University of Hawaii (UH)
Information Technology Services (ITS)
Technology Strategy 2024
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Science Fiction Inspires Innovation

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(note: many of the images in this document were generated by AI apps)

Prolog
Episode 2024, Return of Genisys

ITS' technology strategy is crafted as an implementation layer of the current University of Hawaii Strategic Plan 2023-2029 (ref. https://www.hawaii.edu/strategic-plan/). The relationship of this technology strategy to the institutional strategic plan will help to ensure optimal alignment of all ITS strategic activities to the critical mission serving needs of UH.

This technology strategy is crafted as a lightweight strategy document to minimize otherwise repetitive and duplicative language of a traditional standalone technology strategic plan, and should be viewed in concert with the UH System Strategic Plan.

The Elevator Pitch

The ITS Technology Strategy for the University of Hawaii System (UH) is designed to align with the university's strategic plan for 2023-2029. It aims to simplify and streamline technology services, moving away from overly customized systems of the past towards more standardized solutions. This shift is driven by several factors, including the need to reduce costs, adapt to changes in the workforce, and address the growing threat of cybersecurity incidents.

Key strategic themes for the technology strategy include:

- Information Security and Data Governance: Increasing investment in security measures to protect against internal and external threats.
- Hybrid Cloud and Balancing On-Premise Infrastructure: Strategically balancing the use of cloud services with on-premise infrastructure to maximize value and efficiency.
- Evolution to a Balanced Portfolio of Software-as-a-Service Enterprise Services: Transitioning towards more standardized software solutions to reduce the burden of maintaining highly customized systems.
- Innovation and Support for Teaching and Learning: Leveraging tools and evolving practices to support innovation in teaching and learning supports.
- Integrating Research as a Core Practice: Directly participating in research activities and investing in shared research infrastructure.
- Investments in Workforce and the Future of Work: Adapting to the changing nature of work and investing in the development of the technology workforce.
- AI: Exploring the use of artificial intelligence to improve services and efficiency while being mindful of data and privacy guiderails.
- Core Infrastructure: Continuing to invest in core infrastructure to meet the growing demands of the institution.
- State Broadband Infrastructure Office: Overseeing the implementation of federal broadband infrastructure investments in Hawaii.

The strategy emphasizes the need for focus and prioritization in the face of limited resources. It acknowledges that some services may need to be retired or reduced to reallocate resources for maximum long-term value. The goal is to ensure that technology services effectively support the university's mission and strategic goals.

Technology Strategy Principles

The COVID-19 pandemic magnified and accelerated the changes in our world. We have crossed the threshold into a "new normal", with significant, unrelenting demands on our institutional IT resources, and for now, together with all the legacy costs and constraints we were held to pre-pandemic. The coming months and years will be filled with a number of difficult institutional decisions to pare away the *snowflakes* characteristic of the past decades, so that the finite IT resources of the institution may enable transformational outcomes, while operating within the bounds of institutional resources.

Snowflakes refers to a common legacy practice in enterprise software of creating highly customized, unique, localized versions of already complex systems that are created to meet organizationally specific needs, typically rooted in historical practices, that results in a very expensive and difficult to maintain, one-of-a-kind setup.

During the 1990s and 2000s – our efforts were centered around highly customized enterprise systems - because we had to, and because we could. Enterprise software generally available in that era were generally created for commercial use, and lacked features and functionality required by public higher education systems. Those decisions to customize available software offerings created a recurring workload of updates at every patch and enhancement cycle by the original software manufacturer, and often resulted in stranded baseline features that could not or were not implemented by UH. In some cases, our custom features were created to fill gaps in functionality, that oftentimes were resolved in later baseline versions, but never were adopted by UH. The 2010s saw the institution heavily burdened by our snowflake enterprise systems and legacy maintenance workload. We spawned layered solutions and integration that became the shiny objects to preserve legacy snowflakes, creating even more layers (of snowflakes).

Just as we were moving to build our responses to the growing crowd of new "online" institutions and for-profit competition, we were forced to pivot to respond to the pandemic, the global lockdown, and to-be-determined future of work. We emerged with layers of legacy costs, heavy losses in institutional knowledge, and even higher expectations from our customers and stakeholders. The "new normal" was back-to-campus AND online, with an evolving future of work, and customers now certain that they were entitled to demand both the traditional higher education experience AND this somehow nimble, agile, hybrid, stacked-credential-workforce-directed-customer-centric experience.

