremely high demand and in short supply.

For Hawaii State Government to successfully **Recruit**, **Develop**, and **Retain** its technology workforce in this highly competitive technology job market, it should consider adopting where practicable, a broad collection of progressive and proven recruiting and retention best practices from the technology industry and other government jurisdictions.

COMPETITIVE SALARIES AND COMPENSATION

For many years, comparative national and local salary surveys consistently placed Hawaii government technology worker salaries at the lower end. State government department IT hiring officials have constantly reported that state civil service salary levels were uniformly not competitive with those offered by Hawaii businesses at various entry, mid-career, and senior levels, and within the various technical specialties. A recent University of Hawaii salary benchmarking study compared different IT positions and their average salary levels by experience offered by businesses in Hawaii.



Department Negative Experiences. When reviewing that salary study, state departments confirmed significant disparities, where state technology employee salaries fell short at almost every level against Hawaii's private employers. Some representative comments:

"civil service positions (salary) are quite a bit lower."

"civil service positions are stuck at about $50-$80K."

"(state) senior folks are paid closer to entry level salaries."

"civil service pay bands need to be addressed."

"(employees) need to keep up with cost of living issues NOW."

"(our civil service salaries) are nowhere near private industry salaries."

"how can state government compete?"

"pay gap shows why so many state IT positions are vacant."

"to fix computer salaries, we must change the entire civil service pay system

"we don't have any say because salaries are set by union contacts.

Contrasting Positive Experiences. Unlike most departments, the Office of Enterprise Technology Services (ETS) described much different, positive recruiting experiences, primarily because ETS' enabling Legislation (HRS Chapter 27-43) provides for creating and hiring non-civil service temporary exempt employees that are not subject to requirements of HRS Chapters 76 and 89, i.e., not constrained by civil service and collective bargaining rules. As the position title denotes, these temporary positions do not have job stability, longevity, and seniority rights as do civil service positions; but do receive the same other benefits (as civil service).

With non-civil service temporary exempt positions, ETS cited considerably more flexibility to set compensation, duties and responsibilities, minimum qualifications, and skill requirements. In addition, the recruiting and hiring process for temporary exempt positions is generally much shorter, faster than traditional civil service recruiting. All are critical factors when competing for qualified technology talent. ETS can compare both position models because ETS has some grandfathered positions that continue to be civil service.

By following this non-civil service temporary exempt position model, the Office of Enterprise Technology Services has successfully competed with Hawaii's private industry, thus far, in attracting much needed technology talent to fill its positions. The cautionary note here is that with remote work permitting tech talent in Hawaii to now remotely work for mainland and international companies, Hawaii's businesses and government face stiffer competition ahead to recruit and retain in-state tech talent and must up their game even further.

Pay levels and pay increases for most state government employees, including technology employees, strictly follow defined salary schedules derived from a combination of civil service policies and collective bargaining negotiations. That seniority, longevity-based compensation system differs greatly from performance-based and rewards systems in the private sector. Although it was not within this committee's purview to address changing Hawaii's vast foundational Civil Service System and Collective Bargaining processes, it can recommend where expanding existing state personnel provisions can make significant improvements and make implementing other best practices possible.

Conclusion. To face growing competitive forces for a small pool of tech talent remaining in Hawaii, to attract outside talent, and to benefit IT workers now in state government, refining and expanding the non-civil service temporary exempt model deserves further study, not only for the compensation flexibility, but for the many other tangible and intangible benefits critical to building the next generation state government technology workforce described in this report.

Beyond Compensation

Encouraging workers to choose public service government is a constant challenge. One approach is to offer competitive salaries and benefits packages comparable with the private sector, a difficult deliverable for most governments. Another is to invest in their employees' advancement through ample professional development and advancement opportunities within government. And successful IT recruiters say creating a work environment that is supportive and inclusive, where employees feel valued and respected is equally critical.

