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HOW THIS PLAN FITS INTO THE SYSTEM AND CAMPUS STRATEGY AND GOALS

UMass System Mission

The university's mission is to provide an affordable and accessible education of high quality and to conduct programs of research and public service that advance knowledge and improve the lives of the people of the Commonwealth, the nation, and the world.

UMass System Priority Areas

See page 10 for a chart tying the UMass Amherst campus goals to the IT strategic goals.

Source: www.massachusetts.edu/umass-performance
Information Technology Across the UMass System

Information Technology (IT) is coordinated across the University of Massachusetts System and its five campuses. The Information Technology Steering Committee (ITSC) sets strategic priorities and vision for information technology services throughout the university. Committee membership includes representatives from UMass Academic Affairs, Administration and Finance, Continuing Education, Research, Student Affairs, Information Technology, and Development across all campuses. The ITSC reports to the University President’s Council. Major IT decisions are approved at the President’s Council level.

Information Technology at the Flagship Campus

On our campus, information technology reports to the Vice Chancellor for Information Services and Strategy and Chief Information Officer. The Vice Chancellor reports to the Chancellor, who serves on the University President’s Council.

The Vice Chancellor is advised by the Information and Communication Technology Council (ICTC), a sub council of the Faculty Senate, and also works in collaboration with the Institute for Teaching Excellence and Faculty Development (TEFD), UMass Libraries, the IT Student Advisory group, and more.

Working with campus leadership, individual college and faculty governance boards, and student groups, campus technology leaders and service providers plan and implement information technology initiatives.

This Plan

This plan is for the UMass Amherst campus and is a campus-wide effort. It was designed to fit into the campus strategic plan, which aligns with the system goals and mission. Technology is of ever-growing importance to our students, faculty, and staff and we are committed to collaborating in the best interest of the Commonwealth.
Executive Summary

In alignment with UMass System, and UMass Amherst campus strategic goals, the University of Massachusetts Amherst information technology (IT) strategic plan is intended to be a roadmap for the next five years for information technology at the Commonwealth’s flagship campus, the culmination of a year-long, campus-wide collaboration. The plan will be updated as needed and seeks to maximize the results of IT resources and investments by:

- Identifying strategic goals and actions that can yield sustainable improvements in five key areas: Teaching and Learning, Research, Engagement and Outreach, Enterprise Systems, and Infrastructure.
- Aligning information technology resources with initiatives that best support the university’s strategic plan.
- Providing a guide to decision-making, priority setting, and action for IT in the areas identified above.

We are at a transformational time in higher education. The fast pace of change, coupled with the proliferation of new technologies and growing compliance requirements, has created demand for agile, responsive IT functions that are easy to use and are ubiquitous. For information technology, strategic planning is not only desirable, but imperative. Careful and intentional IT planning provides a vision for the future, anticipates how we may respond to emerging trends, and enables the university to gain strategic advantage.

At the core of our planning effort are three guiding principles:

1. **The complex interdependence of the five key areas**, which information technology underscores: teaching and research excellence, for example, can only be achieved with a robust, resilient, and available technical infrastructure (e.g., improved connectivity in classrooms to better enable teaching and learning). The student learning experience is also highly dependent on institutional academic and administrative processes, including students’ interactions with the student information system and other enterprise systems.
2. **The transformative nature of information technology**, in other words, technology's potential to fundamentally transform how we learn, teach, advance research, work, and engage with one another.

3. **The critical role of information technology as it enables the university to better achieve its strategic goals** – namely, its vision to establish UMass Amherst as the ‘destination of choice’ for teaching and learning and the ‘investment of choice’ for the Commonwealth’s progress through excellence in research, outreach, and community impact. Information technology is a positive differentiator for UMass Amherst in the higher education marketplace.

   We purposefully use a **broad definition of information technology in this plan** to encompass the entire ecosystem. This plan provides an **overarching perspective** that is intended to unify and streamline the various areas and activities of IT currently operating on campus. Our intention is to include universal design and the needs and standards for accessibility in our planning and actions. Information technology at the flagship campus involves all of the technology for faculty, staff, and students, both on campus and beyond. As the campus is becoming more international and technology enables teaching, learning, and research in a greater variety of venues and media, this equates to more demand on our infrastructure and requires for us to be available 24/7.

   The five IT strategic planning committees (members listed at the end of the plan), corresponding to the key areas (Teaching and Learning, Research, Engagement and Outreach, Enterprise Systems, and Infrastructure) identified **information technology goals** specific to each area, complemented by **action items seeking to achieve these goals**. The goals are intentionally broad, while the action items have a one-to-five year completion horizon. As such, these items provide an overarching direction for information technology spanning several years as well as a consistent benchmark for annual reviews by the committees. This plan is a living document, with the intention to review it and update it as significant changes occur.
COMMON THEMES

While the IT strategic planning committees’ work centered on identifying opportunities for information technology in their respective areas of focus, a series of common themes emerged, summarized below:

Create IT Governance for Transparent Decision-Making, Priority-Setting & Action
• Create and uphold a governance model that will foster a more collaborative culture where all voices are heard and projects are prioritized based on university-wide needs to ensure all projects meet the campus mission.

Continue to Inspire & Enable Innovation
• Keep current with emerging trends, better share ideas, and disseminate information. Innovation is a common theme among research, teaching and learning, and engagement.
• Increase support for technology innovation, which enhances the learning environment, allows teachers to embrace new resources for deeper learning, and facilitates further cutting edge research.

Create a More Balanced & Sustainable Resource Strategy that Emphasizes Operational Efficiency
• Improve and better standardize technology procurement processes for consistent use of technology contract language as compliance needs change.
• Promote efficiencies and ensure initiatives meet technical and architecture standards.
• Streamline and make administrative technologies and operations more efficient.
• Improve access to reporting and analytics; make administrative data available and accessible to all who need it to fulfill a business need, following appropriate protocols and procedures.

Create Appropriate Capacity for Ongoing Investment in Campus IT Infrastructure and Information Security as Needs Continue to Grow
• Build and maintain a robust, secure, scalable, and reliable IT infrastructure to support, facilitate, and enhance innovation, teaching, learning, and research.
• Advance and maintain the campus wired and wireless networks and data center to ensure a reliable, stable platform from which to launch broader, more strategic programs.
ENVIRONMENTAL ANALYSIS

The following observations on the ‘current state of IT at UMass Amherst’ are aggregated from discussions of the five IT strategic planning committees and direct feedback from students, faculty, staff, IT professionals, and campus leaders.

Strengths
- Engaged students, faculty, and staff willing to advise on improving IT service offerings.
- New, dynamic campus leadership.
- Dedicated and highly-skilled IT professionals across campus.
- UMass Amherst alumni in key positions at national and international IT organizations.

Challenges
- Resource constraints at a time when we have many competing and good investment opportunities.
- Pockets of technology innovation and expertise in silos across campus and a need to more-effectively share information.
- Better IT governance prioritization and transparency in a very large decentralized environment is complex.
- Dependence on IT from almost every area across our campus at a transformational time in an environment not fully adjusted to this change.

Opportunities
- The ability to strengthen interdisciplinary outcomes, create greater capacity for educational effectiveness, and help achieve the complete educational experience with the help of technology; grow student access.
- The capacity to improve student outcomes and improve affordability with technology. Technology enables closer, easier collaborations world-wide.
- The speed of research breakthroughs are accelerated with the help of technology efficiencies.
- The opportunity to deliver improved regional, national, and international outreach through technology, regardless of geographical boundaries.
- The unique position to increase access to education, information, and jobs for people with certain disabilities, such as low vision, blindness, or deafness.

Threats
- An increasingly competitive market with a decreasing supply of students from our traditional geographic areas in which we will not remain competitive without the proper planning around technology as a key resource.
- Growing compliance with an increased cost and without increased funding.
- Expanding and more sophisticated information security threats targeted at higher education.
- Greater investment by peers in technology differentiation.
# IT Strategic Goals

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<td>Provide the Complete Educational Experience</td>
<td>Create Capacity for Educational Effectiveness</td>
<td>Increase Research Excellence</td>
<td>Sustain the Physical Campus</td>
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## 1. Teaching & Learning:
Students have unfettered, equitable access to the tools, knowledge, and support instrumental to success in their college experience and beyond. Instructors have access to the tools and resources that enable them to design innovative learning experiences based on the diverse needs of their students. Instructional technology choices are developed in consort with IT and the teaching community on campus in a way that ensures that technology is a benefit to teaching and learning as needs evolve.

## 2. Teaching & Learning:
The teaching and learning technologies ecosystem is ubiquitous, equitable, modular, scalable, flexible/nimble, transparent, and supports all types of instruction and interaction (online, in person, team-based learning, across all class sizes, blended)—all focused on engaging and assessing students in a meaningful way to attain learning objectives as needs evolve.

## 3. Research:
Provide the campus with a seamless infrastructure for research information, research data management, and electronic research administration (eRA) based on robust collaboration and shared governance among interested campus entities. Solutions are accessible, usable, sustainable, staffed appropriately, and integrate with current compliance systems as technology and needs change.

## 4. Research:
Ensure the competitiveness of UMass faculty and researchers in their fields by providing support and resources for diverse High Performance Computing needs.

## 5. Engagement & Outreach:
The campus IT infrastructure is accessible (regardless of abilities), dependable, secure, flexible, and scalable. IT services are interoperable, positioned for future change, and meet the teaching, learning, research, and administrative needs of the Amherst campus and its surrounding community.
6. **Engagement & Outreach**: Information technology tools and services facilitate and support collaborations that seek to achieve the university’s mission to improve life for the citizens of Massachusetts and beyond through education, research, creative expression, and community engagement.

7. **Enterprise Systems**: Provide and maintain world-class enterprise and departmental information systems that support collaborations and achievement via established process management, transparent governance, and effective resource allocation.

8. **Enterprise Systems, Infrastructure**: Develop a holistic long-term strategy to address institutional information technology needs and improve operational efficiency and usability. Strategy delineates IT business processes, is aligned with the campus strategic plan, and ensures the provision of adequate resources using a projection-based budget model. Improve analytics to meet the needs of academic and administrative units.

9. **Infrastructure**: Through sustained investment and fiscal planning, maintain a modern, secure, accessible, and resilient IT infrastructure that provides the IT services, support, and training required for innovation in the next generation of teaching, learning, research, and outreach.

10. **Infrastructure**: Human resource policies and practices enable effective recruitment of diverse and highly-competent IT staff and retention of IT staff through professional development and other career-building opportunities.
Teaching and learning are cornerstones of the education philosophy at the University of Massachusetts Amherst, the Commonwealth’s flagship campus. This roadmap to a visionary teaching and learning experience addresses three primary areas: actively promoting a culture of student-centered learning, better supporting faculty in pursuit of innovative teaching techniques, and providing an IT ecosystem for learning and teaching that fosters creative solutions to diverse individual needs as they continue to evolve. The proposed goals will help the university to achieve efficient allocation of resources for its teaching and learning missions and reinforce UMass Amherst as a ‘destination of choice’ for students, faculty, and staff across the Commonwealth, nation, and globe.
Goals

- Promote a culture of student-centered learning
- Improve support of faculty in the creation, implementation, and use of effective and innovative teaching techniques as they continue to evolve
- Provide a new IT ecosystem for learning and teaching that fosters even more creative solutions to diverse individual goals
Goal: Promote a culture of student-centered learning

Students will have unfettered access to the tools, knowledge, and support they need to shift from content consumer to content creator as needs and the market continue to evolve.

The goal is to provide ongoing access that will be equitable amongst the student population and transferable across and beyond traditional classroom contexts into the co-curricular experience. This support and services ecosystem focuses on personalized care and connection amongst faculty and other learners that many pedagogical studies find instrumental to success in their college experience and beyond. At the same time, the need for equivalency of technology experience across personal and academic realms is recognized.

