Chapter 3: Strengthening Collaboration Efforts

With roughly 29,000 undergraduate students, 85 majors at the bachelor’s level, 70 at the master’s level, and 50 at the doctoral level, CU-Boulder serves a large and academically diverse student population. Strengthening collaboration efforts on campus is a means of identifying how to best serve this population, as well as faculty and staff, through increased cooperation among a range of divisions and offices on campus. In particular, chapter 3 considers how IT and ITS may best collaborate with University Libraries, University Information Systems, Facilities Management, and Housing and Dining Services. As technology continues to merge seamlessly with all facets of daily campus life, it is essential to identify and capitalize on opportunities for campus services to work together and provide students, faculty, and staff with a rewarding and supportive campus environment. Such efforts not only require attention to present collaborative efforts, but demand consideration of how ITS may collaborate with an array of campus divisions to best serve campus constituencies in the future as well.

Specific recommendations within the reports detail how ITS may: work with campus libraries to maximize effectiveness of information resources and library space, introduce and usher in the Integrated Student Information System (ISIS), liaise with Facilities Management to address energy consumption and heighten user mobility, and in conjunction with Housing and Dining Services, satisfy the major IT needs of students. These recommendations detail plans for enhanced communication between various campus divisions and ITS as well as the development of oversight committees.
3.1 Libraries

**Major Issue:** In the information age, the relationship between libraries and IT is indistinguishable to many. Campus libraries rely on a robust IT infrastructure and campus IT relies on libraries to provide access to a wide variety of electronic content. This committee will consider the various intersections between libraries and IT including provision of a broad range of content as well as services and spaces. The committee will define a strategic vision for future campus collaborations to meet the needs of students, faculty, and staff.

A. Background/Rationale

Across higher education, close relationships between libraries and IT units make possible the provision of one of the most critical and fundamental services on any campus: access to library content by faculty, students, and staff. While most university libraries, including CU-Boulder's, manage much of their own technology internally, including online catalogues, data storage, and the like, partnerships between libraries and central IT units will become increasingly important over the next several years. In understanding needs that neither libraries nor IT can provide separately, campuses will need to address how best to facilitate partnerships between those two units.

Current issues facing CU-Boulder's University Libraries and ITS:
- How to collaborate to ameliorate space crunches, in party by assessing and programming space in concert;
- How to collaborate on middleware solutions to make access to content easier, more secure, and more proactive (e.g., by pushing relevant content based on roles and affiliations);
- How to jointly provide and provide support for use of IT tools to access the Libraries’ resources; and
- Determining respective roles of the Libraries and IT in data curation and management, including infrastructure development, service, and support.

This chapter focuses on three main areas that require joint Libraries-IT work to support the academic mission of the University: spaces, services and support, and infrastructure.

**Accomplishments to Date**

The University Libraries, which runs an internal information technology unit, and ITS have enjoyed a fruitful strategic partnership over the past several years. Monthly meetings at the director and assistant director level have ensured consistent communication about joint projects (e.g., the Norlin Learning Commons, the Alliance for Digital Repositories, iTunes U) and ITS projects with significant Libraries’ impact (e.g., campus Exchange, password requirements). Although communications and relationships at the strategic level are strong, because the number of joint projects will increase during the next few years and because solid communications and relationships at the operational level are only recently formed through cooperative work on the Norlin Commons the continued strengthening of communications and relationships at all levels is imperative.

**Action Plan**

Explicit Assumptions
Spaces
The draft campus master plan makes several recommendations about the Libraries. Recommendation #3 is to “Establish more multi-use areas, commons spaces, interactive connections, and study spaces within libraries.” Goal one under “Client-Centered Focus” of the draft updated Libraries’ Strategic Plan calls for the Libraries to “base collections, services, programs, and policies on best research practices and leading technologies.” Goal two under “Library as Destination” calls for the Libraries to “enhance our physical spaces to support campus teaching, learning, and research and to facilitate both individual and collaborative learning and research.” IT is both a necessary and natural partner in any activities designed to meet these goals. Any joint activities should work in concert with the draft master plan and the Libraries’ Strategic Plan.

Services and Support
The campus must invest in resources to support the training of students and faculty that use jointly provided spaces (e.g., Learning Commons) and services (e.g., iTunes U, streaming services, ADR, etc.), as well as joint communications about those services, with the goal of enabling a culture that supports open access to all University resources.

Infrastructure
To facilitate access to University resources, the campus must facilitate collaborative work in the area of identity management, VPN, storage, and delivery.

