People increasingly experience or interact with an organization through a technology lens. Accessible, engaging, responsive, flexible, and secure applications, with uses ranging from the casual enquiry to the complex workflow or visualization, are useful or even required by the student, the professor, the researcher, the administrator, the donor, the ticket purchaser and the visitor, whether physically on our campus or in remote corners of the globe.

Therefore, technology is integral to UNH\(^1\) and a key enabler of its mission and strategies. The University is presently at an important juncture in how it uses and manages technology. The University of New Hampshire Strategic Plan vision and specific programmatic initiatives require new and updated technology. Technology change is rapidly expanding the options available for provisioning technology and associated services. These changes are lowering the barriers to technology adoption and raising the complexity of integrating, securing and supporting technology. All of this is occurring in environment that has finite resource and is sensitive to the impact of technology operations on budgets, human resources and energy consumption.

The value of technology is realized through supporting our core mission as a higher education institution. UNH must maintain alignment between academic, research and outreach goals and its technology strategies and initiatives.

Through an environmental scan, literature review and consultation with the UNH community, the technology master plan has identified strategies to move UNH technology forward\(^2\). These strategies are responsive to UNH’s Strategic Plan, include a stronger focus on academic technology, and consider critical developments in technology such as the expanding importance of cyberinfrastructure, increasing mobility of technology users and technology devices and the rapid growth of digital content. Consultations with University leadership enabled the planning team to devise strategies that are responsive to issues that are of primary importance to UNH including accessing new student markets and spurring increased collaborations in teaching and research and sustainability.

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\(^1\) For purposes of this document, UNH means all academic and administrative departments and sites, regardless of location.

\(^2\) This document is a précis of the full UNH Technology Plan, which was the result of significant collaboration by a committee of UNH technology professionals. The full plan and list of committee members can be found at it.unh.edu.
Requisites for Change

Successful change positively affects organizations and the people it serves. In order to identify, prioritize and implement technology investments that will have the most positive impact, we must commit to certain approaches to technology investment and management.

New Investments: We will encourage innovation, leverage of shared resources, and implementation of integrated and interoperable systems. We will invest in projects and services that most support our goals, based on qualitative and quantitative measures. New investment project approval will require funding for one time and ongoing resources and cost estimates to be identified. Ongoing cost estimates must be comprehensive and include hardware renewal and replacement, security, and software maintenance as well as other direct operating costs.

Collaboration: We will involve the community in generating ideas, conducting analysis, making recommendations, and determining lifecycles. UNH IT and our many constituents will work together to create efficiencies, optimize the division of responsibilities and provide well-integrated solutions. The leadership of UNH’s major technology organizations, including UNH IT, the Library, Research Computing, Cooperative Extension Information Technology, Academic Technology Liaisons, UNH Manchester IT and the Interoperability Lab, will gather input and consult regularly regarding technology standards and directions, division of responsibilities, sharing of capabilities, coordinated professional development, alignment of project portfolios and collaborative leadership of joint projects.

Funding: We will support financial practices that result in sensible technology usage behavior and outcomes. Common infrastructure and services should be funded collectively. All departments must be enabled to meet minimum requirements for capacity and currency. Duplication of services or creating excess capacity without institutional value will be discouraged. Charge-backs for central services should be used as a funding model only in those cases where the charge-back helps with effective use of technology resources. Charge-backs must not become barriers to innovation, unduly burdensome to administer or encourage IT to offer non-strategic services as a means to generate funds.

Sustainability: We will require legacy and new projects and services to be financially, operationally and environmentally sustainable. All technology must be appropriately accessible and secure. Legacy technology must have a lifecycle that ensures continuing value and sustainability. New investments will require sustainable attributes prior to approval.

Excellence of Execution: We will make and meet the right commitments, ranging from service level agreements to innovative technology implementations. We will use industry standard IT management processes and architectures that align with our requirements and culture. We will execute efficiently and effectively on new programs and alterations to existing systems and services. We will measure our projects and operations sufficient to ensure quality and accuracy, and will leverage best practices in our commitment to constant improvement.

Balance: We will balance our investments, with focus on meeting those requirements that most strongly align with our market and mission. We must be willing to reprioritize, including delaying or cancelling programs and services. We will need to adopt some solutions that are “good enough” if we derive no strategic benefit from the extra investment to be “best in class”. We will standardize on more common
solutions and avoid making duplicative technology investments when a solution that meets the majority of a constituent needs already exists. We will analyze existing projects and services across UNH and recommend opportunities to retire duplicative technologies, re-order priorities or scale back service levels to align with overall strategies and create the capacity to reinvest in new priorities.

**Future Vision**

In the UNH Strategic Plan, a series of future scenarios are put forth. Most if not all of the scenarios require technology; technology we plan to deliver in technology initiatives.

The student collaborating at a distance with an advisor requires collaboration functionality and a reliable, powerful network. The marine science graduate student requires the ability to create, store and share large video files, via a portal, and requiring storage and a strong network. The Center for the Arts hosting a conference requires logistically complex and elaborate rich media, identity management, online conferencing, and collaboration functionality, accessed via an online portal and run over a strong network - and afterwards the proceedings must be stored for future access and use.