Students will be given greater access to tools that facilitate peer collaborations and cohort building and document their educational experience in a meaningful and enduring way. With the recognition that the educational experience transcends the classroom, students need to have more access to programs that will allow them to engage all parts of their lives in a streamlined and cohesive way and own their own data, potentially including robust individual online portfolios that students can control and take with them when they leave the university. Institutional investment in a more flexible application that brings together all parts of the student experience will further support the student-centered learning experience.
"Unfettered, streamlined, personalized, collaborative"

Action items:

A. Give students increased access to flexible and powerful learning environments.
   • Ensure that classrooms have sufficient wireless capacity maintained to support pedagogies that require students to bring-your-own-device (BYOD) as well as support wireless capacity tools and charging stations (see Infrastructure section for networking).

B. Ensure students have equal access to use mobile devices for high-stakes activities (e.g., audience response quizzing, e-exams) as classroom tools change.
   • Provide on-demand access to reliable technology through more loan programs on campus, without passing additional costs to students.

C. Provide guidance and training to teaching assistants associated with courses meeting in technology-enriched classrooms to help them better assist faculty.
   • Create and maintain through appropriate resources a graduate teaching assistant technology training program in collaboration with the Graduate School to better support and assist faculty teaching in technology-heavy classrooms and who are using online resources in their classrooms.

D. Offer students more training in software that is required for coursework (e.g., statistical software programs, video).
   • Create and maintain a robust support system that supports innovation in the classroom by providing students with workshops and tutorials in software with which they are unfamiliar.
   • Make these services and support available after hours and on weekends.

E. Create and maintain a unified classwork notification system with a single source of information on all course materials despite the learning tool choice by the instructor. Student input should be sought through open forums to describe desired user needs.

F. Lower costs further for students by providing access to more free or low-cost downloads of otherwise expensive software, open content, and discounted services (e.g., printing).
   • Create a broader community partnership between IT, the Institute for Teaching Excellence and Faculty Development (TEFD), the W.E.B. Du Bois Library, and Disability Services to make open access/Open Educational Resources (OER) materials even easier to produce and for students to use.
   • Limit intentionally the number of similarly-featured services that pass costs directly (or indirectly) onto students.
   • Virtualize expensive, domain-specific software in order for students to use them on their own devices.
Teaching & Learning

Goal: Promote a culture of student-centered learning

G. Provide students with better personalized tools to reflect and guide their learning.
   • Explore with faculty and students personal web presences, e-portfolios, and other tools for reflection, identity management, and collaboration.
   • Increase the number of physical “maker” spaces on campus that encourage innovation.
   • Produce, maintain, and share a map of current and new maker spaces to allow for increased access to these spaces and a more robust communication network between them to better promote content and availability.
   • Provide guidance on the best use of these tools for advising, academic, and technical purposes.

H. Help students better connect with the right people to help them create and sustain a productive learning environment.
   • Create or leverage tools to help students make meaningful, productive connections with peers, faculty, staff, and other potential mentors.
   • Encourage the expansion of undergraduate student-taught classes.

Metrics

A. Classroom Infrastructure
   • Year 1: Create and maintain a flexible and accessible “experimental classroom” to showcase innovative pedagogical tools and to encourage research collaborations on classroom configurations. Initiate a pilot circulation of iPads in Learning Commons for shared use by faculty. Complete virtualization of software image (PC) and add charging stations for students (for new classrooms and retrofitting for older).
   • Years 2-3: Provide a more robust infrastructure to support initiatives such as personal response systems that could be open source. Continue retrofit of older classrooms to infuse more technology and ensure accessibility.
   • Years 4-5: Create and uphold dedicated student IT space to be used for things such as gaming, teamwork, or social (depending on student input). Support infrastructure ongoing for high-stakes activities on mobile devices (e-exams).

B. Guidance and Training
   • Year 1: Start a pilot of graduate teaching assistant training on classroom technology in collaboration with the Graduate School for courses offered in technology-enriched rooms.
   • Years 2-3: Expand the pilot to include graduate teaching assistant training for technology-heavy courses throughout campus. Start a pilot of undergraduate staffing of similar support for faculty across campus.
   • Years 4-5: Produce and maintain best practices for graduate teaching assistants who provide technical support for faculty across campus. Continue robust undergraduate staffing of technical support services for faculty who need support in using new technologies across campus.
C. Efficiencies and Effectiveness to Benefit Students
   - **Year 1:** Collaborate with the Library to expand the circulation/loan of campus desired, high-demand technology equipment. Build and maintain a comprehensive catalog and better communicate existing site licenses while further leveraging volume discounts across campus for license acquisitions. Review the use of tools on campus that pass costs to students to decrease student costs where possible.
   - **Year 2:** Mitigate cost of new device purchase by encouraging faculty to leverage existing student personal devices (BYOD) or eliminating need for other classroom resources (online vs. textbooks).

D. Student-controlled Tools
   - **Year 1:** Launch pilots in personal domains and/or other student-centered tools.
   - **Years 2-5:** Make a tool available and accessible to 100% of students on campus that they use to manage their own learning and identity.

E. Community Building
   - **Year 1:** Identify existing resources, offices, and individuals who offer support for student learning. Review tools that can facilitate and coordinate learning support.
   - **Years 2-3:** Develop and maintain a plan for ongoing technologies for student learning support and implement technologies as appropriate.
   - **Years 4-5:** Grow technologies available to allow students to connect with peers and other community members for further support and community.

⚠️ Risks
If these goals are not met:
   - Students will not be as competitive on the job market.
   - It will negatively impact UMass Amherst’s ability to attract talented student scholars.
   - It will create student and faculty retention issues.
   - It will impact UMass Amherst’s performance in student outcomes and reputation.
Teaching & Learning

Goal: Promote a culture of student-centered learning

Recommendations

The next generation of students coming to college between 2015-2020 are much more attuned to their devices, on-time access to information, and personalization. As a campus, we need to provide students with more and better-centralized access to information and tools that they can use to coordinate their own learning, connect with the campus community, and reach their personal goals.

The campus should explore and develop tools that are more student-centered. These tools would include an online central “gateway” that collects the many threads of information students need to track to be successful (e.g., assignments, content, schedules, requirements) and a platform for students to collect, reflect on, and share the work that they produce across their courses and co-curricular activities. Students should be heavily consulted in the development of such a tool. Feedback should be collected through student open forums and other avenues to create a communication system that best meets student needs.

The campus should build on current adaptive learning technologies to provide each student with the opportunity to experience self-paced tools that support individualized learning. This could be done on-campus by developing a process for creating adaptive modules and tools such as those created for OWL (Online Web-based Learning) that combine course content with online assessments. The goal should be to have assessments that build their skills while still allowing and encouraging students to fully access online resources and peers.

A “maker” space for individual and group projects is a necessity on campus, increasing in demand due to the increase of team-based learning and the integrative experience requirement. Having state-of-the-art computers that offer high-value software and exceptional Internet speeds to do more with the ever-changing web and cloud, will better meet the educational and social needs of students. Digital mediums should be used to better communicate broader the availability of resources to faculty, staff, and students.

Projected Cost

$50K - Explore/develop a student-focused platform that students can use to collect and reflect on learning across curricular and co-curricular activities.

$500K - Build a process for developing true adaptive learning systems that will provide each student with individually paced learning experiences.

$100K - Explore/develop an online “gateway” for students that consolidates access to and information from the many platforms they use for learning.
Instructors will have access to a broad and vetted range of technologies, just-in-time support services, and learning opportunities that will enable them to make sound pedagogical choices and design innovative learning experiences based on the diverse needs of their students.

Instructional technology choices will be developed in collaboration with other instructors, IT, the teaching community, and support services on campus to ensure that technology is a benefit to teaching and learning.

An innovation fund will incentivize initiatives that support the IT Strategic Plan for Teaching & Learning. This should be overseen by a subcommittee of the Information and Communication Technology Council (ICTC) of the Faculty Senate. An instructional innovation fund for faculty will motivate faculty to further develop innovative ideas. This innovation fund could be accessed by individuals and groups within the university to carry out new initiatives and innovative approaches to existing problems in teaching and learning both in the classroom and online.

While innovation offers a wide range of potential benefits to students, faculty are often challenged by investments of time in learning new technologies and teaching in a new way. The value added by technology-assisted learning can be underscored by providing more incentives to secure faculty participation. While many of these incentives, including resources provided through UMass Amherst IT and the Institute for Teaching Excellence and Faculty Development (TEFD) are available to faculty, additional compensation would be a strong incentive to innovate.

Goal: Improve support of faculty in the creation, implementation, and use of effective and innovative teaching techniques as they continue to evolve
Teaching & Learning

Goal: Improve support of faculty in the creation, implementation, and use of effective and innovative teaching techniques as they continue to evolve

Action items:
A. Create and support an innovation fund to better promote enhanced instruction.

B. Help develop a governance model that gives faculty more representation in technology-related decisions. One potential model is outlined in the Enterprise Systems section of this report.

C. Give faculty a core offering of carefully vetted teaching tools that are useful, allow for choice, and adapt to instructional goals (but not so many as to be overwhelming), along with robust support.

D. Give faculty increased access to technologies in the classroom that allow for innovative teaching and active learning.
   • Renovate existing and create new classrooms to support active and team-based learning.
   • Develop a better matching program for faculty technology needs and classroom assignments.
   • Make mobile device (device-agnostic) screen projection easier in all active-learning-enhanced classrooms for all devices (e.g., Apple, Windows, Linux, Android).

E. Increase transparency and awareness of coordinated instructional support services for faculty.
   • Make technical support more available in the classroom during class to encourage adoption and use of new teaching technologies.
   • Increase production assistance for flipped course materials (e.g., online videos).
   • Integrate SPIRE, R25 and CAPS to bring full transparency and ease of use to course scheduling for faculty and students.
   • Improve communication in the form of a single, easy-to-use site for support, software, and help including site licensing across all units on campus.

F. Improve learning opportunities for trying new strategies or developing new courses including communities of practice, just-in-time pedagogical training, fellowships, and mentoring.

G. Increase assistance for instructors in making pedagogical choices and designing innovative and accessible learning experiences; provide more resources for faculty and a repository of shared materials, strategies, and ideas.
   • Deploy sustainable pilots that provide resources for innovative teaching and that persist for multiple years.
   • Educate faculty on making informed decisions regarding the value of using technology in the classroom and how to balance the need for students to be connected with the need for them to focus.
"Supportive, Innovative, Inclusive, Empowered"

**Metrics**

A. Innovation

- **Year 1:** Make initial request for proposals (RFP), fund first grants, and assess success at the end of the year.
- **Years 2-3:** Revise RFP based on assessment, ramp up to full funding levels, and execute ongoing assessment.
- **Years 4-5:** Continue program and assessment. Actively pursue external funding to support strategic initiatives and receive one innovation grant.

B. Governance

- **Year 1:** Recommend appropriate faculty and other members for the new governance model. These may consist of members from the Information and Communication Technology Council (ICTC) of the Faculty Senate.
- **Years 2-5:** Incorporate feedback from the members on proposed changes.

C. Teaching Tools

- **Year 1:** Conduct a study by the joint governance committee to recommend specific teaching technologies to research and/or rollout.
- **Years 2-5:** Assess currently supported teaching technologies and roll out newly recommended technologies.

D. Technologies

- **Year 1:** Study current state of technologies and form a subcommittee to recommend changes.
- **Years 2-3:** Implement new technologies as recommended.
- **Years 4-5:** Review improvements and alter as needed.

E. Support

- **Year 1:** Identify support structure (perhaps student-based) for in-class help, ramp up production assistance, study SPIRE changes, review IT information repositories, and prepare action plan to consolidate it.
- **Years 2-3:** Implement recommendation.
- **Years 4-5:** Review improvements and alter as needed.
Teaching & Learning

Goal: Improve support of faculty in the creation, implementation, and use of effective and innovative teaching techniques as they continue to evolve

⚠️ Risks

Innovation Risk: Failure to provide continued support for projects initiated through the innovation fund will undermine the program both for lost faculty time investment and IT monetary investment.

Governance Risk: The joint committee may find itself in a frustrating position if its proposals are not acted upon.