Just as we executed a serious pivot in response to the COVID-19 pandemic, we must make the hard decisions to do less (not more) with available resources, and do the right things to enable truly transformational outcomes for our customers.

As we collectively work to choose our path forward, we're also facing the realities of a thin base of resources, settling in after collective losses (to departures and retirements) equivalent to losing a few hundred human-years of subject matter expertise. We historically have been on the short end when competing for highly experienced subject matter experts; the evolved face of the

workforce has only made it worse. New investments will be heavily focused on mentoring internal candidates to grow, together with an increased number of students employees (aka student interns), apprentice-like participants, and entry-level hires.

Technology Vision

Contrary to the historical approach of creating a technology centric "mission" and "vision", this IT Strategy is crafted around simple and straightforward principles, to maximize alignment, values and actions with the UH System Strategic Plan. In pursuit of this singular focus, the technology units of UH, led by ITS, will work to build and maintain current skills and expertise in high-value technologies that best serve the singular focus, keeping a watchful eye on sustainability of the skills and abilities of the technology units to ensure we have the ability to deliver in service of the singular focus.
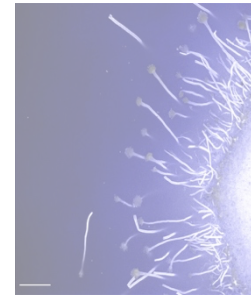
Technology Strategy Guiderails

First and foremost, technology strategies shall be grounded in sound organizational and operational practices and be in full alignment with the UH System Strategic Plan. These guiderails parallel the System Strategic Plan Foundational Principles,

- Hawaiian Place of Learning
- Statewide Need
- Diversity and Equity
- Sustainability
- Stewardship of Resources

Basic operational excellence is central to ITS core infrastructure, enterprise systems and systemwide services. The institution is critically dependent on technology and technology-delivered services to perform its core mission. For the foreseeable future, everything that we (ITS together with systemwide distributed IT organizations) do is a foundational necessity for the institution. Principles of operations – our Kuleana – shall be to deliver continuous availability / high reliability, high value / high performance, and responsible and responsive collaboration.

Important note: this does not and cannot be taken to mean, all things to all people, more with less, and other useless tag lines. This strategy is about focus, and doing the best that we can for our university and our community.

Continuing on guiderails, specifically addressing limited resources, this strategy requires that we focus on delivering maximum value in strategic investments of time and resources. Some things will break, and some services will have to be retired in order to realign resources for maximum long-term value. We must be sensitive to those that are on the short end of those decisions, and

help by providing reasonable transition, replacement or alternative supports to fill the small voids that we will inevitably create.

Everything, Everywhere, All At Once – Information Security, Security Incident Response and Institutional Data Governance will continue to grow significantly in the immediate term, to ensure that we are responsible stewards of the university's technology and data assets. We have already experienced far too many costly and unfortunate incidents over recent years, and the level of internal and external threats continue to grow geometrically on a global basis – perhaps the largest global growth "economy" – the collective of "bad actors" who's sole "job" is to steal stuff, and damage individual and organizational technology assets.

Finally, our collective workforce has evolved significantly over the last decade, with many changes resulting in placing the university at a greater disadvantage to effectively compete for talent in the market. To a large degree, the changes in work practices during the pandemic effectively made it easier for out-of-state employers to effectively poach talent from the Hawaii talent pool; conversely, the visibility of employment opportunities on a national basis have further increased our challenges in recruitment and retention.

Given all of these challenges, while continuing our legacy recruitment practices, we are increasing investments both to encourage accelerated growth from our incumbent talent, as well as increase the size of incoming workforce pool, including student employees (aka student interns), apprentices (advanced student interns, together with entry level candidates), and additional entry level staff. We do recognize that heavily weighted junior staff does increase the workload for journeyman and subject matter expert personnel – i.e. consumes additional in-house training and mentoring tasks. Our strategy includes partnering with responsible local employers to provide additional expertise to mentor our interns and apprentices. We are confident the long-term impacts will be substantial, and provide a sustainable source for the university's future technology talent.