A broad review of different departments' current recruitment and retention activities identified several common areas for improvement, where creative solutions, some simple, others not so, could make a significant difference in addition to compensation and basic state fringe benefits:

- **Recruitment** (specific methods to find, attract, and hire)
- **Retention** (programs that encourage employees to join and continue working for state government, e.g., career ladders, flexible schedules, and professional development)

Recruitment

Building a new generation of IT public servants requires providing incentives that attract and retain younger millennials and members of Generation Z. Top factors include clearly highlighting opportunities to serve the public, IT promotion potential, employer-supported IT professional development, some job stability, in addition to standard retirement and medical plans offered all employees.

Recruiting the Next Generation

Gen-Z is the smallest percentage of workers in state and local government. Despite being highly sought after, efforts to hire and retain them aren't increasing those numbers. Solution are different recruitment strategies for Gen Z and Millennial tech workers whose perceptions of the workplace differs from those of previous generations, with the option to work remotely is now a basic expectation.

https://www.governing.com/work/how-local-government-can-recruit-and-retain-the-gen-z-workforce

https://www.washingtonpost.com/business/2023/03/29/more-federal-internships/

Addressing the Next Generation Remote Hybrid Work "Must Haves"

Many states are continuing a hybrid mix of remote, work from home (WFH) options, and flexible schedules, with the goal of creating an attractive, productive working environment blending work site, remote work location, working styles, and work hours. The technology workforce led the wide adoption of work from home during the height of COVID-19 pandemic, and never looked back.

Those prevailing tech industry practices focus on addressing tech employee burnout and employees' mental and emotional well-being in this high stress profession. Tech employees, in particular, are more productive, happier and healthier when working from home. Those younger workers also value the sense of purpose that public services brings, and are expecting greater work-life balance, remote work and schedule flexibility.

A recent NASCIO study shows that tech workers from the millennial generation, now the majority of the U.S. workforce, view remote and flexible work as a "must have." However, only 54 percent of the public sector is offering it, especially for tech employees whose work is more conducive to remote work.

Provide Remote Hybrid Work Benefits

In a 2022 survey by Cisco of 28,000 full-time employees around the globe, 78% of respondents say remote and hybrid work improved their overall well being. And 79% of respondents felt that working remotely improved their work-life balance. 74% report that working from home improved their family relationships, and 51% strengthened their friendships, addressing concerns about isolation. 82% say the ability to work from anywhere has made them happier, and 55% say that such work decreased their stress levels. https://www.cisco.com/c/dam/m/en_us/solutions/global-hybrid-work-study/reports/cisco-global-hybrid-work-study-2022.pdf

With clear expectations and work-life boundaries for remote and hybrid work, research clearly shows that overall remote and hybrid workers have better wellbeing and lower burnout than in-office workers working in the same roles. https://www.thehartford.com/insights/future-of-benefits/occupational-burnout-survey

Emphasize the Public Service Value Proposition for Technology Workers

IT hIring officials in states attracting employees looking for meaningful work experience in public service, have creative marketing campaigns that brand state government as an employer of choice, with mission-driven work, and unique benefits that are distinctive and different from the private sector. Specific messages to the young tech talent pool describe the overall value proposition that working for public service provides hands-on experience, use of modern IT tools and technologies, and opportunities to influence the future of their communities, that together create an attractive workplace.

An April 2022 McKinsey & Company report found that "meaningful work matters." Today's employees seek careers that give them a sense of meaning and purpose, which should be part of the state's IT recruitment strategies.

https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/the-organization-blog/making-work-meaningful-from-the-c-suite-to-the-frontline

That McKinsey & Company report says after compensation, meaningful work and workplace flexibility were the greatest factors to an employee's decision to join, then stay in their current job. Those who leave most often cite the lack of career development opportunities (45 percent of respondents) and dissatisfaction with leadership (42 percent).

Explain the Financial incentive: Government Service Can Help Repay Loans

Another effective recruiting incentive has been heavily promoting Education Debt Reduction Programs and scholarship and loan repayment programs which cover college debt in exchange for a minimum term (years) of government service. The Public Service Loan Forgiveness (PSLF) offers forgiveness of Direct Student Loans for working full time for a government or nonprofit organization. As another example, the federal government's Scholarship for Service provides undergraduate and graduate-level scholarships to students who agree to work for government after graduation.