Teaching Tools Risk: IT must support a wide array of technology to meet needs and stay current, but also must be aware of transition cost to faculty as they move to new technologies. Technology changes must work in the faculty’s pace and with a sensitivity to academic cycles.

Technologies Risk: The large and diverse faculty community may ask for so many different options that support for each would be minimal, potentially resulting in disgruntled users and chaotic rollouts. There must be enough variety of technologies to meet needs at enough of a depth to be helpful and have adequate support.

Support Risk: Ongoing costs may be prohibitive.

Opportunities Risk: Faculty participation requests may outstrip IT’s ability to supply resources.

Pilots Risk: Ongoing support for pilots that become standard campus-wide efforts may be cost prohibitive.
**Recommendations**

Increased instructor support for uses of technology in the classroom will be crucial as we move toward 2020. Both online learning tool upgrades and classroom enhancements must be addressed in order to allow instructors to develop new, effective pedagogies deployed face-to-face, online, or in a blended style. Enhancing support structures is essential as is ongoing support for development and testing of new course teaching strategies.

Infrastructure in the form of robust wireless communications as well as expansion of collaborative learning spaces (e.g., Team Based Learning-enabled classrooms) is a critical component of the IT learning support strategy. These areas must be funded adequately and on an ongoing basis to ensure that both faculty and students have access to learning and teaching tools that will enhance student learning outcomes. This is further covered in the Infrastructure section of this report.

**Projected Cost**

**Faculty Innovation Fund:** $25K in year 1, $50K in subsequent years

**Options:** Ongoing $30K per year for site licenses

**Technologies:** $200K in year 2, $100K in subsequent years

**Support:** $20K annually for student/staff time

**Creation of Innovative Learning Experiences:** $20K annually for pilot programs
A successful ecosystem of teaching and learning technologies is ubiquitous, equitable, modular, scalable, flexible/nimble, transparent, and supports all types of instruction and interaction (e.g., online, in person, blended, team-based learning, across all class sizes). It will focus on engaging and assessing students in a meaningful way to attain learning objectives.

Any technology employed for learning needs to focus on higher cognitive learning, not just basic didactic processes. Technology governance must be shared between campus leaders, faculty, IT, and other interested partners with ongoing input from students. Ideally, there should be technology expertise embedded in each department.

We see the classroom of the future as a learning space without limits. Classrooms must be more flexible and organic, and technology housed in that space must be equally nimble. In an effort
to streamline the student experience, students need to be able to more easily access information related to their learning from multiple sources. To enable the faculty to focus on their strengths, they need to have further access to tools that are appropriate to their individual pedagogical requirements, intuitive to use, and updated at reasonable intervals. As we move into pilots for software used in classrooms, we must plan for the future and recognize that software supported under a pilot might not be supported in the longer term. We also recognize that faculty who participate in pilots of software may need to have a sustainable path forward to continue to use those tools or have assistance to shift to equivalent tools after the end of a successful pilot.

"Flexible, Nimble, Seamless, Sustainable"

Action items:

A. Help establish a transparent governance process that addresses technologies used in all different types of teaching (e.g., face-to-face, online, blended, team-based, large lecture, small seminar) and work in concert with the Information and Communication Technology Council (ICTC) of the Faculty Senate to:
   • Clarify further the process for managing the phases of a technology: proposing, assessing, piloting, implementing, supporting, reviewing, and decommissioning.
   • Develop a path for future classroom technology improvements, including implementing change in technology and funding, and empowering use of new teaching methods.
   • Address the effect of technological change on teaching, especially when new technologies require re-design or re-creation of existing curriculum.
   • Formalize the process by which departments and faculty request teaching spaces that include or support specialized instructional technology (e.g., Team Based Learning (TBL) classrooms, video conferencing rooms).
   • Provide information to faculty to help them evaluate and compare available tools.

B. Coordinate instructional support services across campus that bring together faculty and staff from IT, the Institute for Teaching Excellence & Faculty Development (TEFD), the Libraries, Disability Services, and any distributed departmental support groups.
   • Provide clearer paths for accessing phone and Internet support ("Who do I call for what?")
   • Strengthen communication channels between groups to allow for a more consistent support experience.
   • Give faculty a single location (virtual and physical) where they can go to get information on teaching with technology and connect with other faculty to compare and share ideas (e.g., monitored blogs for specific technologies and software).
Teaching & Learning

Goal: Provide a new IT ecosystem for learning and teaching that fosters even more creative solutions to diverse individual goals

C. Address the need for environments where innovations can be tested and assessed. Balance this with the need for stable environments where standard teaching and learning can occur.

- Select innovative projects to be explored in the next five years (e.g., e-portfolios, student-centered virtual workspaces, adaptive learning tools) and assess the interoperability and accessibility of existing tools.
- Review today’s tools (e.g., learning management systems, clickers, blogs, Google Apps, SPIRE) and develop with faculty a reasonable, regular path for replacements as they continue to evolve.
- Provide faculty with continued funding and support (modified Student Response to Instruction (SRTI)) to encourage instructional innovations.

D. Support ongoing investment in the campus IT infrastructure so online and physical environments are equipped with appropriate levels of technology for innovation to occur.

- Determine a roadmap for providing capacity for full BYOD work in all classrooms based on the classroom wireless capacity assessment (see Infrastructure section for more details).
- Advance the review of audio-visual (AV) capabilities in classrooms and add features where possible to allow for more active teaching and team-based techniques in a range of classroom sizes (e.g., wireless projection, more white board writing surfaces).
- Provide laptops and mobile systems in the Integrative Learning Center to enable flexible and accessible online exam testing and include an upgrade of servers to be able to handle the demand.
- Provide zero-based clients in some computer labs to enable nimble and malleable lab configurations.
- Enable wider use of online tools by creating a “group” feature in SPIRE or another common data source that can be used to automate the population of groups and control access to the tool.

Metrics

A. Governance

Year 1: Establish a subcommittee of the Faculty Senate Information and Communication Technology Council (ICTC) to define goals and draft guidelines for governance of existing and proposed teaching technologies and publicize the guidelines. Begin to establish a committee of faculty and IT staff to study demand for technology-enhanced teaching spaces and develop an instrument to assess the demand.
Year 2: Document a transparent process for piloting and sun setting technologies. Roll out pilots for faculty adoption and testing of software or hardware solutions for instruction.

**Classroom improvements & testing**

**Year 1:** Build on the inventory already completed and assess the number and sizes of courses that need collaborative, accessible student-centered learning spaces. Initiate the renovation of two classrooms into 36-seat TBL-enabled classrooms, purchase testing devices and charging/storage carts for the Integrative Learning Center (ILC), and review options for modification of course space request and course enrollment software systems.

**Year 2:** Execute renovations of active learning classrooms, ramp up use of e-testing in the Integrative Learning Center (ILC), and begin to modify current SPIRE, CAPS and Resource25 software to make a user-friendly, transparent interface for course and room scheduling.

**Years 3-5:** Execute continual renovations of about two classrooms per year based on assessment undertaken in year one and expand electronic homework server capacity and team project space for students. Provide more support for further development and implementation of online exams.

**B. Instructional Support Services**

**Year 1:** Develop faculty support groups (including distributed IT) that will meet and create plans to coordinate their communications and support channels.

**Year 2:** Make faculty aware of a single channel (virtual & physical) that they can use to get support.

**C. Instructional Innovations**

**Year 1:** Begin studying options for a uniform student and faculty interface to the dual campus learning management systems (LMS) and instructional software that works on a variety of devices. Students will be able to track work and due dates via a single online gateway and faculty will have a uniform mechanism to assign and grade coursework.

**Years 2-5:** Review and revise the uniform interface to respond to user input and potential bugs.

⚠️ **Risks**

**Governance Risk:**
Not having a transparent governance process will reduce adoption of new technology and cause old technology to continue to be used beyond its natural "end-of-life." This could affect the UMass Amherst reputation, eventually reducing resources and the ability to attract quality faculty.
Teaching & Learning

Goal: Provide a new IT ecosystem for learning and teaching that fosters even more creative solutions to diverse individual goals.

and students. Additionally, without transparency, faculty and staff could feel disenfranchised if they feel some groups on campus have more influence than others. Communicating the process will help people plan for both future adoption and elimination of outdated hardware/software.

Instructional Support Services Risk:
Inefficiencies created by failing to coordinate support services are costly in terms of time and money. They potentially create resentment for those who feel they are not being serviced at the same level as others.

Instructional Innovations Risk:
UMass Amherst needs to stay at the leading, but not bleeding, edge of technology. Technology innovation enhances the learning environment, allows faculty to embrace new resources for deeper learning, and facilitates innovative research. Lack of technology innovation can lead to stagnation. The new generation of students has grown up with technology and expects to be taught in a manner that addresses their technological abilities.

Teaching and Learning Space improvements Risk:
Classroom technology needs an ongoing funding plan to ensure equipment is meeting needs as the technology market continues to change. Without this, learning becomes secondary to trying to use outdated projectors, computers, and furniture. Classroom configuration styles are a good example of how investment in infrastructure can create a learning environment of old-school chalk & talk or an exciting, versatile environment for both teacher and student.

Recommendations
Given the desire for a more facile, student-centered learning experience for all students across all curricula, providing more appropriate learning spaces is essential. Increasing the number of collaborative learning classrooms, particularly those serving classes of fewer than 40 students, will greatly enhance the accessibility of both instructors and students in student-centered courses.

A forward-thinking approach to student assessments suggests that the use of online testing, particularly that offered by the UMass Amherst-developed Online Web-based Learning (OWL) system with its broad palette of interactive quizzing styles and rich feedback to students, will
become more useful to instructors as we approach 2020. The use of the Integrative Learning Center (ILC), with its proven wireless capacity for online exams, along with mobile testing devices that can be deployed to any classroom in the building, is a cost effective way to provide instructors with the tools to design and implement online testing in a large number of courses.

To complement the move to a student-centered learning experience across all curricula, developing a single gateway for students’ course work along with a student-personalized, online repository for student work throughout their academic careers is a key feature that should be implemented and offered to better facilitate the goals of this effort.

### Projected Cost

**90K** - Purchase and support mobile systems to provide flexible testing in Integrative Learning Center (ILC) classrooms during classes and after hours.

**200K** - Create 10 Team Based Learning-enabled classrooms with 30-36 seats from existing classrooms over the next five years (2 per year).
The University of Massachusetts Amherst provides internationally-recognized research, and the role of information technology in supporting the needs of the research community is increasingly fundamental. The key areas to preserving an outstanding research environment focus at UMass Amherst include Information and Data Management, Electronic Research Administration, and High Performance Computing. The goals in these areas will help create an integrated, shared research platform for the faculty to publicize their work and utilize IT training campus-wide.
Goals

- Information & Data Management
- Electronic Research Administration (eRA)
- High Performance Computing
Goal: Information and Data Management

The desired future state for campus information and data management includes a robust collaboration, including shared governance, with IT, the Libraries, the Office of Research and Engagement (ORE), in consultation with the relevant Faculty Senate Councils and Committees that will provide the campus with a seamless infrastructure for research information and research data management.

Recommended Actions

To achieve the desired future state, UMass Amherst IT will (i) collaborate with stakeholders to select an enterprise system for storage, transmission and use of research data, (ii) develop a stewardship and custodianship policy that incorporates a new generation approach to information management that combines institutional information and research data under a university-wide structure while addressing compliance and risk management needs and (iii) develop an IT policy framework that encapsulates the issues of privacy, security and web conventions for information and data management.

The University Libraries will expand Digital Scholarship and Consultation services to provide highly trained staff to consult with faculty and students on planning, creating and preserving digital information, and develop a digital scholarship and consultation services portal that will provide information and pointers to the extensive research data infrastructure maintained by IT. The Libraries will expand ScholarWorks to include a seamless ability to ingest open-access journal
articles produced by faculty. This will also provide a connection to the campus’ comprehensive, standardized auto-populated research profiling system (see below). The University Libraries, in close coordination with the Office of Research and Engagement and UMass IT, will develop a centrally coordinated portal that directs faculty and students to the appropriate solutions for all aspects of research data management needs.