Strategic Technology Themes

The UH System Strategic Plan is built around four key Imperatives, that create clear and definitive pillars that guide the actions of the university. These four imperatives are,

- Fulfill Kuleana to Hawaiians and Hawaiʻi
- Develop Successful Students for a Better Future
- Meet Hawaiʻi Workforce Needs of Today and Tomorrow
- Diversify Hawaiʻi's Economy through UH Innovation and Research

Everything that we do across the technology units of UH relies on the solid and reliable foundation of our policy, compliance and always-on operational units. These include the often unseen (*quiet and effective*) teams that do the invaluable work of keeping the lights on, handling day-to-day needs of our community, and work in the trenches of delivering on our educational, research and community service mission. Building on this solid foundation, are substantial undertakings that are strategic for the university, will consume substantial resources – resulting in high value benefits for the institution, and will be key pillars for the future of UH.

Major Undertakings

The following set of strategic themes describe the major technology initiatives for the institution, marking significant planned investments in resources over the remainder of the decade. These strategic themes also reflect the singular focus that shapes our collective efforts, including investments in our workforce and the future of work.

Each strategic theme that follows will include one or more specific efforts that are currently or soon to be underway, and that will result in outcomes important to the future of the institution. These are not listed in priority order as all represent undertakings of critical importance to our future; some of these also overlap with other undertakings given the nature of the work.

Each strategic theme includes a reference to UH System Strategic Plan *foundational principles* and/or *imperatives* as the primary alignment vector of the strategic theme. Most of the strategic themes apply broadly to multiple foundational principles and imperatives; in these cases, the most relevant foundational principles and/or imperatives are noted.
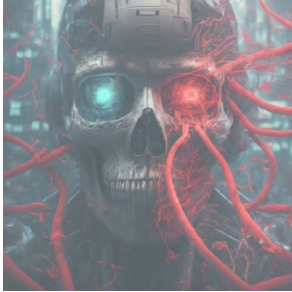
ST-1: Information Security and Data Governance
*Foundations: Statewide Need, Stewardship of Resources*

Already established as the consensus highest risk for the institution, systemwide Information Security investments, with focus on combined *internal* and external threats will continue to escalate as a permanent, and rising theme for the institution. Following on the very public incidents in 2023, we increased the level of investment, dedicated resource, outreach, and policy enforcement across the institution, impacting all faculty, staff, students and executives of the university and its affiliates. There are no *mulligans*; IT staff, data custodians and unit executives are all collectively responsible for actively protecting institutional data and assets.

Regular outreach and informational briefing sessions have been increased to occur multiple times per year, to include at least one fully in-person visit to each and every campus location to provide direct access to information security and data governance leadership, directly address potential incidents and risks, and reinforce training and support for campus and school/college distributed technology units. The sessions are jointly led by our institutional Chief Information Security Officer (CISO) and Data Governance Director, often accompanied by other ITS directors and staff to brief on current and related topical areas. Quarterly webinar sessions have typically seen well over 500 registrations, with in-person sessions also well attended by both technical and functional leads.

All units can expect high levels of active monitoring of infrastructure and devices consistent with the constant and persistent increases in threats to the institution. These include well known external threats as well as the high potential for internal threats triggered by a combination of internal bad actors, and a range of internal failings including lapses in judgement and simple human error. Units may also expect both increased capacity for incident response from both central and distributed technology units, as well as shared allocation of costs and liabilities resulting from security incidents.

As an integral part of the institutional response to increased threats and risk, ITS is working to establish shared, managed infrastructure to shift the risk and human resource load to central shared services. Over time we expect to expand these manage infrastructure offerings to include secure enclaves suited for various classes of regulated and protected data. These managed infrastructure instances will be under the oversight of ITS, and managed with policies and practices consistent with ITS enterprise infrastructure. Availability of these managed instances, combined with increasing external penetration testing, internal assessments and training, will produce systemic improvements in our overall information technology risk profile and responsiveness, and improved capacity to effectively support our statewide community.