Other scenarios include:

- A faculty member requests and is swiftly able to get assistance with technology tools, education and support resources needed for a class. There is a range of academic technology services available, including high-tech classrooms and online learning.
- Students employ collaborative workspace for class project work – where they can store content and iterative drafts of their work, prior to final delivery, and then seamlessly move the final product into their online portfolios.
- Alumni and community members receive information about events and volunteer opportunities via the channels that fit the individual constituent – from mobile devices to social networking portals.
- Mundane yet necessary activities, from parents viewing tuition and fee payment history, to scheduling of classrooms or athletic facilities, are easily accomplished, real-time transactions.

**Technology Initiatives**

All initiatives will directly support the UNH Strategic Plan programmatic initiatives, envisioned in the future scenarios. Initiative plan and delivery may be in direct support of one or many of the programs. In most cases, initiatives will be comprised of multiple individual projects and phases.

Success of these initiatives will all be predicated on the requisites for change as well as support for disciplined program management including:

- Functional and technical requirements that are complete, accurate and support test-driven design, whether we are building or buying technology.
- Effective management practices, including measurable and effort-based plans.
The description and characteristics of these initiatives are:

**Scholarship and Research Directory and Information Services:** This will be a collection of services that will be guided by the need for interdisciplinarity, enterprise, inclusiveness and outreach. Information services will enable the capture and analysis of individual and department data. Directory services will enable people within and beyond the institution to locate UNH resources based upon a variety of search criteria. These services will require integration and interoperability with a number of existing and new systems, including ERP, department databases and web sites, and UNH’s internet presence. These services will be built as true technology services, and require modern connection and translation capability.

**Learning Portal:** The Learning Portal (LeaP) is a technology service that will archive rich media and other digital curricula, enable new teacher-learner relationships, and stimulate new pedagogies. UNH IT will work with the Provost’s Office and faculty groups to evaluate the services and technologies needed to create LeaP. Initial focus will be on collecting what we already have in place, to better leverage repositories of theme-based lectures, exercises, assignments, data or digitized media that can be accessed, repackaged and used by UNH teachers and learners, using a wide array of creative interfaces. We will train and support faculty, continuing and expanding programs such as the Faculty Instructional Technology Summer Institute (FITSI). LeaP will be dependent upon Cyberinfrastructure (see below). To build LeaP, we will need requirements and specifications that are complete and support test-driven design. LeaP will require integration and interoperability with a number of existing and new systems, including student information and learning management. LEAP will require a modern architecture and portal technology.

**Communication & Collaboration Suite:** The suite will be a collection of services that will enable people and groups to work together from varied locations and using varied hardware or software tools, including mobile devices. The suite will allow the creation and management of sites that support collaborative functions, ranging from joint editing of media to virtual meetings to interactive video or text chat. It can be used to engage alumni and friends, connect researchers within UNH and other institutions, and collaborate on projects of many shapes and sizes. These services will integrate with other systems, including the ones listed here.

**Institutional Repository:** The repository is a storage, discovery and retrieval system that will enable the University to archive and promote faculty, student, and institutional scholarly work, including data sets, research materials, reports, and published findings, ensuring continued access to that work for the benefit of both the University and the public at large. The repository will also archive University records and other assets in accordance with the practices of the University Archives. Services associated with the repository include statistical tracking and citation reporting, access to faculty research profiles, assistance with author and intellectual property rights and requirements, and research data curation and preservation services. The development

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3 The order of the initiatives is not indicative of priority, size or order. All are considered to be priorities during the coming years and their pace and sequence will be ascertained according to institutional priorities.

1 A service refers to a set of related software functionality, together with the policies that control their usage.
of the repository will be guided by University content and best practices in records and metadata management, and will interoperate with other university systems.

**Identity Management (IDM):** IDM will be a service that enables authorization, authentication and access for individuals to data and systems. It will be a service connected to UNH data and applications. In order to provide access and deliver outreach, we must provide a service that allows individuals and groups to identify themselves, be given authorized credentials, and have those credentials enable access to applications and data. The process of provisioning, altering and deleting access must be measured in minutes or even seconds, according to evolving roles and relationships of individuals and groups. The service will ensure the appropriate levels of security and privacy.

**Cyberinfrastructure (CI):** CI is a collection of technologies, including networks, storage, servers, operating systems, databases and datasets. It is the backbone, behind-the-scenes technology that should be invisible yet responsive to users. UNH and the Northern New England area in which it and its state system partners reside does not currently have sufficient access to modern CI, which is required to realize any of the programmatic initiatives listed here or in the UNH Strategic Plan. We require our human and digital assets to be ubiquitously visible and available to wide varieties of individuals and organizations, ranging from schoolchildren in homes or small towns, to urban social sector or commercial institutions. High capacity, high availability CI will enable that availability.

The next steps for all initiatives are to propose specific approaches, plans and funding mechanisms for initiatives. (Some, like Cyberinfrastructure, are already underway.) There are many intersections between existing and emerging technologies and practices, including but not limited to software, services and pedagogies. We need to be flexible, innovate and efficient, and adhere to inclusive and decisive governance.

We will work with leadership forums such as the UNH Cabinet, Provost Council, Faculty Senate, and Student Senate to start and govern all programs correctly. During the life of all programs, UNH IT will communicate and collaborate with the community via its web presence, it.unh.edu, as well as via other logical channels.

**Conclusion**

Our technology ambitions are challenging, but essential. They align and support UNH mission and objectives. They represent pragmatism and innovation. They will intentionally be delivered and supported with excellence. We will face risks and issues as we pursue our ambitions, but we will be energized and focused on the transformative results.

*Questions, feedback and constructive criticism on this document, and any information technology topic, are welcomed by the UNH CIO at it.unh.edu.*