The Office of Research and Engagement (ORE) will work with the Libraries to recommend a third-party data management solution to support the full life cycle of generated research data; a basic level of data management support will be provided at no-cost to researchers. This solution will meet campus information security guidelines. ORE will also facilitate the deployment of a comprehensive research profiling system and public portal integrated with existing campus databases. It will put in place a robust collaboration tool that can be used by research projects (and cited in proposals) for collaboration support among geographically disbursed researchers. For research analytics, the campus will continue to use a third-party tool that enables comparisons of research and scholarly activity between and among institutions.

Action items:

A. For FY2016, data management infrastructure expenses need to be built into the IT, Libraries, and Office of Research and Engagement (ORE) budget.

B. Establish an Information and Data Management subcommittee within the Research & Community Engagement governance advisory committee with representation from the Research Council, UMass Amherst IT, University Libraries, and ORE. This shared governance subcommittee will establish task-forces with appropriate stakeholders and experts, charged to make recommendations on two aspects:

   • Research data resources: Evaluate whether the campus has the appropriate IT resources to support varying needs by scholarly and academic discipline. If the campus does not currently or imminently have these resources, this subcommittee would investigate and evaluate third party options and make recommendations, including price and resources needed to support the options. Ultimately, the campus should provide a suite of research data management resources through a combination of in-house offerings and third-party services. Third-party services should be pre-qualified for use by campus researchers. Submit recommendations by February 2016.

   • Research profiling and networking: Review and evaluate the potential options—whether commercial or open source, developed in house or by a third-party vendor – and recommend a research profiling and networking system solution with the necessary capabilities, and integration with current campus business processes and the systems that already collect information about research activities (e.g., annual faculty reports, grant proposal and award data, etc.). Aspects relating to confidentiality, security, and accessibility must also be considered and evaluated. Submit recommendations by February 2016.
C. Incorporate costs for the recommended products into the FY2017 budget plans and/or seek external sponsorship. The governance subcommittee will also ensure communication with campus and, as appropriate, system level stakeholders about these third party options.

### Metrics
- Formation of the Information and Data Management governance subcommittee.
- Evaluation of potential options for research profiling and networking by summer 2016.
- Implementation of a new, intuitive and compliant data storage system.
- Implementation of third-party data management solution to support full life cycle of research data.
- Implementation of comprehensive research profiling system and public portal.

### Risks
- Without the appropriate information and data management solutions in place, compliance with federal requirements around open access and open data will be difficult.
- Without a compliant and usable data storage system in place, the research output of the campus will be endangered.
- Without a comprehensive research profiling system and public portal in place, it will be difficult to impossible for the campus to maintain a competitive edge in research funding and collaborations.
Projected Cost

For FY2016, data management infrastructure expenses need to be built into the IT, Libraries and ORE budget. These costs include:

- **IT**: Costs to scale a compliant and intuitive storage system across campus, including supporting staff resources
- **Libraries**: Additional cost for ScholarWorks
- **Staff support (data management librarian)**
- **Research Engagement**: Cost for Research analytics
- **Staff support**

<table>
<thead>
<tr>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT</td>
<td>TBD</td>
</tr>
<tr>
<td>Libraries</td>
<td>$53K/yr</td>
</tr>
<tr>
<td>Staff support (librarian)</td>
<td>$65K/yr + fringe</td>
</tr>
<tr>
<td>Research Engagement</td>
<td>$100K</td>
</tr>
<tr>
<td>Staff support</td>
<td>$65K/yr + fringe</td>
</tr>
</tbody>
</table>
The desired future state for electronic research administration systems involves two key components:

1. The campus needs an Electronic Research Administration (eRA) solution that ensures sustainability while providing the same or better functionality as our current systems, and is also more user-friendly and has better integration with our compliance systems.

2. The campus needs better staff training and more full-time staff in critical areas related to Electronic Research Administration (eRA).

**Recommended Actions**

The current Electronic Research Administration (eRA) systems are out of scale with respect to current and future growth. The costs and benefits of moving to a new eRA system should be considered. The decision on whether to build on the current eRA systems or migrate to a new one will need to consider upfront costs, ongoing operational costs, and functionality for supporting research and compliances. A small committee with the appropriate stakeholders should be formed to survey practices at other institutions, assess costs, and make specific recommendations to the governance board for addressing these needs.

In the near-term there needs to be a decision on whether UMass IT can provide the necessary level of “24/7” support for the mission-critical eRA systems, including an assessment of the associated costs, versus the cost of using a hosted solution.

In terms of staffing, there is a specific need for a customer-support staff person to answer questions and provide support to SmartGrant and eProtocol users. Also a second staff person to serve as a backup role for current eRA support staff.
Action items:

A. Establish a small committee to make recommendations on a future eRA system for campus.

B. This committee should go out to other institutions who are currently using the systems that we have already identified as possible alternatives. The committee could include a faculty member, possibly an Associate Dean, an experienced business manager, an Office of Grant and Contract Administration (OGCA) representative from pre and post award, an IT representation from technology architecture and security, someone for the reporting aspect, and possibly a controller’s office representative. This committee would be able to see the systems in action and talk to people about the pros and cons. That evaluation will allow us to see how well they work in relation to our needs, how user friendly they are, and whether we would be gaining or losing any functionalities by moving to a new system. The committee should also look at the hosted systems costs, reliability, security, and accessibility of a hosted system. The committee should make recommendations by spring 2016.

C. Determine the costs of improved support for 24/7 eRA systems from UMass IT and compare it to the cost of hosted solutions.

D. It is recommended that if UMass IT continues to host critical eRA Systems, that an agreement between Research and IT be developed outlining service levels, expectations, timelines, communication, roles and responsibilities, and costs, and that this agreement be reviewed on an annual basis. At the same time, these costs should be compared to the cost of a hosted solution, estimated to be $16,500 per year for SmartGrant and yet to be determined for eProtocol. It is envisioned that JGAMS and JOL will still run on servers managed by UMass Amherst IT.

E. Provide staff resources to improve user support for eRA systems. Two staff positions are recommended, one of which will be a front-line customer facing position to support SmartGrant and eProtocol users and another position to address immediate needs for backup role for SmartGrant support staff.
Research

Goal: Electronic Research Administration (eRA)

**Metrics**

- Evaluate the increased efficiency and effectiveness of a new system in research expenditures per dollar of eRA system cost.
  - UMass SmartGrant (current): $400 research expenditures/dollar of eRA cost
  - Peers using Kuali Coeus (estimated from small data set): $1,200 res exp /dollar of eRA cost
- Track user friendliness of the eRA system through the current PI feedback survey.

**Risks**

The greatest risks associated with eRA systems are associated with staying with our current solution, rather than migration to a new eRA system. In particular, the following are the two greatest risks in maintaining the status quo:

- **Sustainability.** Sustainability is a key concern with a small company. If the current ERA vendor were to cease to function, the current level of functionality would only be maintained for several months.
- **Compliance.** Because we currently have four different e-systems that support research administration (SmartGrant, JGAMS, Jordan Online, and eProtocol), there is concern about our ability for staff and for users to efficiently address compliance issues in sponsored research. A more integrated and comprehensive system would insure that information is consistent, accurate, and current as needs change.

**Projected Costs**

Two staff positions are recommended.

<table>
<thead>
<tr>
<th>Position 1:</th>
<th>Position 2:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front-line customer facing position to support SmartGrant and eProtocol users.</td>
<td>Addressing immediate needs for backup role for SmartGrant support staff.</td>
</tr>
</tbody>
</table>

Total cost for both positions: **150K/year + fringe**
Goal: High Performance Computing

The desired future state in High Performance Computing (HPC) involves an overarching goal of ensuring the competitiveness of UMass faculty in their fields by providing excellent support for diverse HPC needs.

Recommended Actions:

To achieve the desired future state, we recommend the following:

- Establish a full-time High Performance Computing (HPC) expert within UMass IT who will be the “go-to” person for faculty HPC needs. A Ph.D. level position with a scientific computing background can probably best engage with on-campus HPC researchers. Support in the form of an HPC help desk is also recommended.

- Address clearly felt needs for a robust large-scale data storage options for HPC data (the current storage options are deemed inadequate).

- Establish a HPC subcommittee within the Research & Community Engagement governance advisory committee with representation from various stakeholders to make recommendations on key HPC decisions.

- Develop a clear fee structure for buying into the Massachusetts Green High Performance Computing Center (MGHPCC)/shared clusters. Refine policies for using shared clusters (e.g., fair-share/priority queues).
• Address compliance needs such as HIPAA when conducting research using HPC systems.
• Address the diverse set of HPC needs on campus ranging from workstation computing, GPU computing, cluster computing and cloud-based HPC.

**Action items:**

A. **Hire a HPC expert with a scientific computing background, possibly at the Ph.D. level, housed with UMass IT, to become the campus point-person for all technical HPC-related issues and questions.** Establishment of a HPC Help Desk is also desirable.

B. **Establish an HPC governance subcommittee with appropriate stakeholders with overall responsibility to make policy recommendations related to HPC issues.** This committee should be initially tasked to study issues related to the MHGPCC such as fee structure for shared clusters. The committee should also consider related issues such as: (i) how to expand the range of storage options available to HPC researchers for their datasets; (ii) understanding long-term archival needs and the relationship to research data management, versus short-term storage needs for research data.

**Metrics**

• Measure research utility of the HPC systems by the percentage increase in the faculty using campus HPC systems.
• Measure teaching utility of HPC systems by the number of courses taught using campus HPC systems.
• Number of successful proposals that have a substantial use of campus HPC systems.
Risks

- Fee structure: Not having a flexible charging model excludes faculty members who lack adequate funding and threatens the sustainability of campus HPC systems.
- HPC Expert: Not having appropriate levels of HPC expertise on staff will make it harder to achieve the desired excellence in campus HPC research. Sufficient support for teaching, learning, and research using HPC is essential to its success and accessibility.

Projected Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPC expert with a scientific computing background</td>
<td>$100K + fringe</td>
</tr>
<tr>
<td>Establishment of HPC help-desk</td>
<td>$75k + fringe</td>
</tr>
</tbody>
</table>
Community engagement and outreach is foundational to the University of Massachusetts Amherst’s mission to improve the quality of life for people of the “Commonwealth, nation, and the world.” Information and technology have the powerful potential to be used to foster mutually beneficial relationships between on and off-campus communities for people of all abilities. The goals in this section are designed to align with the strategic plan of the university, including the campus values of diversity, equity, inclusion, and social justice.

The objective is to develop a framework that:

• Enables all members of the university community to use technology more effectively and appropriately.
• Creates and fosters more productive working relationships through the use of shared technology tools.
• Builds on existing technology skill sets and resources.
• Recognizes that users have many levels of technology proficiency.
• Incorporates the reality of exponential technology evolution into system design, budgets, training, implementation, and evaluation to benefit the campus community and beyond.
Goals

- Create campus-wide universally accessible IT systems and information resources
- Integrate, develop, and design systems that support the fundamental interactions of people with each other and technology to solve campus needs and/or leverage opportunities.

Within the next five years, the strategy is to coordinate policies, protocols, and practices with existing and new technology to “open up” the campus information infrastructure to make campus personnel and operations more efficient, productive, and accessible to all users.

Our goal is to promote engagement by having campus-wide information technology infrastructure accessible to all, regardless of technical proficiency and across a broad array of tools.
Goal: Create campus-wide universally accessible IT systems and information resources

Planning to not only meet, but exceed state and federal accessibility regulations as they continue to evolve is a campus priority. Campus-wide information technology infrastructure is accessible to all, regardless of ability, available technology, and technical proficiency. IT delivers services, tools, and training that are integrated and state-of-the-art to meet the teaching, learning, research, and administrative needs of students, faculty, staff, as well as our local, national, and global communities.

Action items:

A. Design an information infrastructure that not only meets, but exceeds federal and state accessibility regulations, providing functional and equitable access by users regardless of physical ability and location, both on and off campus.

- Phase 1 – (Year 1-2):
  - Evaluate current state of information and technology accessibility.
  - Collect and review campus and other accessibility policies.
  - Map impediments and barriers to information accessibility.