Improve Flexible Benefit Packages

As switching jobs periodically has become a way of life in the technology field, offering more flexible retirement packages where possible, such as pension funds that offer portability regardless of employer, can provide a recruiting edge. Although not technically state government, an often cited example is TIAA/CREF for RCUH employees.

Adopt Skills-based Hiring

Skills-based hiring, as opposed to hiring based on possessing college degrees, is a proven way to expand the technology applicant pool. Yet many states, including Hawaii, still have mandatory degree requirements for civil service IT jobs. Many IT hiring officials say demonstrated practical technology experience and certifications is more valuable than formal education. They see the top qualifying criteria as tech skills formed by combining some education with training and experience, i.e., that exposure to actual work environments was more valuable than to education in a classroom.

For selected IT positions, migrating from education degree requirement to skills and experience-based credential hiring, reflecting prevailing practices within tech and private industry, provides a competitive advantage.

Revisit State Employee Residency Requirements

The State of Hawaii requires government employees to be residents of this state. Many states never had such restrictions, and after COVID-19, other states lifted that residency requirement

For positions where remote work is feasible, Hawaii should consider this option for tech positions that attract few qualified applicants. Some applicants outside Hawaii may be willing to combine on-site and remote options to work in Hawaii, but may not want to establish permanent legal residency in Hawaii.

Improve Methods and Mechanics of Recruiting

While IT hiring managers know best the type of candidates they need, HR managers may have more resources and expertise to find and attract those candidates. By more closely working together, such a team can look at creative recruitment practices and collaborations to attract an optimum pool of qualified tech talent at all levels. The following suggestions come from many other states and current Hawaii practices.

Embrace Multiple Recruitment Approaches and Channels.

To supplement the traditional job postings and on-line listings, the State Department of Human Resources Development and some department IT managers have been joining community job fairs and using **social media** and other on-line messaging and communication platforms, such as LinkedIn, Instagram, and Facebook, with some success. In addition to those, the Office of Enterprise Services attends many **IT profession job fairs**, partners with technology **professional associations** to announce job openings, and attends **industry events** to **network** and form relationships with potential candidates.

Enhance State Job Posting Content

An attention-getting, well written job posting is one of the most important part of the hiring process. IT hiring officials can do more to improve these postings. Standard state job posting are too general and vague, using terminology and classifications that are not familiar to candidates who have not worked in government, and often may not reflect the full range and opportunities in the job. In addition, succinctly describing the IT professional development incentives, advancement possibilities, exciting technologies involved, and including more details of that specific job can attract more qualified and interested applicants.

Re-Align state IT Job Titles, Classifications and Position Descriptions

Transition decades old static state government position descriptions to dynamic position descriptions that reflect modern, current, and flexible needs of today's technology positions, e.g., update minimum and preferred requirements for technology positions consistent with rapidly changing industry practices, align position and job titles with current industry standards and usage.

- Update ancient position descriptions and classifications to more closely match prevailing private sector descriptions
- Align position titles to reflect current industry standards.
- Adopt & use consistent job/position requirements, both minimum and preferred, to minimize barriers to entry, such as outdated or unnecessary requirements..
- Create uniformity among position descriptions in use across departments.

NASCIO reports that State chief information officers (CIOs) consistently say that aligning job titles and position descriptions more closely with the private sector is one of the **top reforms** that would help with recruitment, yet many states have not done so.

Build a Tech Talent Pool Database of Past Applicants

Such collections would include many qualified candidates who reached the final stages of a hiring process, or applied after a position was filled, or may not have qualified for one position but might for the next. Job searches do not have to start from scratch whenever a position opens.

Enlist Current Employees as Recruiters

Create an effective **referral program**, such as incentives for employees to refer candidates and for sending reminders of job openings to their colleagues to reach specific target pools of tech talent.