Distributed technology units will undergo the same scrutiny as is the case for central IT (ITS), to ensure that the information security program is maximally effective for the institution. We recognize that the level of threats to the institution will continue to rise, and part of our response needs to ensure quick and effective response WHEN our next security incident occurs.
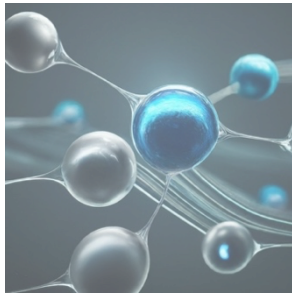
ST-2: HYBRID CLOUD AND BALANCING ON-PREMISE INFRASTRUCTURE
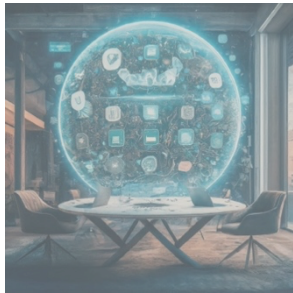*FOUNDATIONS: SUSTAINABILITY, STEWARDSHIP OF RESOURCES*

ITS will continue the practice of strategic refresh investments of on-premise data center infrastructure (see also ST-7), while making specific strategic investments to increase our public and private cloud footprint. Key drivers for seeking a mix of cloud and on-premise enterprise infrastructure include,

- Maximizing realized value of prior capital investments in on-premise facilities and assets,
- Expected continued increases in cost of power (that's already a multiple of power costs in several CONUS regions),
- Challenges in recruitment and retention of infrastructure engineers,
- Balanced hybrid infrastructure as a strategy to maintain cost leverage over commercial cloud providers, and
- Benefits of shared investment in research infrastructure with higher education peers.

In particular for new cloud investments, look establish a scalable presence to host protected data in a shared resource, managed services cloud environment that provides off-premise net growth in institutional resources, without adding significant stresses to the ITS Technology Infrastructure (TI) staff resource (i.e. intelligent use of managed services to increase overall reliability and security posture without requiring increased demand on TI staff resources). We may also utilize the managed cloud instances as opportunities to create secure enclaves for highly regulated datasets and associated controlled use (provided the necessary security layers are properly provisioned and managed).

The initial offering of the shared-use managed cloud infrastructure will be available by end of Spring 2024. The initial offering will provide a managed space that may be used by campuses

or units/schools/colleges/departments/projects that require secure shared storage, containing sensitive or regulated data, as an alternative to infrastructure that may be poorly managed on premise. Used of the managed cloud instance may become mandatory for certain institutional uses or by units without sufficiently trained and capable technology unit support.

ST-3: EVOLUTION TO A BALANCED PORTFOLIO OF SOFTWARE-AS-A-SERVICE ENTERPRISE SERVICES
FOUNDATIONS: SUSTAINABILITY, STEWARDSHIP OF RESOURCES

Through the decades preceding the global pandemic, we relied heavily on high degrees of customization of commercial software, and in a number of cases, fully custom developed software systems, to deliver enterprise solutions for the institution that performed exactly as we "wanted", in some cases mimicking legacy software operations at the expense of taking fullest advantage of modern capabilities. In the majority of cases, we did so because the set of available solutions did not satisfy our requirements, needs and wants. While that continues to be the case (i.e. that our needs and wants continue to diverge from available solutions), commercial offerings in our higher education space have become significantly more robust and complete over the past decades, and can now typically offer full functionality suitable for higher education use. The challenge remains that our "wants" now reflect those snowflakes that have outlived their usefulness.

Our environment continues to be stressed by retirements of long-time incumbents, many of whom were present at the birthing of our most highly customized enterprise systems. At that time (the birthing events), we were thankful that we had the capacity to modify commercial software solutions, and have been able to maintain those systems over the years. Two major influences cause us to reassess the approach. First, many of the commercial systems have evolved over time, partly due to changing regulatory and compliance requirements – which we have to adopt and adapt our customizations appropriately – and second, the growing list of enhancements by the commercial author that we opted not to incorporate with our customizations over time, due to conflicting needs and code. Together with the challenge of hiring and maintaining enterprise software development staff (remembering that the age of the solution also parallels the age of that solution's technical stack), sustaining the snowflake approach to enterprise systems will simply not work.