- Phase 2 – (Year 2-3):
  - Identify external entities interfacing with university, and identify principle human and technology-based access points.
  - Inform campus entities of state and federal government access policy mandates, and help support their compliance with them.

- Phase 3 – (Year 3-5):
  - Put into practice remedies indicated by research carried out in Phases 1 and 2.

- Ongoing Maintenance of Effort:
  - Integrate accessible emerging technologies and their applications seamlessly for users.
  - Continue to evaluate and maintain services and tools with accessibility in mind.
B. Assess, evaluate, plan, and implement IT training

- **Phase 1 – (Year 1-2):**
  - Design an IT training plan that includes a more current inventory of training needs and accessibility compliance.

- **Phase 2 – (Year 2-3):**
  - Design an IT skill and knowledge self-assessment enabling people to devise an individualized IT training plan, with more incentives to encourage use and continuous learning.
  - Identify gaps in available training programs and propose solutions.

- **Phase 3 – (Year 3-5)**
  - Invest in a user-friendly portal for staff that highlights services, tools, training, security, information, updates, policies and more.

- **Ongoing Maintenance of Effort:**
  - Increase visibility of existing training topics and develop new topics per user input and development.

C. Create and foster a UMass Amherst IT-led, accessible IT-enabled campus practice of continuous IT learning.

- **Phase 1 – (Year 2-3)**
  - Develop a campus-wide recognition program for IT proficiency and knowledge sharing.

- **Ongoing Maintenance of Effort:**
  - Utilize more communities of practice, best practices experts, and campus IT leaders for optimal inclusion.
  - Review and vet new technology tools and modalities, relying on the expertise of early adopters and IT experts across campus.
  - Develop accessibility testing teams to support evaluation of software, including websites and applications, for accessibility and usability.

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**Metrics**

- Complete and document a market survey with recommendations on knowledge-base software that can better answer natural-language questions.

- Enable accessibility that is more ubiquitous, intentional, and consistently implemented for all IT tools, platforms, and trainings.

- Provide a new, accessible IT training website that is user-oriented, interactive, dynamic, and intuitively navigable. Lay-people with limited technical experience would be comfortable accessing and navigating the site for self-evaluation of IT proficiency.

- Deliver more robust IT training as needed via workshops, webinars, videos, computer-aided tutorials, adaptable technology, and more.

- Show marked improvement in meeting accessibility standards when evaluating campus websites and applications.
UMass Amherst community members create, support, and secure a high-quality and viable “public good.” As a resource to our internal and external communities, our access to and interface with technology facilitates knowledge creation and improved quality of life.

Operations serving the university’s academic, institutional, and financial goals must be supported with accessible tools and applications that are more flexible and responsive, ensure information integrity and security, and are better positioned for future change.

**Action items:**

**A. Improve information access between campus units (e.g., departments, UMass Amherst IT) and between the campus and the external community, in a sustainable and comprehensive fashion.**

- **Phase 1 – (Year 1-2):**
  - Gather specific IT needs from major campus users, including both current and future needs and requirements. This can be done through surveys and other mechanisms.
  - Identify known points of contact and/or communities of practice for sharing information, creating policy, establishing protocols, trouble-shooting, etc.
  - Create more professional development opportunities for career advancement through peer-to-peer and/or collegial technology training opportunities within and across departments for user unit groups.
Student Engagement

UMass Amherst IT’s ongoing commitment to engage with the student body is important for fostering good relationships and for making decisions that reflect the best interests of students and the campus. These interactions should extend throughout the duration of this plan and beyond. Students should be able to continue to give feedback on technology related concerns and planning, and their needs should be reflected in IT decisions. Increasing awareness for how students can engage with IT is imperative to improve students’ experience with technology for academic, extracurricular, and social purposes.

Activities and outreach, such as tabling at the Campus Center and social media engagement have had a positive effect on students and should continue to grow in the coming years. It is important to also continue to recognize and value students’ opinions and concerns, and to collaborate with specific organizations such as the Student Government Association and the IT Student Advisory group to gain better student insights. Furthermore, student forums should be held regarding significant IT changes affecting students. There should also be better publicized methods of providing feedback through the IT website to ensure all students have formal channels to voice their opinion.

- Consider the viability of campus-wide, centralized data access management. This will enable authorized individuals to obtain more secure, accessible, usable, and appropriately permissioned access to databases anywhere on campus as needed for their work.

B. Streamline and standardize the selection, purchase, and implementation of the university’s collaboration tools.

- **Phase 1 – (Year 1-2)**
  - Survey existing processes for tool and application selection and procurement.
  - Refine and/or define process and protocol for future collaborative tool selection and procurement by using committees of knowledgeable people who represent all client groups to articulate user needs, including accessibility needs and standards.

- **Phase 2 – (Year 2-3)**
  - Develop a more coordinated long-term e-communications strategy to do things such as better integrate email and group calendar applications.
  - Support and make interoperable current and future document sharing sites (e.g., UDrive, Box, Google Drive, SharePoint, Confluence).

- **Phase 3 – (Year 4-5)**
  - Integrate accessible emerging technologies and their applications more seamlessly.
  - Ensure a more attractive, integrated, functional, and consistent web presence across mobile devices.
Community Engagement & Outreach

Goal: Integrate, develop, and design systems that support the fundamental interactions of people with each other and technology.

UMass faculty, staff, and students comprise a fundamental network of human interactions and relationships that is integral to effective and innovative IT.

C. Understand and manage IT expenditures for optimal efficiency.

• Phase 1 – (Year 1-2)
  • Survey campus units to quantify costs related to IT.
  • Centralize IT services, where appropriate, for cost efficiency. Better support decentralized IT units, cross-functional teams, and experts where appropriate.
  • Request appropriate fiscal year budget requests to fund IT services to users.
  • Pursue further external funding sources to leverage dedicated IT expenditures, including better leveraging alumni for targeted IT investments.
  • Implement a purchasing policy requiring all IT services and equipment to be scalable, usable, and to conform to accessibility standards.
**Metrics**

- Develop and implement a checklist to ensure accessibility and mobile device standards are met for new and revised websites.
- Perform a baseline survey to determine user satisfaction with information and services. Repeat the survey at the end of each phase.
- Track website usage on new and revised websites to see if engagement is increasing.
- Develop and publish financial reports showing IT expenditures and expected benefits of accessibility and collaboration.

**Risks**

- This plan’s success requires continued leadership, governance, and prioritization of these goals and the plan.
- A new way of working is required that may not be recognized or equitably rewarded.
- New collaboration and governance requires relinquishing some scope of power for shared outcomes to a mutually beneficial end.
- Lack of accessibility could create a barrier for some individuals.

**Projected Cost**

$150,000 – over 5 years to pay for:

- Survey tools and analysis. Possible solutions include: on-campus, student projects, and consultants.
- Reorganization of staff duties to meet engagement and outreach goals.
- Funding for rewards and incentive programs.
- Professional development opportunities.
- Grant-funding for proposal creation and implementation of cross-area/disciplines for staff in collaboration with students and faculty.
- Engagement opportunities for new collaboration between external entities, including programs for local community colleges and high schools to allow for student interaction with the university.
Enterprise Systems
Integration & Analytics

Transcending boundaries
to better connect our community

At their most basic elements, enterprise systems are used by organizations to coordinate and improve operations. Among higher educational institutions, there is a common enterprise system theme to increase connectivity among members of the academic community. Enterprise systems are used to transcend communication boundaries so people can connect in new ways to spread knowledge, solve problems, and investigate opportunities for the future. As the University of Massachusetts Amherst community continues to expand, it is increasingly important to better utilize the data in strategic ways across the enterprise. By optimizing data usage (e.g., human resources, finance, student, development, and other campus data) effectively, the campus will improve operational efficiency and enhance innovation to better solve challenges, encourage campus-wide communication and collaboration, and better evaluate opportunities and enhance transparency.
Goals

• Establish a transparent governance model

• Provide more streamlined business process management including an IT procurement review

• Improve the ease of and access to data reporting, business intelligence, and analytics
Enterprise Systems

Goal: Establish a transparent governance model

Ensure that the appropriate information technology priorities are established and communicated through a transparent governance process in order to develop and maintain an IT environment that enables students, faculty, and staff to meet teaching, learning, research, and organizational university goals.

👉 Action items:

A. Establish an IT governance model, related policies, and evaluation plan.
   - Create a culture of better informed decision-making.
   - Develop more transparent policies and procedures. All decisions will be communicated to campus members and actions will be coordinated with UMass Amherst IT and strategic planning subcommittees.
   - Address security and accessibility concerns as they arise.
   - Ensure that all proposed projects are fully evaluated and assessed for impact on the university as they align with university goals. It is important to prioritize and approve current proposed IT enterprise system projects and identify where resources should be allocated.

B. Identify governance board members.
   - Include several senior leaders with representation from across all campus areas. It is important that individuals with an understanding of university goals as well as those who work within the enterprise systems are members.

C. Perform an IT enterprise systems needs assessment.
   - Complete the UMass Amherst system needs assessment. As part of this, there will be an evaluation process to determine the appropriate timing of new IT enterprise systems, upgrades, and add-ons. The review includes functional, technical, and financial specifications. It is important to enhance current applications to meet immediate and future plan needs.
   - Complete interview and survey process across the campus and the university. Deans and business managers need to continue to be included and help identify individuals who understand the end-user needs of each department and college. It is important that this process continue in a manner that conveys the ability to air concerns in a safe environment.
One Potential Governance Model Option

IT Governance Board
Executive Council
(must be decision-makers and budget holders)

Information and Communication Technology Council (ICTC)

Administrative Initiatives Council
Academic Initiatives Council
Student Technology Advisory Group
Research Technology Council
Engagement & Outreach Technology Council
Infrastructure

Information Security/Privacy
Analytics/Business Intelligence/Reporting
Policy/Procurement
Information Accessibility/Usability

First Tasks:
- Inventory (ongoing)
- Communities of Practice
- IT Showcase (self-promotion)

Metrics
- Finalize the governance model by June 2016.
- Identify all members by December 2016.
- Put governance policies and an evaluation plan in place by June 2017.
- Complete all system needs assessments by June 2017.
- Complete technology roadmaps by January 2018.

Projected Costs
There are no expected capital costs associated with this goal. All members will perform tasks as part of their university service.
Enterprise Systems

Goal: Provide more streamlined business process management including an IT procurement review

Provide and maintain intentional, well designed and well delivered enterprise and critical department information systems that utilize sound process management, effective resource allocation, and defined governance and that provide opportunities for collaboration, shared institutional perspective, and investments.

Action items:

A. Catalog IT/enterprise systems and maintain an ongoing inventory to streamline efficient and effective use of these systems. Determine the meta information to capture for these systems and a means to catalog the systems.
   - Include financial and resource requirements for the system to allow for a cost/benefit analysis.
   - Incorporate systems from the entire campus. Collecting a baseline set of data could be accomplished through surveys and/or via current data collection mechanisms. The Business Continuity Planning system has been identified as a current data collection mechanism. The project management workflow should include a step to update and/or add documentation of any new system or system upgrade to the catalog.
   - Perform a search of existing systems to make sure that redundant solutions are not being deployed as new requests come in.
   - Survey and respond to user needs continually.

B. Publish a service catalog to promote inter-system integration; include web services, application program interfaces (APIs), data dictionaries, and more.
   - **Promote efficiency and effectiveness:** A searchable, up-to-date catalog of services will promote greater use of these services by end users, developers, and other IT staff. A major benefit is the use of real-time data instead of copies of that data either from feeds or manual data entry.
   - **Extend best practice project management tools across campus to streamline project development processes and report project timeliness and completion status.**
   - Ensure projects meet required goals within transparent project timeliness and resources. Each project must include functional, technical, and financial specifications for development and maintenance.
• Measure current and future resource commitments to optimally schedule projects.
• Develop, maintain, and share more consistent technical architecture standards and work practices across campus. This will involve sharing best practices for configuration management techniques and tools to model workflows, timeliness, build specifications, and more.