Significantly Shorten Lengthy Recruitment Processes

Reducing the time to hire is extremely critical in the competitive technology job market. A 2017 Society for Human Resource Management report found that the average time to fill a tech position is 36 days. In contrast, state positions take three to six months or longer. The lengthy traditional civil service recruitment process is a major disadvantage when competing for technology talent who are in high demand, who often are simultaneously considering multiple job offers. The challenge to government:

how to identify which step to shorten, improve, or eliminate from position creation, application to review, interview and screening and beyond.

One example. The State of Maryland is piloting a one-way interview process for recruiting state employees. Mark Townend, the recruitment and examination division director in Maryland's Department of Budget and Management Office of Personnel Services and Benefits, described the initiative: "We were looking for ways to reduce the time it takes for the state to fill vacancies. With an average 'time to fill' of around 90 days for state positions, we determined it was taking two to four weeks for a panel to interview candidates. Scheduling candidates required allowing several days to accommodate their availability and some had problems taking time off from their current jobs to interview."

Maryland employed a one-way video interviewing platform that allows the state to email a link to pre-recorded interview questions to selected applicants. The applicants have a deadline by which they must log in and record their responses to continue being considered for the position.

Townend shared that the platform allows for after-work hours and weekend responses so applicants do not have to take time off work to complete the process. Three staff members on his team became well-versed in how the platform works and coordinated with agencies interested in using it to train agency employees. Townend says this "allowed us to see if the process made sense and brought value to different types of positions."

Besides allowing potential candidates to complete interviews on their own time and not interfere with their existing job, the platform has allowed the state to provide consistent interview experiences to applicants, interview more applicants with a better response rate and more easily narrow down candidates for a second interview. This process also helps applicants avoid the stress of large panel interviews, something that has been especially beneficial to neurodiverse candidates. The primary drawbacks of this platform are that managers lose the ability to ask follow-up questions and not all positions are well-suited for this approach. Maryland also offers candidates the ability to request an accommodation for a live interview and is working to make sure the platform meets all accessibility requirements.

Increase Education Partnerships

In addition to supporting internships, apprenticeships and other experiential learning opportunities, the state IT leadership and hiring officials can increase their partnerships with lower- and higher-education to maintain an on-going pipeline of technology professionals to address the current and future shortages, and ensure that training adequately prepares students for the workforce. Such engagement with the education community includes joining computer science advisory boards, advising student tech organizations, guest lecturing on current topics, and attending tech student mixers.

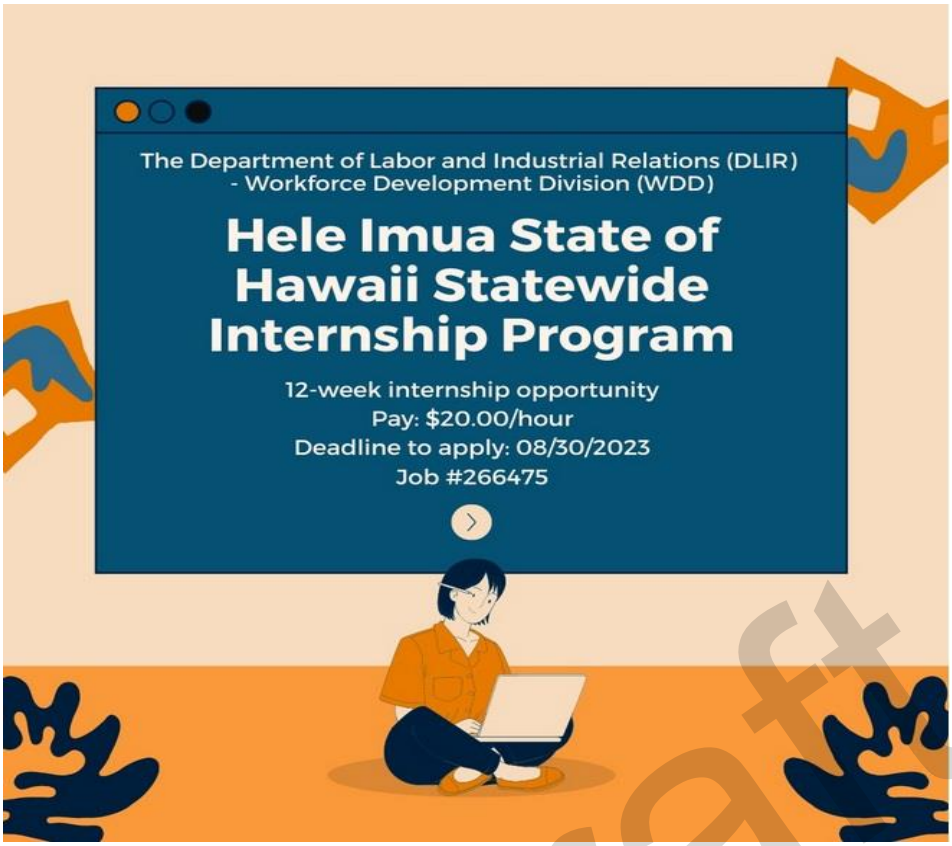
One example. The State of **Georgia** is trying a multi-pronged approach to close the cybersecurity professional gap by developing a speakers' bureau of employee volunteers of all levels who will go out into school systems to increase awareness. They also work with Georgia Tech University on a public/private fellowship program that includes six months working for state government and six months working for the private sector. The state is also paying for employee certifications and working with in-state technical schools to help fund this initiative.