The necessary pivot for our institution is to adopt Commercial Off-the-Shelf (COTS) Software-as-a-Service (SaaS) offerings, in some cases by the same commercial partners, but crafted to support continuous delivery, to include modern functions and features of value to the institution. Such a move will require change and compromise by our institutional customers and stakeholders. The net benefit to our customers will be access to modern, high functioning software solutions; with the net benefit to our technology units being a reduction in legacy development teams (in favor of migration of staff to high-value integration development teams), and reduction in on-premise hosting and licensing costs. The cost offsets will be absorbed by the increased operational expenses (opex) of the SaaS solutions, but in a fair trade-off resulting in high net value for the institution. **This core strategy does NOT mean everything immediately flips to COTS/SaaS; we will continually assess the merits and value of specialization and customization on a case-by-case basis to ensure the optimum set of solutions and services for the institution.**

The highest impact projects include:

- Banner back-to-baseline projects (multiple starting with accounts receivable and financial aid) – ongoing projects with varying completion targets in 2024 and 2025
- Banner Self Service Banner 9 (SSB9) upgrade (that also requires core infrastructure changes, including Ellucian Ethos components) – target 2025
- Banner ODS to Insights migration to fully deprecate ODS (already declared to move to end-of-life by Ellucian); conversion to SaaS delivered – pilot implementation target early-2025, full deployment later in 2025 (this has future phases to include integration of Kuali Financial System (KFS) and PeopleSoft Human Capital Management (PS-HCM) data)
- Institutional Auto-Admit/Express-Admit – target high school class of 2025 admits
- Kuali Financial System (KFS) migration to Kuali SaaS, consolidation of selected customizations in to Kuali SaaS baseline – target 2026
- Learning Management System (LMS) migration to D2L Brightspace (SaaS); note the LMS is required to specifically include investment in Hawaiian language support (and increasing support of Pacific languages) – target 2025

Of note, the migrations to SaaS operations will provide significant relief for on-premise server and storage infrastructure operations, including significant Oracle licensing relief resulting from ODS and KFS migrations (of note, both SaaS destinations are non-Oracle implementations). ITS teams also successfully tested the potential for migrating the PS-HCM production instance to (Oracle Cloud Infrastructure) OCI operations; this migration is also a candidate for migration to cloud hosted operations.

ST-4: INNOVATION AND SUPPORT FOR TEACHING AND LEARNING
IMPERATIVES: STUDENT SUCCESS, WORKFORCE
FOUNDATIONS: STATEWIDE NEED

Effective support for core teaching and learning functions will continue to be central to the foundational services delivered to our customers. Enterprise services (ref. ST-3) will continue to deliver mission critical operational teaching and learning supports on a systemwide basis, with a push to improve customer experience as we can upgrade and enhance our service offerings. We expect to deliver substantial improvements with the migration to a modern, full featured, SaaS-delivered LMS (Brightspace by D2L) over the next year and a half. Of note, the implementation scope includes a requirement for D2L to implement Hawaiian language translation for UH – high functioning Hawaiian language support has been notably absent from the market and this commitment by D2L, as required in our LMS procurement, will help to increase the accessibility of our instructional materials, and hopefully increase industry interest in Pacific languages. While efficient support of the day-to-day mission of the institution is a foundational requirement, ITS must also provide leadership for the institution to leverage innovation and evolutionary practices to guide our future teaching and learning principles and practices.

Ongoing investments in innovation in the online learning space will continue to be led by the ITS Online Innovation Center (OIC, ref. ST-6), including integration with the adoption of AI tools, principles and practices (ref. ST-7). Multiple strategic themes converge in the support of teaching and learning for the institution. Opportunities related to AI include both generalized AI applications tied to course content, student support and student learning outcomes, as well as predictive AI applications that may influence the future of navigating academic and career pathways. Our efforts in the IT space to collaborate with faculty and instructional designers will serve as foundational investments to help define and organize the platforms for innovations in teaching and learning spaces.