C. Engage end users of enterprise systems to better identify usability and accessibility issues and develop roadmaps for improvements.
• Increase end user productivity and ease of use to lessen the burden of training and technical support.
• Support user centric interfaces that may require architectural changes with a greater emphasis on enterprise web services feeding third party systems.

D. Conduct an IT procurement review to:
• Improve and better standardize technology procurement processes for consistent use of technology contract language as compliance needs change, including accessibility compliance.
• Promote efficiencies and ensure initiatives meet technical and architecture standards.
• Make the procurement experience easier for campus customers.
• Collaborate more with our partners across campus and our vendors off campus to leverage bulk purchases and to improve the security and accessibility of their products.

E. Train staff in the skills needed to carry out the action items, particularly those skills required for business analyst and project management roles.

Metrics
• Determine the data needed to catalog systems and services by December 2016.
• Begin cataloging systems and services by January 2017.
• Select and deploy best practice project management tools by June 2017.
• Produce guidelines for effective project management by December 2017.
• Publish and update the catalog continuously for all public central IT systems services starting July 2018.
• Catalog other non-centralized IT systems services by December 2018.
• Review and update procurement process to improve efficiency and effectiveness by December 2018.
• Conduct targeted usability studies of 1-2 major IT/enterprise systems per year starting in July 2016.
Enterprise Systems

Goal: Provide more streamlined business process management including an IT procurement review

From Reactive to Proactive

BI Must Get Involved Earlier in Decision Making Process

Typical Data-Informed Decision Making Process

- Campus member identifies problem or opportunity; desires data to inform decision
- Campus member submits requests for data from decision support team
- Decision support team reacts to campus member’s request, delivers report
- Campus member unsatisfied with report, submits another request

“Decision support” gets involved with little knowledge of what decision campus member is trying to make

Where decision support should be involved

Source: EAB interviews and analysis.

Risks

- Web services and application program interfaces (APIs) inherently incur a security risk. Each web service and API needs to have an accompanying security review.
- New processes may slow down decision-making and implementation.
- The new resource allocation model for the campus will introduce some uncertainty to the action items in regards to the resources required to implement them.

Projected Costs

Without systems in place, projecting costs is not feasible. Part of the development of this model will be to evaluate costs.
Best Practices for IT Purchasing

Assess a potential technology purchase to account for more comprehensive technical, functional, and financial considerations to mitigate compliance and efficiency risks.

**TECHNICAL**

- Does the plan fit IT architecture/infrastructure/support plans?
- How will the system meet evolving information security needs?
- How does the system interface with other systems?
- How much training is needed and what is the cost?
- How will testing of impact on other systems be resourced?

**FUNCTIONAL**

- Does the plan meet the needs of users today and will it continue to do so for at least a 3-5 year window?
- Where does the proposed investment fit with the organization’s strategic planning priorities and users’ competing priorities/needs?
- Did the user base compile the needs requirements and a rating scorecard vs. the vendor?

**FINANCIAL**

- Is the cost feasible?
- How does this investment compare to other campus/system opportunities?
- What is the likelihood that the technology vendor will be a going concern over the expected life of the system? How large is their development staff?
- Does the plan meet changing compliance needs?
- How will multi-year contracting be handled? Who owns the information risks and contract renewal terms and rates?
Goal: Improve the ease of and access to data reporting, business intelligence, and analytics

The campus community needs to have much easier and faster ways to get data in and out of our systems at any time on-demand with the appropriate security and accessibility measures in place. Higher education is becoming an increasingly personalized service and we need to be able to cater to individualized needs while serving very large communities. We also need to be able to evaluate different investment opportunities against each other faster than ever before. To do so, we need to be able to look at roles and preferences and more easily compare to peers.

Action items:

- Engage users of our major systems and continue to ask if current needs are being met in order to understand what information they will need in the future.
- Seek to find solutions through current system features and functionalities.
- Create a plan and execute it to better share existing best practices across campus and the university system.
- Repurpose existing staff duties and positions as transitions occur to grow our analytics capacity more aggressively across multiple fields and areas.
- Create and maintain an electronic repository that allows potential data users to easily access and analyze appropriate levels of data on-demand at their convenience.
Utilize the new governance structure to have ongoing needs assessments and responses to support better internal and external accountability demands and operational support.

Give early and special emphasis to demands arising from the campus’ exploration of the new budget allocation system (including development and distribution of data necessary to populate the allocation model) and from the strategic planning process (including information needed by academic and administrative units to assess performance, analyze costs and service effectiveness, and consider improvement options and scenarios).

Assemble more peer and aspirant peer data on reporting and analytics services and best practices, including staffing levels, organizational structures, tool sets, and policies to assess and determine where we want to differentiate.

Develop a requirements document based on results of the intake process and evaluate existing systems and structures in terms of capacity to meet those requirements.

Recommend options for improving existing capacity and/or developing new capacity, including cost and time estimates.

Evaluate institutional policies relating to the roles of data owner, data steward, and data custodian, and the access they have to data and tools.

Recommend policies and roles as needed, emphasizing the broadest practical access for university decision makers, and putting data and the tools directly in the hands of users whenever possible.

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Infrastructure is an important foundation to achieving the University of Massachusetts Amherst’s goals as a leader in public education, research, engagement, innovation, and discovery. The campus community’s needs for infrastructure are growing at a very rapid pace and we must be able to keep up as demands evolve. This requires more planning and matching of investments than ever before. Improving the wired and wireless network components are essential to the day-to-day functions of the university, therefore, we have already started some of these projects.

A successful strategy plan needs to include a working, living relationship between the resources, the tools, and the people. End-users need to be aware of the available technologies and empowered to follow best practices. A bidirectional feedback process needs to be present as the inherent information is necessary for improving and optimizing IT offerings.

Having a healthy infrastructure involves more than just technology systems. It also includes the community of staff, administration, and faculty entrusted with the responsibility to design, build, and deploy the infrastructure the university needs. This strategic plan identifies the greatest challenges to building and maintaining state of the art infrastructure. Like other colleges, we need to be more aware of the value of recruiting and retaining highly skilled IT staff. The campus community’s need for infrastructure is changing and growing and IT must remain nimble and strong to meet those needs.
Goals

• Advance major network initiative

• Complete and commission the new UMass data center as part of the System-wide data center optimization project

• Assess and improve other existing infrastructure and related protocols and policies

• Ensure the university is able to successfully recruit, develop, and retain the people required to support a robust and dynamic campus information technology enterprise
The UMass Amherst campus is in the second year of a major, multi-million dollar network upgrade to meet the current and emerging teaching, learning and outreach needs of the Commonwealth’s flagship campus. This project involves campus-wide updates that connect faculty, staff, and students through wireless and wired networks. It consists of primary, optical, transport, and routing equipment used by the entire campus community to connect campus buildings to the UMassNet, Five Colleges, Internet2, and the Internet to allow for world-wide access. As our campus becomes more international, we expect to continue to participate in collaborations that allow easy access to wireless networks across the world, such as eduroam, which allows for access to encrypted networks at research and higher education institutions in over 76 countries and territories world-wide.

Goal: Advance major network initiative

The primary goal of the **Network Infrastructure Project** is to provide better, faster network connectivity and fulfill the academic, social connectivity, and general communication needs of our students, faculty, and staff, as these needs continue to evolve. The multi-year project includes work on both the core network and infrastructure at the building level.
**Action items:**

A. Execute the next phase of the multi-year Network Infrastructure Project plan.
B. Sustain the campus wired and wireless network environment as needs evolve.
C. Leverage on-going infrastructure governance.
D. Continue to foster partnerships with external entities to further support academic initiatives (e.g., donations, research, teaching fellowships).

**Metrics**

- Ensure the campus network meets the teaching, learning, and research needs of the campus.
- Ensure networks are properly segmented.
- Provide reliable wired and wireless network connectivity.
- Improve and maintain adequate resources to permit heavy network usage across campus. Wireless access should be able to support multiple devices per person.
- Maintain an updated measurement (heat map) for wireless and wired capacity across campus.

**Risks**

- The order of activities is critical. The Network Infrastructure Project must be completed to handle increased bandwidth projects and improved connectivity.
- Security threats are urgent and have increasing impact.

**Projected Costs**

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The new data center is designed as a hybrid data center and will add significant new storage, a higher level of reliability, and better redundancy capabilities for faculty, staff, and students across the UMass System. It will also allow for more efficient and sustainable support of technology systems. Significant IT services are already offered in the cloud (see the appendices for list).

This is a two-phase project that has already been approved and funded. Further project justification, details, and design are located in the appendices. Phase one is physical construction and was completed as of December 2015. The second phase is just starting and will include moving equipment into the center and the launch of new technology offerings.
Action items:
A. Sustain the campus data center environment through the completion of the new data center, including the allocation of additional space. This is currently underway.
B. Develop a plan for the provision of increased data storage.
C. Acquire appropriate hardware and software to manage and provision storage.
D. Continue to monitor data center efficiencies.

Metrics
- Migrate services to the new data center.
- Complete and maintain a plan for the provision of increased data storage.
- Acquire appropriate hardware and software to manage and provision storage (cost per storage unit, capacity available, elapsed time to provision).

Risks
- The data center replacement is essential before other improvements in infrastructure.
- Security threats are urgent and have increasing impact.

Projected Costs

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**Goal: Assess and improve other existing infrastructure and related protocols and policies**

UMass Amherst has committed to building and maintaining a robust, secure, scalable, and reliable IT infrastructure to support, facilitate and enhance innovation, teaching, learning, and research with sustained investment and continuous assessment and planning.

**Action items:**

A. Develop an integrated planning model for campus infrastructure decision-making that reflects both overall systemic needs and the individual programmatic requirements of populations being served. It should include consideration of current costs, ongoing support and maintenance, end-of-life replacement, and campus fiscal realities.

B. Anticipate ongoing maintenance and upgrade costs for the IT infrastructure and continue to invest in a robust environment. Align funding decisions and investment priorities directly with campus strategic objectives.

C. Develop and maintain a data management plan and policies for campus, including governance, ownership, data classification, and retention requirements.
D. **Materialize and sustain a campus information technology architecture.** Expand change management and incident management for all IT services.

E. **Develop and maintain an evaluation process for new and existing IT/enterprise systems that includes a functional, technical, and financial specification.** Establish and maintain institutional guidelines for implementation and upgrades to IT/enterprise systems. Increase emphasis on collaboration and research into reuse of existing systems for efficiencies. See the Enterprise Systems section of this strategic plan for more details.

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**Metrics**

- Develop a data management plan and supporting policies, including governance, ownership, data classification and retention requirements to use to inform business processes and procedures.
- Complete a campus information technology architecture plan. Ensure that change management and incident management is followed for all IT services.
- Create, maintain, and make available a baseline of common services for all campus constituencies (service catalog).
- Continue to support PCs, Macs, and Unix to meet the diverse needs of the campus community.
- Continue to use technology to optimize processes across campus, including reviewing remaining paper processes to see if they can be better automated.

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**Risks**

- The resource allocation model is crucial for prioritizing and funding strategic priorities.
- The governance model must prioritize projects in a consistent manner.
- Institutional will to implement comprehensive data management, security, and accessibility policies is critical.
- Resource constraints may slow progress on some areas. There may be limits in staffing to balance all critical efforts.
- Better project management is critical to keep initiatives focused and efficient.
Goal: Ensure the university is able to successfully recruit, develop, and retain the people required to support a robust and dynamic campus information technology enterprise

The university must review and enhance its investment in its information technology human resources as a campus-wide asset. It must be coupled with the training and professional development required to maintain knowledge and skills most relevant and requisite to the information technology enterprise.

Increasingly, technical expertise is not concentrated solely among technical staff, but is distributed broadly across every level of the campus. Fostering user communities around technologies can provide a conduit both for reaching the right audience with important information about technologies and increasing the sharing of information within the community itself. This offers the potential to transform both how technical information is disseminated and consumed.