Expand Internships

Government can do more to collaborating with the lower and higher education community to expand its funded government technology student internship and externship opportunities provide hands-on experience opportunities that often transition into regular government employment. The Office of Enterprise Services has had active internship programs with the University of Hawaii for many years, where ETS staff mentor ETS interns for a semester or two. Many of those interns are now regular ETS employees.

For a broader reach into government, the State Department of Labor and Industrial Relations (DLIR) introduced a new paid state internship program for students interested in working for state government, to explore potential state careers while completing their education. DLIR partnered with state departments and divisions and other employers to offer real on-the-job work experience, training, and supervision for selected interns interested in high-demand jobs. This program is intended to prepare interns for possible careers and offers job seekers an inside look and feel of what it is like to work for departments while at the same time allowing departments to observe interns at work, and to complete department functions with the assistance of interns.

ETS and some departments successfully tailored their DLIR internships specifically for technology jobs. Expanding that success into other internships programs for students in high school, college, trade schools and other qualifying educational institution will help to direct qualified students from this community into entry-level state technology jobs.



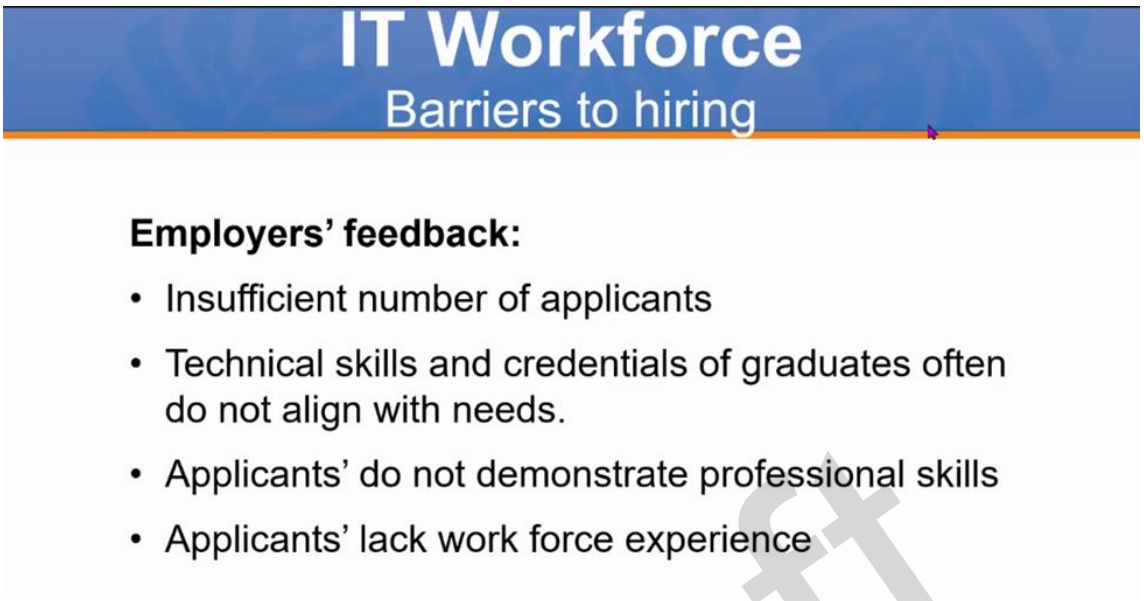
Many states have embraced interns, with the federal government leading the way. In 2023, the Office of Personnel Management issued specific strategies promoting paid internships to enact the Federal government 2121 plan to increase the number of paid interns and early-career employees, with an emphasis on increasing paid internship opportunities and decreasing reliance on unpaid internships.