Accessibility Issues: All joint services and support must meet minimum 508 guidelines to ensure that all faculty, students, and staff have access to University Libraries resources.

Sustainability Issues: The creation of new, jointly designed learning spaces will need to be guided by sustainability goals that limit the power and resources needed for desktops, laptops, and other technologies.

D. Specific Recommendations

Spaces
- The Libraries and IT should partner appropriately on the Norlin Renaissance plan.
- We should use space efficiently, taking every opportunity to look at available space and use it wisely. This should factor into any upgrades/remodels affecting current facilities in Norlin and the branches.
- The Libraries and IT have a shared interest in a robust infrastructure (e.g., networking, Libraries’ IT, IdM, Lab Management, etc.) that enables us to manage space wisely.
- We need to understand how both undergraduate and graduate students use and want to use space and align our categorization of spaces with those needs. This is especially critical as open lab environments are converted to other purposes. Although students still need access to specialized applications, space for labs is shrinking. With the main campus fully built-out, student voices may not be adequately represented in the discussions around this issue. One possible tool is to survey students about their needs and thoroughly analyze any data we have about use of IT resources and use of spaces within the Libraries. Again, goals under client-centered focus and the library as destination are relevant to this discussion.
- We need to understand how faculty and other patrons use and want to use space and technology resources and align our space planning with those needs.
Since the Main Campus is at capacity, it seems natural to assume that East Campus will take on a larger role in the life of the Boulder Campus. How this will play out remains unclear. A case in point: while a small space in the biotechnology building currently under construction has been designated as a drop-in spot for consultation with the Libraries and/or IT, how staff use this space has not been worked out.

As the campus moves forward with the East Campus, the Libraries and IT need to understand both the short and long-term directions and plan accordingly. The Libraries and IT should have ongoing conversations on this issue.

**Services and Support**

- Many IT-related projects that are pending must be concluded, including iTunes U (public and private instances) and the Alliance Digital Repository (ADR). There is a need for improved communication between the Libraries and ITS on large projects such as these. This could include a central point of contact that could communicate updates, take ownership of the project, and ensure that the project is moving along at an appropriate speed.
- We must actively assess user needs and expectations, as well as changing patterns of scholarly communication (what is the target of this research?) in order to continually improve library services. Methods might include observations, interviews, and focus groups targeting students and/or faculty.
- Continued research on other institutions
- Observations, interviews, and focus groups targeting students and/or faculty
- Faculty and students need to be more informed of copyright and fair use policies, as well as open access and scholarly communications and dissemination. Find, create, and implement easy and effective ways to push information about these and other library resources out to faculty and students.
- The Libraries’ website and its relationship to CU’s website requires continuous improvement, including the addition of video tutorials to help users understand what the Libraries have to offer, and how to use library resources. The Libraries’ website and all interfaces also need to be compatible with mobile devices, most importantly the search tool.

**Infrastructure**

- One card for photocopying, printing, and scanning that can be replenished using credit cards (one for CU affiliates, one for non-CU users).
- Host a conversation about the future of reserves.
- Consider one-stop shopping, single sign-on for course-specific content, and collaboration around that content, e.g.: ** A portal at which students can get their course-specific Library reserve information. See [http://www.lib.rochester.edu/index.cfm?page=courses](http://www.lib.rochester.edu/index.cfm?page=courses)
- A way for students to access course-specific reserve information from within CULearn courses.
- Online group data and document collaboration for students
- Long-term access to institutional assets (retirees, graduates, etc.)
- Advanced Videoconferencing Technologies/electronic collaborative environments, such as Access Grid, to facilitate at-a-distance collaboration that is as easy as picking up the phone ([http://www.accessgrid.org](http://www.accessgrid.org))
- Discipline-specific portals of information made available to students, based on their major, coursework, or by choosing areas/keywords; tailored “My Libraries” function in CUConnect or CULearn.
• The Libraries and ITS need to collaborate on future faculty and student research on technology, such as hyper-text media, archaeological media, gaming, etc.
• Content management system to maintain and enhance the Libraries' web presence
• Campus-wide support for research-related productivity tools, e.g. bibliographic management software.
• User education or training integrating both ITS-supplied and Libraries-supplied tools to enhance student learning

Long & Short-Term Objectives/Timeline

Short Term: Libraries and IT to continue collaborations on issues with pressing deadlines such as iTunes U replacement, campus audio/video streaming services, and the ADR (or other) digital repository platform. Now through Fall 2011.