To accomplish this, each significant technology project and product in use on the campus should have a regularly-updated public feed of campus resources. It will support multiple communication modalities and be available to all UMass Amherst faculty, staff, and students that may include a user community, security announcements, relevant news, updates, and a knowledge-base; coupled with administrative encouragement, support, and resources for ongoing professional development related to IT skills.
Action items:

A. Establish working groups to work in partnership with university Human Resources and other stakeholders to accomplish the following outcomes:

Identify and define opportunities for and challenges to effectively recruiting and retaining IT professionals.

- Review all related campus IT position descriptions to ensure they reflect current requirements and are flexible to changing needs (Completion: July 2016).
- Develop and propose more flexible, creative, and effective strategies for recruiting staff members the university wants and needs (Completion: April 2016).
- Create a “job banding” model featuring a limited and flexible set of IT positions that position the university to be more competitive in the marketplace (Completion: September 2016).
- Develop and propose flexible, creative, and effective strategies for retaining staff members the university wants and needs (Completion: June 2016).
- Develop and propose a more holistic, dynamic training curriculum and professional development program for campus IT staff members (Completion: October 2016).
- Identify budget and other resource impacts of each action item (Completion: Rolling completion targets, by action item).

B. Determine the relative priority for each proposed outcome (above) and secure the resources necessary to implement accordingly (Completion: Rolling completion targets, as determined by internal and external consideration).

C. Improve communications and training surrounding IT projects and technologies in the following ways:

- Create and maintain a list of current technology projects and products on campus: identify categories or groups of technologies around which to build a feed and user community.
- Identify and recruit leaders from the broader university community to help coordinate efforts for each community.
- Select and set up a team portal system, to enable group collaboration around each identified community that will minimally provide: an RSS feed for news and announcements; calendaring (for group meetings); a repository of frequently-asked-questions (possibly on a wiki); and include full email integration.
Infrastructure

Goal: Ensure the university is able to successfully recruit, develop, and retain the people required to support a robust and dynamic campus information technology enterprise

- Provide adequate staffing to support and maintain the team portal system and facilitate communication.
- Increase resources to identify and complete needed training for technology user communities.
- Enable early adopters to create new user communities around emerging technologies before they are widely adopted.
- Create a process for notifying user communities about pending decisions that may impact the community and provide opportunities for input from the community.
- Train staff in the skills needed to carry out the action items.

Metrics

- Create an inventory of technology projects/products, organized into meaningful categories and make them transparent to the campus.
- Catalog and manage all existing and future projects continually
- Put in place a sufficiently staffed team portal system that meets the specifications outlined in the goals.
- Identify a leader drawn from somewhere in the broader university community. This leader’s duties may include: organizing periodic meetings, moderating online group discussion, and tracking/posting news & updates.
- Post and tag all announcements relevant to IT communities with an appropriate taxonomy so that they appear in appropriate feed(s).
- Take expertise drawn from user communities into account for IT governance decisions that impact those technology projects/products.
Risks

- Limited time on the part of both technical and broader university staff to engage with and support communities.
- Saturation of certain key individuals who are central to multiple projects.
- Limited resources for building or purchasing training.
- Limited recognition by campus supervisors for effort expended by their staff members devoted to building and maintaining user communities and/or IT skills.
- Difficulty of integrating help desk functions with user communities.
- Current absence of effective governance structures for IT decision-making.
Information assurance, an umbrella term that includes the protection of the privacy and security of institutional information and research data, is essential to maintaining efficiency and excellence at the University of Massachusetts Amherst, the Commonwealth's flagship. Due to the expanding scope and sophistication of the threats to that information, and the ever-growing landscape of regulations regarding the information in the university's care, a more mature program of information assurance to address these issues is necessary for UMass Amherst's strategic planning. This program includes:

- Campus policies grounded in internationally-recognized standards and practices that set community expectations for implementation, including data inventory and classification.
- The application of appropriate technical controls to institutional information and research data sets.
- State of the art training and education interwoven in campus culture, especially on information security.

This program can only succeed by focusing on the value of the information assets, tailoring the program to the preservation of those assets, and recognizing that information assurance is the responsibility of every user. In other words, it becomes less successful if it becomes more difficult
for the university to use information to fulfill the campus mission, and if not everyone is involved.

Leadership and governance are critical components in effectuating a robust information assurance culture. The central IT organization has already started a multi-year plan and this needs to be carried forward for the next five years. This plan strives:

- To have information assurance as an increased campus priority.
- For information assurance to be more embedded in all IT areas throughout campus through an IT governance model.
- To increase the availability of risk management tools to those who have the potential of accessing sensitive information.

Working with the campus community, central IT leaders will strive to establish more robust information management governance through the identification of key data stewards and their subsequent formation of the data steward delegates. This body will participate in the overall IT governance process outlined in the Enterprise Systems section of this report and will help ensure that information is available as an asset to the campus community, while adequately maintaining privacy and compliance for the data under their care.

Academic and administrative unit managers or “security liaisons” will help improve communications with the Information Security Office and to share risk assessment perspectives, tools and operations. This governance model bridges the gaps between central administrative and academic units and contributes to the necessary cultural shifts towards enhanced privacy and security awareness. This group is best comprised of mid-level unit managers with either direct knowledge of information assurance or authority over IT administrators or other IT staff in their unit that do. Institutional policy should instantiate this role as well as outline specific responsibilities. Peer and peer-aspirant institutions have used modest additional compensation as an incentive for individuals to assume these responsibilities. The administration’s creation of this role and the instantiation of this body signals the overall importance of information management in support of the university’s mission.

Through governance and campus collaboration, the Information Security Office will work to review current capabilities and compliance targets and risks, and will develop strategies, tools, training, and education to align with campus priorities.
The next section includes a list of committee members and contributors and IT Strategic Plan funding.

See the appendices for more details.
## Teaching & Learning Committee

### Committee Chairs

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<tr>
<td>Gill</td>
<td>Alyson</td>
<td>Information Technology/Provost's Office</td>
<td>Associate Provost for Instructional Innovation</td>
</tr>
<tr>
<td>Gross</td>
<td>Dave</td>
<td>Biochemistry &amp; Molecular Biology</td>
<td>Professor</td>
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### Members

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<tr>
<td>Al-Hariri</td>
<td>Lara</td>
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<td>Anderson</td>
<td>Timothy</td>
<td>College of Engineering</td>
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<td>Anne</td>
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<td>Susan</td>
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<td>Director, Technology Support &amp; Services</td>
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<tr>
<td>Buehler</td>
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<td>Linda</td>
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<td>Professor &amp; Interim Department Chair, Hospitality &amp; Tourism Management</td>
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<tr>
<td>Gerber</td>
<td>Dan</td>
<td>School of Public Health</td>
<td>Associate Dean of Academic Affairs/Director, online MPH in Public Health Practice/Lecturer</td>
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<tr>
<td>Holloway</td>
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**IT Support (Teaching & Learning Committee)**
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<td>Anderson</td>
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<td>Iris</td>
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<td>Davis</td>
<td>Robert</td>
<td>Information Technology</td>
<td>Manager, IT Computer Classrooms</td>
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<tr>
<td>Deschamps</td>
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### Research Committee

**Committee Chairs**

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**IT Support (Research Committee)**

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### Engagement & Outreach Committee

#### Committee Chair

Dukes Cheryl L. College of Nursing Director of Healthcare Outreach and Community Engagement

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# Enterprise Systems Committee

## Committee Chairs

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## Last Name | First Name | Department | Title
---|---|---|---
Billings | Marilyn | University Libraries | Scholarly Communication & Special Initiatives Librarian |
Buehler | Julie | Office of the Chancellor/Information Technology | Vice Chancellor for Information Services & Strategy & CIO |
Donald | Claudia | University Relations, Office of Communications | Director of Online Communications |
Griffin | Linda | College of Education | Associate Dean, Academic Affairs |
Holloway | William (Bret) | Continuing & Professional Education | Senior Coordinator for Faculty Instructional Support |
Schliemann | Bernd | Mechanical & Industrial Engineering | Senior Lecturer |
Shevlin | Sharon | Residential Life/Student Affairs Information & Technology Services | Director of SAITS & Residential Life Technology Services |
Stoia | Nikki | College of Humanities & Fine Arts/Music & Dance | Associate Dean of Advising/Chief Undergraduate Advisor & Honors Program Director |
Sullivan | Patrick | Graduate School | Deputy University Registrar |
Watrous | Jacqueline | Administration & Finance | Executive Director of Administrative Systems |
Wileden | Jack | Computer Science | Professor/Associate Dean of Student Affairs |

## IT Support (Enterprise Committee)

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## Infrastructure Committee

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<td>Jacqueline</td>
<td>Administration &amp; Finance</td>
<td>Executive Director of Administrative Systems</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Department</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bourbeau</td>
<td>Anne</td>
<td>University Relations</td>
<td>Director of Web Communications</td>
</tr>
<tr>
<td>Bradley</td>
<td>Scott</td>
<td>College of Engineering</td>
<td>Director of Engineering Computer Services</td>
</tr>
<tr>
<td>Buehler</td>
<td>Julie</td>
<td>Office of the Chancellor/Information Technology</td>
<td>Vice Chancellor for Information Services &amp; Strategy &amp; CIO</td>
</tr>
<tr>
<td>Canavan</td>
<td>MJ (Maryjane)</td>
<td>University Libraries</td>
<td>Head of Library Systems &amp; Web Services</td>
</tr>
<tr>
<td>de Bruyn Kops</td>
<td>Stephen</td>
<td>College of Engineering/Mechanical &amp; Industrial Engineering</td>
<td>Professor/Director of Center for Energy Efficiency and Renewable Energy (CEERE)</td>
</tr>
<tr>
<td>Donald</td>
<td>Claudia</td>
<td>University Relations Office of Communications</td>
<td>Director of Online Communications</td>
</tr>
<tr>
<td>Drake</td>
<td>George</td>
<td>Biology</td>
<td>Director of Computing/Networking</td>
</tr>
<tr>
<td>Grotevant</td>
<td>Hal</td>
<td>Psychology</td>
<td>Department Chair/Rudd Family Foundation Chair/Professor</td>
</tr>
<tr>
<td>Hull</td>
<td>Eddie</td>
<td>Student Affairs &amp; Campus Life</td>
<td>Executive Director of Residential Life</td>
</tr>
<tr>
<td>Jhally</td>
<td>Sut</td>
<td>Communication</td>
<td>Professor</td>
</tr>
<tr>
<td>Kurose</td>
<td>Jim</td>
<td>Computer Science</td>
<td>Distinguished Professor</td>
</tr>
<tr>
<td>Pasquini</td>
<td>Joseph</td>
<td>Public Health &amp; Health Sciences</td>
<td>Information Technology Manager</td>
</tr>
<tr>
<td>Perot</td>
<td>Blair</td>
<td>Mechanical &amp; Industrial Engineering</td>
<td>Professor</td>
</tr>
<tr>
<td>Richardson</td>
<td>Bruce</td>
<td>Residential Life/Student Affairs</td>
<td>Manager of Network Operations</td>
</tr>
<tr>
<td>Rigler</td>
<td>Steven</td>
<td>College of Humanities &amp; Fine Arts</td>
<td>Director of Information Technology</td>
</tr>
<tr>
<td>Shevlin</td>
<td>Sharon</td>
<td>Residential Life/Student Affairs</td>
<td>Director of SAITS &amp; Residential Life Technology Services</td>
</tr>
<tr>
<td>Smith</td>
<td>Jim</td>
<td>College of Humanities &amp; Fine Arts</td>
<td>Technical Assistant III</td>
</tr>
<tr>
<td>Starr</td>
<td>Dale</td>
<td>Isenberg School of Management</td>
<td>Associate Director of Technology Support &amp; Service</td>
</tr>
<tr>
<td>Wells</td>
<td>Craig</td>
<td>College of Education</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Wenczel</td>
<td>Steve</td>
<td>Administration &amp; Finance</td>
<td>Assistant Director of IT Infrastructure</td>
</tr>
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</table>
## IT Support (Infrastructure Committee)