https://www.chcoc.gov/content/guidance-promoting-internships-and-other-student-and-early-career-programs-federal

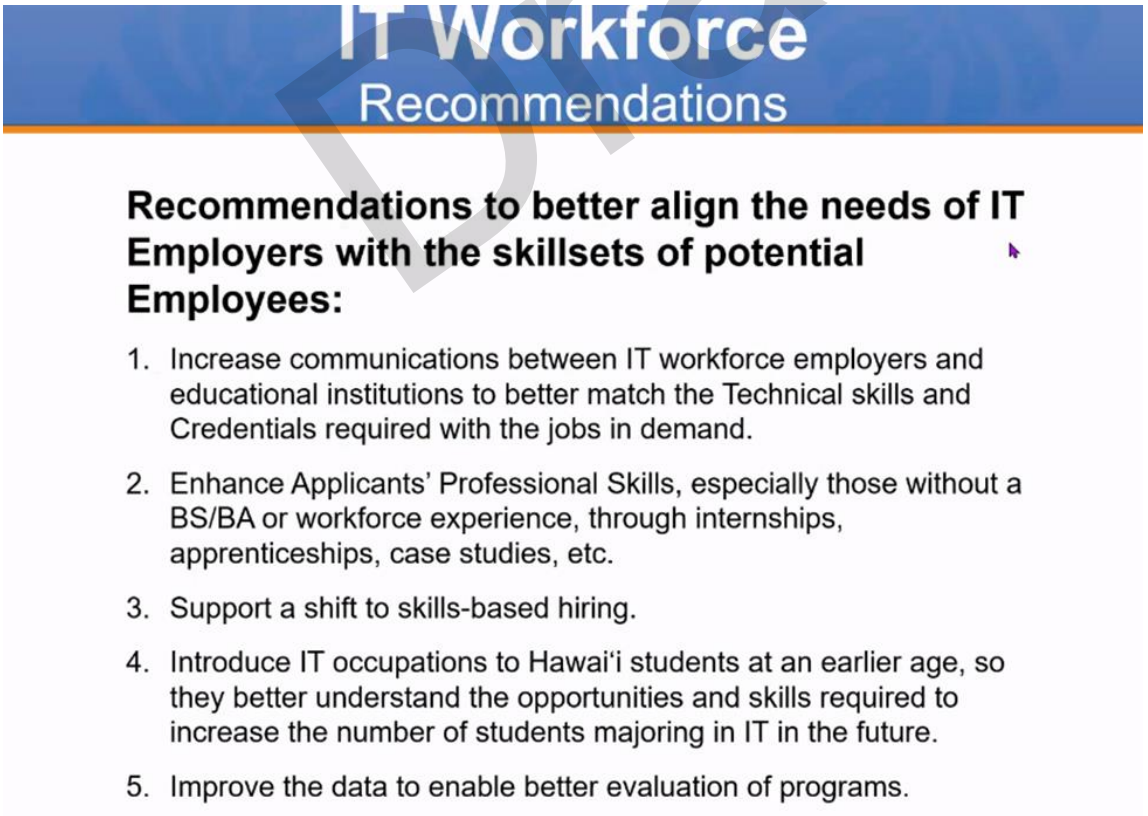
In addition to existing internship programs, State IT hiring officials can support industry-led technology student internship and externship opportunities, such as those led by Microsoft, AWS, Google, Oracle, that provide hands-on experience that could potentially transition into regular government employment. Expanding those internship programs will help increase the recruitment pool.