Long Term: Build on established collaborations by enhancing services to include features such as single-sign-on or dynamically including information about library resources into courses in the new learning management system platform. Design and build future phases of the Norlin Renaissance Plan as well as work together on other campus facilities projects where the library and IT intersect. Fall 2011 onward.

• Development of a performance and usage metrics program to monitor and evaluate existing and proposed library and IT integrated services.
• Review of other related ITSP initiatives, including “Offering Teaching and Learning Tools”, “Providing Teaching and Learning Spaces”, “Developing Rich Collaboration Tools”, and “Improving the IT Service Model,” which have varying levels of overlap and common objectives and potential shared resource pools. This will allow for integration and coordination of plans and objectives.

Possible Risk

It is possible that future campus funding levels could compromise our ability to complete these projects in a timely fashion.

Resource Allocation

As appropriate, the Libraries and ITS should collaborate on seeking funding for ongoing and special projects from Academic Affairs and Campus Administration.

Responsible Parties

The Dean of Libraries along with the associate deans and the Associate Vice Chancellor for Information Technology and Chief Information Officer along with the assistant directors are responsible for delegating sections of this plan.
3.2 ISIS Integration

Major Issue: The introduction of the Integrated Student Information System (ISIS) suite of tools and supporting technologies represents a significant disruptive technology event that replaces aging systems, provides modern technologies and data structures, provides additional enterprise tools, and represents an opportunity to greatly improve the administrative services required to support university students. This change and the opportunities it provides come at a time of deep resource limitation felt at a state and national level. The challenge for this strategic planning cycle is to recognize and identify priority investments that create an agile, participative data application environment supporting key student services, while enhancing students’ educational experience and enabling campus objectives amidst the turmoil of change and economic constraint.

A. Background/Rationale

ISIS is the emerging Integrated Student Information System for the university. It includes Oracle Peoplesoft’s Campus Solutions, Constituent Relationship Management (CRM system), Master Data Management, the enterprise portal for services, and a new student data warehouse and related enterprise class data reporting system. It also includes an integrated document management system, a degree audit system, and underlying software systems for integration and workflow. This system represents a transition to Oracle enterprise products for human resource, accounting, and student information purposes.

ISIS is managed by University Information Systems for all campuses and academic units of the university. The ISIS systems are the culmination of a large, multi-year project to replace the legacy Student Information System that served the campus for more than two decades. The admissions modules of ISIS went live in the Fall 2009, with full implementation scheduled through 2010.

On the Boulder campus, there are at least 50 campus application systems and likely many more that extract data from or feed data to ISIS. These systems vary in size and complexity. Examples include learning management systems, Library catalog and resource systems, Housing and Buff OneCard systems, Parking Management, International Education systems for study abroad students and international students on campus, Student Advising in Arts & Sciences, several interfaces to federal systems to meet federal reporting requirements, and many more in academic and administrative units. These systems are supported by Computer Support Representatives (CSR’s) who are departmental personnel and departmental IT system managers. These departmental systems help departments meet their mission responsibilities using traditional extract and load technologies that are not often secure or timely. ISIS presents opportunities to improve and modernize the integration of campus systems.

In the next two years, the university will face extraordinary budget pressure to both be more efficient and to look for revenue other than from State appropriations. This implies that improved business processes and increasing staff efficiency are important contributors to improved student services. Faculty, and other important constituents of the university including parents, alumni, high school counselors, international education, 3rd party counselors, potential transfer students, are also impacted. The university will find itself in an even more competitive environment for recruiting the kinds of students needed to meet its mission and goals. The university will also have to adapt and fine-tune student processes and data assets that have been in place for many years.
The Campus Flagship 2030 strategic plan has a number of academic and business drivers that ISIS must meet along with the integration of campus systems. A few highlights are given here that are pertinent to ISIS and ISIS integration:

- Increase uniformity in administrative processes among campus units where efficiencies can be gained or services improved
- Increase graduate student recruiting and retention
- Support new kinds of graduate level master and certificate programs
- Support students at distant, or enrolled in other, collaborating universities
- Increase international student recruiting, retention, and study abroad opportunities
- Enhance revenue
- Increase efficiencies of staff, their access to, and use of, computing technologies
- Support new kinds of educational programs and offerings through new, innovative housing models