ST-5: INTEGRATING RESEARCH AS A CORE PRACTICE
IMPERATIVES: INNOVATION AND RESEARCH, STUDENT SUCCESS
FOUNDATIONS: STATEWIDE NEED

Technology units, including ITS and Hawaii Data Science Institute (HiDSI), directly participate in significant research activity, with projects ranging from international network infrastructure, to the institutional EPSCoR and all manner of data centric visualization and analytics. Core staffing for the efforts are housed within the ITS Cyberinfrastructure division and the Hawaii Data Science Institute, comprised of a mixture of full time staff and student participants. With the rise of AI and increased attention to data visualization and analytics, we expect continued growth extramural projects, supplemented by in-sourced project efforts to help boost institutional capacity. Shared research infrastructure built on the original 2013 UH System investment in High Performance Computing (HPC) continues to be enhanced with a mix of institutional and extramural funds. While generally running on an independent technology stack (different from our institutional technology infrastructure), cross-training and shared support will be necessary and useful as the research infrastructure continues to grow, including very high capacity connectivity to partner institution HPC resources. The Hawaii Data Science Institute recently completed implementation of a shared storage resource (KoaStore, NSF Award#2232862) delivering over 4PB of available pooled storage for the research community.

ITS and HiDSI continue growth of their respective extramurally funded research porfolios, including the standout International Research Network (NSF Awards #2029312, 1451058), and Pacific Disaster Center programs. The growth in awards under interim Cyberinfrastructure Director Sean Cleveland, and HiDSI and LAVA Lab Founder Jason Leigh, are anticipated to continue to spur growth in topical areas of Artificial Intelligence, Machine Learning and Data Visualization.

See also ST-7 as to related topics and efforts.

ST-6: INVESTMENTS IN WORKFORCE AND THE FUTURE OF WORK
IMPERATIVES: STUDENT SUCCESS, WORKFORCE
FOUNDATIONS: STATEWIDE NEED

The global pandemic triggered major shifts in the way we work and tore down many of the imaginary hurdles to our broad adoption of telework, hybrid work environments and distributed teams; and opened our eyes to the future of work. While many organizations throughout Hawaii have opted for a return to "normal" (i.e. snap back to pre-pandemic behavior), our technology operations are permanently evolved, and will continue to change as our workforce is able to adapt to new operating environments. There are and will remain those work teams that must be present for direct customer facing activities (remembering that our customers have also evolved in different ways), and to directly deal with brick-and-mortar facilities that will remain a part of our institution (that will also continue to evolve).

A difficult challenge for technology units is that the evolution of the work place and workforce is not a unified change where our world is simply shifted online – rather, this evolution is multi-faceted, not unlike the unfolding of the multi-verse, where we now must interact, support and operate in a mix of environments. Not in-person OR online, but in-person, online, AND hybrid in continuous shades of grey. This applies not only to the technology units directly, but also to our institution and our community of customers across the state and around the world.

Technology strategies will continue to fully support all modes of work throughout the community, including our own technology units. Workforce development and investment in our talent pipeline is even more critical now – as our own workers enjoy greater flexibility and productivity, the same holds true, in many times to a greater degree, for those employers seeking to recruit from our institutional ranks. Great for our students that are better prepared for the hybrid and online world; that also translates to a reduced hurdle to poach the institution's best and brightest. While continuing across the board retention activities, increased investment in our talent pipeline is critically important to ensure we have the human resources to continue our work.

The ITS Online Innovation Center (OIC) has a focus of delivering guidance and professional development opportunities to support the future of teaching and learning throughout our institution. OIC was established in 2019 to take a leadership position for the institution in establishing forward-looking practices for online teaching and learning activities, and to deliver systemwide support and professional development support.

Our showcase project, continuing as a "forever" beta-phase effort, is our Leap-Start Experience Excelerator program. The effort now has significant traction with a group of local employers, and

queued up interest in participation subject to our ability to increase quality candidate selection. The baseline program will be layered with industry cooperative workforce development efforts, including potential contribution from the large commercial partners in this space, e.g., AWS, Google, Microsoft, Salesforce, Oracle. Additional work to integrate our UH eSports program has also proved successfully to jointly support growth and expansion of the eSports efforts.
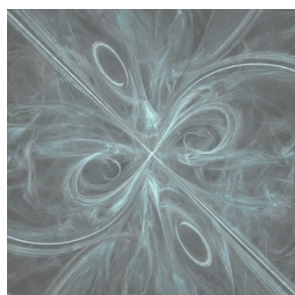
ST-7: AI
IMPERATIVES: WORKFORCE, INNOVATION AND RESEARCH
FOUNDATIONS: STATEWIDE NEED

Artificial Intelligence as a conceptual area is older than most of our legacy technology investment. The 2022 "Break out" with the public release of OpenAI's ChatGPT was more accurately the convergence of corporate R&D investments in AI, together with the commoditization of new generations of high performance GPUs. Use of public "free" models and increasingly institutional walled-gardens have taken hold, while many technology and data governance entities have struggled to establish thin policies to protect the institution's regulated and protected data assets, as well as our high-value research intellectual property assets. Once released in the wild, there's little chance of un-ringing the bell.