Summing Up the Recruitment Continum

This slide highlights difficulties hiring official face when recruiting entry level technology employees:



This slide highlights recommendations to improve recruiting entry level technology employees:



IT Employee Retention and Development

In addition to salary and benefits, providing employee **Career Growth and Advancement Programs** are key components to attracting and keeping employees, to reduce attrition. For state government, this means investing in its employees.

Develop Government Career IT Ladders

Establish career progressions and future pathways through rotating job assignments, mentorship programs, and internal promotional opportunities within State government. These are strong messages about government's willingness to invest in their employees's futue which will help attract and retain IT employees.

Build Formal Training Program About Hawaii State Government

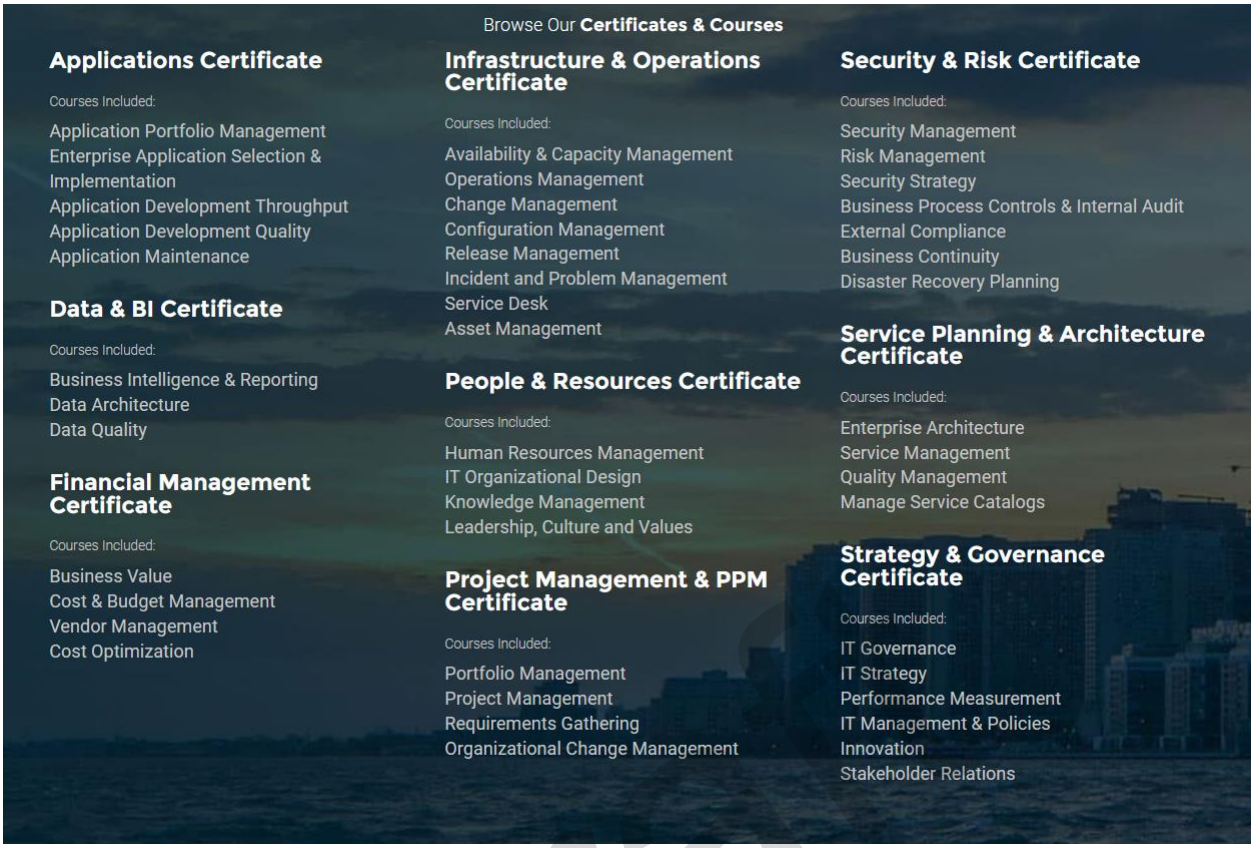
Offer leadership, management, and administrative skills training required for advancement within the upper levels of government by learning about the business of Hawaii's government.