A. Explicit Assumptions

1. The campus will largely react to changes introduced by the ISIS project for the next year or two. Strategic execution and thinking will be limited as the campus develops new processes and learns to effectively utilize ISIS tools. Much of the tactical deployment of strategic objectives is thus more likely to be seen in years 3 and 4 of this planning cycle.
2. The university has invested in and will rely heavily on Oracle PeopleSoft to provide rich features and services that enable university priorities and direction.
3. The university will stay current with Oracle’s changing technology and upgrades. This maintains a viable system but requires appropriate levels of staffing and attention.
4. The university will adopt business and IT practices that support the efficient application of software upgrades, patches, and releases. This includes adapting business process and staff training to conform to vendor distribution cycles and an investment in software testing and quality assurance processes to manage the impact of software change.
5. The university will continue the central tenet of the ISIS project to minimize customizations to the systems. Minimizing customizations maximizes the integration contribution of the system and accommodates frequent upgrade cycles. This does not preclude supportive extensions, but suggests a strong value proposition is necessary and that process modification is an equally viable consideration.
6. The university will continue to make an investment sending staff to the Higher Education User Group for PeopleSoft products, and other important user associations and events. Active participation by university personnel will influence product improvements that are important to CU and keep key personnel well informed of upcoming changes.
7. New integration methods will allow for a high degree of reuse of data services. The university will use standard, canonical data services, supplied by Oracle, facilitated through “middle-ware”, or developed by the university. “Standard data services” describes common, well-defined collections of data readily available for use by other systems.
8. Departmental systems will conform to the university and Oracle standards for integration and will commonly use Web based, service oriented approaches.
9. In the late 2011 to 2012 timeframe, the university will start to expand use of the ISIS systems, especially CRM for student retention and other strategic areas.
10. The demand for integrated workflow between systems will continue and even increase.
11. Pressure arising from the need for more cost savings will encourage more use of central systems.
12. The need for agile, quick responses to specific needs of departments will continue. The innovative, entrepreneurial nature of departments will continue. Easily accessible technology services, such as cloud computing, will offer opportunities for departments to be innovative service providers.

13. Data and identity protection will continue to be a vital requirement for the university. Management of access to data will continue to be a policy and procedural issue.

14. Effective identity management will continue to be a critical need, driving certain IT initiatives. University-wide identity management is a necessary component for effective ISIS integration. Most services and techniques depend on an accurate and transparent understanding of persons and their relationship to the university and/or campus.

15. IT Governance (decision making) will mature and support the need for cross-department coordination of IT development and support. IT Governance will provide a forum to make optimal decisions related to acquisition or development of departmental systems. IT Governance will improve service relations between departments and central IT units.

B. Specific Recommendations:

1. Pursue Technology Initiatives To Achieve Effective ISIS Utilization and Resource Efficiencies
   A. Maximize value from the investment in the ISIS Project. Take advantage of ISIS integration and the investments made in ISIS to meet campus business needs. Examples to consider include:
      1) Expand the use of the CRM system from student recruiting to student retention.
      2) Use the CRM system for other business needs that require better communication, service, and follow through with constituent groups.
      3) Utilize the new document management system more broadly.
      4) Develop the workflow software and integration software for campus and departmental business needs.
   B. Implement automated workflow with the capabilities of the new workflow software and related products.
   C. Provide for “real-time” and event-driven services.
   D. Invest in skills and cooperative development models to foster effective use of ISIS technologies and data in central and departmental technology organizations. Develop business process analysis, modeling, and design competencies.
   E. Encourage the development of additional features and services to meet business needs. Define, publish, and support development architecture and effective life-cycle management for ISIS technologies.

2. Make Meaningful Data Available Through Data Services Standards and Approaches
   A. Move toward developing a set of standard web and data services that combine data from ISIS and other source data systems.
   B. Produce data models and information architecture to support integration efforts
   C. Participate in a robust identity management methodology and master data practices to provide reliable, up-to-date, accurate records of persons and their relationship to the University. This is an essential enabler for many ISIS technology objectives and an integrated systems environment.
   D. Minimize duplication of effort and provide uniform data accessibility while providing abstraction from the component technologies and their dynamic changes by utilizing Web Services approaches and standards. Standard services can reduce interface
duplication, promote consistent and predictable integration, and provide a stable buffer between campus systems and ISIS change cycles.

E. Advance privacy and protection of data while pursuing these data initiatives

3. Establish Service and Governance Initiatives To Provide Direction, Clarity, and Opportunity

1. Consider and investigate opportunities to replace campus systems (such as fsaAtlas or Apply Yourself) where ISIS provides sufficiently similar functionality. Utilizing ISIS functionality provides cleaner integration, eliminates redundant license fees, and reduces data duplication and exchange.