UH has a number of stellar researchers already practicing in the AI arena, to include related topics like machine learning, data visualization, data animation, and data analytics. The greatest gap at present is the need for technology units to establish useful and meaningful service offerings that can leverage AI to deliver more with less, i.e. more service to customers with less human resources, and to inform and train core staff on the potential uses for the institution.

Ideally, project teams would take on early adopter AI solutions, initially using non-protected/regulated datasets, that would provide both meaningful benefit for our community, while helping get technology units up to speed on the AI tools and solutions. These project teams will likely take on multi-institutional, virtual team characteristics, to help share the load between and among our peers. The addition of student members to the teams will help to balance the workload while also helping students to grow and explore the topical area.

Strategic projects under this theme will be formulated over the near term, with the objective of delivering limited but meaningful outcomes by Summer 2024, with ongoing efforts to expand the

reach and impacts of services beyond the pilot efforts. Funding for staff as well as infrastructure will be a challenge that is hopefully offset by participation by strategic industry partners (understanding that the bill will likely come due in future years).

Working in concert with peers across the country (based on highly engaged discussions with Internet2, Educause and about two dozen research university CIOs), ITS will commission a number of short duration projects to invest in early, limited scope opportunities to build internal capacity, and to work with virtual teams across higher education peers to begin to establish working principles for AI based deployments. Candidate project opportunities, to launch by the end of the Spring 2024 semester, include:

- ITS AskUs "Easy Button" – RAG (Retrieval-Augmented Generation) based approach to initially support limited scope "help" documentation search; to be expanded in later phases to include text and document-based data retrieval supporting administrative functions (e.g., procurement). Forms and documents in the multiple phases of this project would be limited to non-regulated data.
- UH Office of Research Services (ORS) document analysis – RAG based approach to analyze MyGrants submissions in support of ORS document reviews (subject to low/no-impact finding for ORS)
- And the potential high-value candidate, combining de-identified pathway/degree/major from STAR, with USDOL matched employment data, and career-compensation and market data from EMSI – tied to (open) LLM-based conversational queries supporting pathways guidance, tied to career and potential job/compensation outcomes, e.g., I am a fifth semester UHM ACM major, with interests in optimum path to graduation and finding an Oahu-based employer offering at least $55,000 annual salary; outcome would be recommended 6/7/8 semester courses (or maybe 6/7 semester courses to early graduation), perhaps recommendation for summer internships, and possible job postings (based on current postings). Additional datasets might include K12 STEM pathway info, job posting databases (e.g., Glassdoor, Indeed, Ladder).

These or similar projects would be launched in Spring 2024, with the intention of coordinated activity with higher education peers, and AI guidance from industry partners and HiDSI staff. Other outcomes would include establishment of one or more training AI sandbox environments, training material repository, and perhaps partnerships with other units in addition to statewide technology units.

Building on the pilot activities of Summer 2024, we expect to establish multiple pathways for AI enable innovation. Our basic institutional research in AI and related topics will continue to grow, and to spawn other activities as the area evolves and grows. Besides our initial efforts around administrative and operational efficiencies, and evolving our operational practices, we hope to make strategic investments in teaching and learning, using AI principles to help evolve our teaching and learning practices, provide support for course development and innovative techniques, and to bring new tools and supports to empower student success. Our research enterprise must also continue to grow in this space, extending the bounds of what might be

possible with the range of tools, models and practices being developed both here at UH as well as around the globe. We expect that AI powered automation opportunities will provide our community with the ability to literally do more (with less) through employing automated response generation apps to generate a force multiplier effect for traditionally human-intensive faculty and staff services.
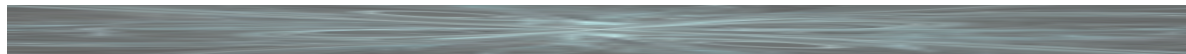
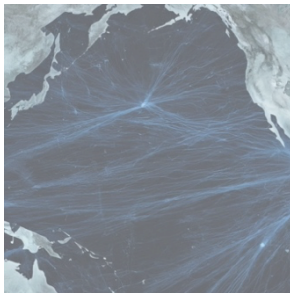ST-8: CORE INFRASTRUCTURE
FOUNDATIONS: STEWARDSHIP OF RESOURCES