Prepare IT workers For Future IT Leadership Roles

Collaborate with proven consulting and training organizations that have track record delivering such programs to industry and government, such as CIO training academies and IT leadership institutes by information technology research and advisory companies like Gartner Consulting and Info-Tech.

Several other states' IT departments, including Hawaii's Enterprise Technology Services, have enlisted the Info-Tech's Academy which helps IT leaders at many career points contribute to building successful IT programs and departments through Info-tech's extensive research and executive coaching services. The Academy's series of online courses help IT teams master the 45 core IT processes. Built around Info-Tech's IT Management & Governance framework, the learning content in the Academy is practical, outcome-driven research delivered by top experts in the field.

https://www.infotech.com/academy#academy-catalogue



As another example, since career paths can rapidly change, the CompTIA Public Technology Institute (PTI) has expanded the CGCIO™ program to allow graduates to be designated as either a Certified Government CIO; or Certified in Government Technology Leadership. The CompTIA PTI/Rutgers University Center for Government Services CGCIO™ Certification Program is a 12-month course that lays the foundation for assessing and addressing some of the most critical issues facing IT leadership in the public sector. The purpose of this program is to equip leaders with the requisite tools to manage and improve their organizational technology assets.

https://connect.comptia.org/connect/public-sector/public-technology-institute/certified-government-chief-information-officer-%28cgcio-%29-program

And some states have enlisted assistance from Coursera, which partners with more than 275 leading universities and companies to deliver flexible, affordable, job-relevant online learning to individuals and organizations worldwide. Coursera offers a range of learning opportunities, from hands-on projects and courses to job-ready certificates and degree programs tailored to specific employer requirements.
https://about.coursera.org/
https://www.coursera.org/articles/software-engineer-career-path

Provide Incentives to Maintain and Improve Knowledge and Skills

These include fellowships, tuition assistance, and other financial support for employee individual development and enhancement, to improve employee skills and knowledge as they progress through

their government careers, e.g., obtain and maintain professional credentials and technical certifications for skills growth; attend conferences & vendor summits, join and actively participate in professional organizations and associations.

Offer Professional Development and Skills Training Opportunities

To meet evolving job competencies and advancing IT requirements, future skills requirements, using new tools and technologies, and prepare for internal promotional opportunities, the employer should offer training, reskilling, and upskilling current employees, especially in these identified areas where state government needs help now:

- Strategic IT portfolio management.
- IT Procurement.
- Project Management.
- IT Service and Operations Management.
- Business and Vendor Relationship Management.
- Security and Privacy.
- Data Management
- Artificial Intelligence (AI) use & application

Create Challenging and Collaborative Work Environments

Provide continuously evolving current tools for employees to do their jobs. Old software, old equipment, ancient platforms are demoralizing turnoffs.

Organize formal and informal activities where technology employees share information, success stories, and best practices, e.g., Centers of Excellence, brown bag lunches to learn from other employees.

Develop enterprise-wide Artificial Intelligence (AI) AI training and orientation programs to explore possibilities, to build internal expertise on this emerging AI technology. For example, minimize repetitive and repeatable tasks that AI can help do better, at lower cost, which will allow employees to focus on tasks requiring higher-level skills, which may reduce the technology staffing shortage and reduce need for additional staffing.

Lastly, Remember to Address the "Small Stuff"

Those can be deciding factors to attract and keep state employees. In the highly competitive tech field, experience shows that attending "small stuff" make a difference.

- Parking (priority, availability, location, cost)
- Day care (for youths and seniors)
- Conducive work spaces and office environments (when not WFH)
- Others

References:

Hawaii Technology Industry 2020 Brief

CompTIA State of the Tech Workforce 2022

UH Hawaii IT Salaries 2022 Study

Skillsoft IT Skills Report 2021