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Department</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battisti</td>
<td>Stephen</td>
<td>Information Technology</td>
<td>Assistant Director of Software Engineering</td>
</tr>
<tr>
<td>Chelaru</td>
<td>Iris</td>
<td>Information Technology</td>
<td>IT Communications Manager</td>
</tr>
<tr>
<td>Choudhry</td>
<td>Wajid</td>
<td>Information Technology</td>
<td>Director of IT User Services</td>
</tr>
<tr>
<td>Cunningham</td>
<td>Jake</td>
<td>Information Technology</td>
<td>Assistant Director of Information Security</td>
</tr>
<tr>
<td>Dollard</td>
<td>Heidi</td>
<td>Information Technology</td>
<td>Deputy Chief Information Officer</td>
</tr>
<tr>
<td>Lagji</td>
<td>Genti</td>
<td>Information Technology</td>
<td>Assistant Director, IT Help Center</td>
</tr>
<tr>
<td>Mack</td>
<td>Robert</td>
<td>Information Technology</td>
<td>Director of Administrative Computing Technology</td>
</tr>
<tr>
<td>Mileski</td>
<td>James</td>
<td>Information Technology</td>
<td>Director of Enterprise Infrastructure</td>
</tr>
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## Network Advisory Subgroup

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
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<th>Title</th>
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</thead>
<tbody>
<tr>
<td>Guha</td>
<td>Arjun</td>
<td>Computer Science</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Kurose</td>
<td>Jim</td>
<td>Computer Science</td>
<td>Distinguished Professor</td>
</tr>
<tr>
<td>Levine</td>
<td>Brian</td>
<td>Computer Science</td>
<td>Professor</td>
</tr>
<tr>
<td>Venkataramani</td>
<td>Arun</td>
<td>Computer Science</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Wolf</td>
<td>Tilman</td>
<td>College of Engineering</td>
<td>Associate Dean of Engineering (Graduate Studies and Operations)/Professor</td>
</tr>
<tr>
<td>Zink</td>
<td>Michael</td>
<td>Electrical &amp; Computer Engineering</td>
<td>Associate Professor</td>
</tr>
</tbody>
</table>

## Student Contributors

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Major</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gendreau</td>
<td>Eric</td>
<td>Computer Science, Class of 2017</td>
<td>Secretary of Technology, Student Government Association (SGA)</td>
</tr>
<tr>
<td>Argueta</td>
<td>Natalie</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chhoeuy</td>
<td>Piseth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clark</td>
<td>Marisa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kellogg</td>
<td>Ross</td>
<td></td>
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</tr>
<tr>
<td>Milam</td>
<td>Chase</td>
<td></td>
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</tr>
<tr>
<td>Onut</td>
<td>Gamze</td>
<td></td>
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</tr>
<tr>
<td>Patel</td>
<td>Niral</td>
<td></td>
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</tr>
<tr>
<td>True</td>
<td>Emily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valcour</td>
<td>Molly</td>
<td></td>
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</tr>
<tr>
<td>Whitmus</td>
<td>Kyle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilt</td>
<td>Greta</td>
<td></td>
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## IT Strategic Plan

### Funding

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Total Cost</th>
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<tr>
<td>TEACHING &amp; LEARNING</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Promote a culture of student-centered learning</td>
<td>$130K</td>
<td>$130K</td>
<td>$130K</td>
<td>$130K</td>
<td>$650K</td>
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<tr>
<td>Improve support of faculty in the creation, implementation, and use of effective and innovative teaching techniques as they continue to evolve</td>
<td>$95K</td>
<td>$320K</td>
<td>$220K</td>
<td>$220K</td>
<td>$1,075K</td>
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<td>Provide a new IT ecosystem for learning and teaching that fosters more creative solutions to diverse individual goals</td>
<td>$90K</td>
<td>$50K</td>
<td>$50K</td>
<td>$50K</td>
<td>$290K</td>
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<td>RESEARCH</td>
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<td>Information and Data Management</td>
<td>$283K</td>
<td>$183K</td>
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<td>$183K</td>
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<td>Electronic Research Administration (eRA)</td>
<td>$150K</td>
<td>$150K</td>
<td>$150K</td>
<td>$150K</td>
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<td>High Performance Computing</td>
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<td>$175K</td>
<td>$175K</td>
<td>$875K</td>
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<td>COMMUNITY ENGAGEMENT &amp; OUTREACH</td>
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<tr>
<td>Create campus-wide universally accessible IT systems and information resources</td>
<td>$15K</td>
<td>$15K</td>
<td>$15K</td>
<td>$15K</td>
<td>$75K</td>
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<tr>
<td>Integrate, develop, and design systems that support the fundamental interactions of people with each other and technology to solve campus needs and/or leverage opportunities.</td>
<td>$15K</td>
<td>$15K</td>
<td>$15K</td>
<td>$15K</td>
<td>$75K</td>
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<tr>
<td>ENTERPRISE SYSTEMS</td>
<td>Year 1</td>
<td>Year 2</td>
<td>Year 3</td>
<td>Year 4</td>
<td>Year 5</td>
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<td>-------------------</td>
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<tr>
<td>Establish a transparent governance model</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>Provide more streamlined business process management including an IT procurement review</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>Improve the ease of and access to data reporting, business intelligence, and analytics</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>INFRASTRUCTURE</td>
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<tr>
<td>Advance major network initiative</td>
<td>$7.4M</td>
<td>$11.2M</td>
<td>$7.6M</td>
<td>$5M</td>
<td>$5M</td>
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<tr>
<td>Complete and commission the new UMass data center as part of the System-wide data center optimization project</td>
<td>$2.2M</td>
<td>$8.6M</td>
<td>$1.3M</td>
<td>$1.2M</td>
<td>$1.3M</td>
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<tr>
<td>Assess and improve other existing infrastructure and related protocols and policies</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>Ensure the university is able to successfully recruit, develop, and retain the human resource assets required to support a robust and dynamic campus information technology enterprise</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>SUBTOTAL</td>
<td>$10.553M</td>
<td>$20.838M</td>
<td>$9.838M</td>
<td>$7.138M</td>
<td>$7.238M</td>
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</table>

*Includes some infrastructure items already funded
Glossary

**Adaptive learning tools** – Self-paced tools that support individualized learning for students; adaptive modules such as those created for OWL (Online Web-based Learning) that combine course content with online assessments.

**API (Application Program Interface)** – A set of routines, protocols, and tools for building software and applications.

**BI (Business Intelligence)** – A set of techniques and tools for the acquisition and transformation of raw data into meaningful and useful information for business analysis purposes.

**Business continuity planning** – A management process that identifies risk, threats, and vulnerabilities that could impact an organization’s continued operations and provides a framework for building organizational resilience.

**BYOD** – An abbreviation for ‘bring your own device.’ Students are bringing their own laptops, tablets, smartphones, and more into classrooms to support learning.

**Change management** – Refers to any approach to transitioning individuals, teams, and organizations using methods intended to re-direct the use of resources, budget allocations, and other modes of operation that significantly reshape an organization.

**Cloud computing or ‘the cloud’** – Storing and accessing data and programs over the Internet instead of on your local computers and hard drives. The cloud is often a metaphor for the Internet.

**Culture of evidence** - Practices employing data and research to inform decision-making at all levels of an institution, with the goal of ensuring higher levels of success for all students.

**Data center** – A controlled access environment that houses critical technology services, equipment, applications, and data.

**Data steward** – A specialist role that incorporates processes, policies, guidelines, and responsibilities for administering organizations' entire data in compliance with policy and/or regulatory obligations.

**Early adopter** – A person who starts using a technology as soon as it becomes available.
Glossary

**Electronic repository** – A central electronic location where data is stored and maintained.

**Enterprise system** – Large-scale application software systems that support business processes, information flows, reporting, and data analytics. At their most basic elements, enterprise systems are used by organizations to coordinate and improve operations (e.g., SPIRE).

**ePortfolio (electronic portfolio)** – An electronic tool for storing, organizing, reflecting on, and sharing items that represent a student’s learning experience.

**eRA (Electronic Research Administration)** – A method of conducting research administration in an online, paperless environment.

**ERP (Enterprise Resource Planning)** – A business process that facilitates the flow of information in order to base decisions on data. ERP software organizes data from various levels of the organization to provide insight into key performance indicators.

**Governance model** – A model that dictates all processes of interaction and decision-making among the actors involved in an organization.

**HPC (high performance computing)** – The practice of aggregating computing power in a way that delivers much higher performance than one could get out of a typical desktop computer or workstation in order to solve large problems in science, engineering, or business.

**ICTC (Information and Communication Technology Council)** – A sub council of the UMass Amherst Faculty Senate. For more information, see: [www.umass.edu/senate/infotech](http://www.umass.edu/senate/infotech)

**Incident management** – A term used to describe the activities of an organization to identify, analyze, and correct hazards to prevent a future reoccurrence.

**Information assurance** – An umbrella term that includes the protection of the privacy and security of institutional information and research data.

**Internet2** – A member-owned advanced technology community that provides a collaborative environment where US research and education organizations can solve common technology challenges and develop innovative solutions in support of their educational, research, and community service missions.
Glossary

**IT infrastructure** – The composite hardware, software, network, facilities, and services required for the existence, operation, and management of a large-scale IT environment.

**JGAMS** – A workflow system that handles the processing of sponsored research proposals and awards for the Office of Grants and Contracts. It enhances the functionality of the SmartGrant system (formerly called GAMS), where proposals are entered by faculty members and through which they are submitted to funding agencies electronically.

**JOL** – An online reporting system where current and historic information about sponsored research proposals and awards can be queried. Access requires a UMass Amherst NetID.

**Kuali** – An open-source suite of administrative software built specifically for higher education to streamline processes and significantly reduce costs for research, finance, student administration, and business continuity.

**Maker space** – Any area where people gather to make and create by sharing tools, skills, and ideas (e.g., The Digital Media Lab at the UMass Amherst W. E. B. DuBois Library is a maker space for the campus community, providing sound rooms, green screens, audio visual equipment, and more).

**MGHPCC (Massachusetts Green High Performance Computing Center)** – Provides state of the art infrastructure for computationally intensive research that is indispensable in the increasingly sensor and data-rich environments of modern science and engineering. Computers at the MGHPCC run millions of virtual experiments every month, supporting thousands of researchers in Massachusetts and around the world.

**OWL (Online Web-based Learning)** – An electronic learning environment developed at UMass Amherst that provides both automatically-graded study questions and interactive modules.

**Procurement** – The series of activities and procedures necessary to acquire products and services.

**Risk management** – The forecasting and evaluation of risks together with the identification of procedures to avoid or minimize their impact.

**RSS (Rich Site Summary) feed** – A format for delivering regularly changing web content. Many news-related sites, and other online publishers syndicate their content as an RSS feed.

**SRTI (Student Response to Instruction)** – A UMass Amherst designed instrument that
provides faculty members with useful feedback on students’ experiences in the classroom. SRTI focuses on aspects of teaching that are highly related to student learning and satisfaction and are appropriate for the wide variety of instructional styles and courses taught at UMass Amherst. For more information, see: www.umass.edu/oapa/srti

Student-centered learning – A method of teaching that focuses on the student experience by providing students with better personalized tools to reflect and guide their learning, and helping students better connect with the right people to help them create and sustain a productive learning environment.

TBL (Team-Based Learning) – The use of learning teams to enhance student engagement and the quality of student learning. The main purpose of TBL is to change the classroom experience from acquiring course content and concepts in a lecture-based format to applying course content and concepts in a team format.

TEFD (Institute for Teaching Excellence & Faculty Development) – Supports the professional development of UMass Amherst faculty across all career stages and disciplines with a wide range of programs and resources focused on teaching, mentoring, scholarly writing, tenure preparation, leadership, and work/life balance. For more information, see: www.umass.edu/tefd

UMassNet – A statewide high capacity network that provides campus-to-campus and external ISP (Internet service provider) connectivity to the various UMass campuses and to their core service sites.
THANK YOU

UMASS AMHERST COMMUNITY FOR YOUR CONTRIBUTIONS TO THIS PLAN

GO UMASS!