Even as our adoption of hybrid cloud services increases, we must continue to ensure our core on-premise infrastructure remains current and keeps pace with institutional demand. Overall demand continues to spike in an unprecedented fashion, as units and individuals demand greater performance and capacity from technology units. Gone are the days of unlimited free stuff; and our heavily discounted bleeding edge acquisition strategy has quickly been overtaken by unbridled demand by commercial services – the race to the top for the Skynet-AI is on, with (in alphabetical order) Amazon, Google, Meta and Microsoft leading the way.

Core infrastructure investments in traditional servers, storage and network will continue as a strategic theme for technology units. Growth in hybrid cloud investments will outpace the on-premise investments, albeit with an opex (hybrid cloud) model versus our traditional opportunistic capex (on-premise) model. With the exception of high end research and AI capacity growth (see also ST-4 and ST-6), technology units will have to manage spend at a relatively constant level, with the occasional one-time supplement from institutional or extramural funds. Of note, our institutional infrasructure includes substantial investments, both central and distributed, supporting multi-media and collaboration needs of the institution. ITS is responsible for systemwide multi-media and collaboration infrastructure, as well as providing guidance for distributed technology units supporting campus and department needs.

Strategic projects under this theme include:

- Current round of on-premise server and storage refresh – by Summer/Fall 2024
- Core network uplift – by 2025

- Wide area and long-haul capacity and resilience upgrades, including intra-state and trans-Pacific connections – by 2026, with the goal of surpassing 1Tb aggregate external capacity by 2030
- Avaya legacy forklift (to Mitel softswitch core) – by 2026
- Team Dynamix replacement for Cherwell ITSM – Implementation by late 2024
- IDM strategy roadmap, including hosted IDM overlay – by 2024

ST-9: STATE BROADBAND INFRASTRUCTURE OFFICE
IMPERATIVES: WORKFORCE, INNOVATION AND RESEARCH
FOUNDATIONS: STATEWIDE NEED

Best classified as an effort by ITS to support the greater good – doing our part to support all of our communities. With the support of the current and prior administration, we have taken on the role of the state broadband office, overseeing the execution of significant federal formula-based broadband investments allocated to Hawaii. The effort includes oversight of the largest of the federal broadband investment programs, US Treasury Coronavirus Capital Projects Fund (CPF), National Telecommunications and Information Administration (NTIA) Broadband Equity Access and Deployment (BEAD), and technical assistance to the Department of Hawaiian Home Lands (DHHL) in support of their awards under the Tribal Broadband Connectivity Program (TBCP).

Together with the Digital Equity programs administered by the Department of Business and Economic Development, these programs represent Hawaii's public investments exceeding $400m to help us ensure the future of reliable and affordable Internet for All. These programs together are intended to comprehensively support universal access for connections, devices and "know-how" for all Hawaii residents.

See also www.hawaii.edu/broadband/ and www.connectkakou.org

Postlude: Next Steps; Reliable Execution

We have too much work in the queue, and the institution is reliant on our collective technology units to shoulder the load. Every future scenario (well, except the apocalypse scenario) requires that we execute strategically in order for the institution to succeed. This focus and the reality of limited resources also means that we will need to do less with less. Key strategic themes that include back-to-baseline efforts and bringing modern COTS SaaS services into service will eventually trim the out-of-control tide of maintaining our snowflake enterprise systems.

The greatest impact to the institution will be adapting to the changing face of technology. The "good old days" are gone, period.

Our future is a work in progress. Planned updates to these strategic themes will occur at least annually, most likely in concert with an ITACW event (Summer IT All Campus Workshop and January State-of-ITS workshop).

Finally, *Mahalo!* (Thank You!) to each and every one of the four-hundred-plus technology personnel that are the people that deliver the benefits of technology to our UH community.