2. Establish clear decision making forums and utilize the new IT governance processes to help manage and clarify priorities while directing funding towards optimal campus investments.
   1) Create an approach for defining and developing optimal web services and data services. This includes a governance process that supports co-development and an “architecture of participation” that enables solutions and defines responsibilities and expectations for all providers.
   2) As part of IT governance, create a data governance process to support better utilization of all ISIS related data assets.

3. Develop a service model that encourages co-development of new services that takes advantage of the distinctive capabilities of personnel from UIS, ITS, and campus departments.
   1) Improve information, documentation, and training for campus department IT staff.
   2) Clarify responsibilities so that campus departments can easily identify contextual contacts for ISIS information.
   3) Provide an “application manager” for each of the major application areas of ISIS. This person will have in-depth knowledge of the application and can help departments determine the best way to use the application to meet business needs or integrate with the departmental system.
   4) Provide additional campus contextual documentation and training for the ISIS system.
   5) Keep departments informed of upcoming changes in the new software releases for ISIS.
   6) Establish a registry or catalogue of services and departmental applications with ISIS interfaces or integration. Encourage departments to select existing university or campus solutions before purchasing potentially redundant application systems. This will help identify existing integrations and interfaces, minimize duplication of effort and data, and promote effective service deployment.
   7) Develop a process that allows departments and providers to develop enterprise quality business solutions that can be used by other departments and organizations and become part of the campus portfolio of services.
   8) Establish a structured communication process between departments, ITS, and UIS.
   9) Encourage cooperative and positive collaboration to meet departmental needs.
   10) Adapt service delivery environments to a rapidly changing, dynamic social technology expectation
   11) Increase service windows and support for international services (language, cultural, legal environment considerations)

4. Encourage primary reliance on university wide reporting tools and the data warehouse for data reporting purposes.
1) Develop supportive training and utilize key providers (such as Registrar services and Institutional Research offices) when possible to eliminate redundancy, provide expertise and consistency, and assure a level of data integrity.

2) Support methodologies to integrate and make campus or departmental data sources more widely available through these tools.

C. Short/Long-term Objectives

1. The university must strengthen the initiation and development of relationships with prospective students, enrolled students, and graduating students as well as family members, alumni, and community members. Effective, positive relationships between the university’s wide ranging constituents and administrative services will help meet recruiting goals, improve retention, and improve the overall experience of students. ISIS systems will help the university meet these goals, particularly by extending the use of integrated elements such as the CRM system and data warehouse. Real-time integration between ISIS and campus systems improves service and information quality.

2. The way the university uses technology for communicating and interacting with students must be flexible and must be extensible to take into account ever changing communication technologies. The newer generation of students will be much more agile with how they use communication. Their expectations will be higher that the university can match the way that they communicate with their peers and others. This can be said in another way – the university must offer multiple channels of communication so that we can ask students “how do you want to communicate with us”; not tell students you must use these channels.

3. The university needs a much better way to support all students in a responsive and efficient manner, such as students experiencing academic or personal difficulties (students of concern) and for a multitude of student retention goals. Identifying and supporting such students requires a comprehensive view of student information, including academic performance, administrative support, and extra-curricular activities. To support objectives of organizations such as the Division of Student Affairs to facilitate immediate assistance without excessive “assistance shopping”, heavy reliance on strong integration and comprehensive information availability is necessary. “No wrong door” processes are better supported by technology (such as the ISIS CRM functionality) when the processes and data are supported through standardized, integrated methods.

4. Improve the integration of campus-based systems with ISIS. Reduce the cost of maintaining interfaces while improving the integration with more real-time data and event driven processing, improving data integrity, and reducing security risk.

5. Develop a useful and well understood IT architecture for integration. This architecture can provide a small collection of standard data services that are well documented, and that can be used by departments to develop additional, innovative services to support specific business needs. The use of defined methods and processes will take better advantage of distributed campus IT skills and will assist in developing the IT community into a self-sustaining and robust set of expertise. University IT organizations, with product support from Oracle, can define an enabling IT architecture for building innovative extensions to ISIS. Architecturally compliant solutions can in turn become university-wide solutions, not merely local point-solutions.
6. Comprehend and pursue an understanding of the impact of increased internationalization on data and services. Expanded support windows, additional customer concerns (agents, cultures, regulatory environments, language barriers), and increased clarity in communications are necessary across all integrated services.

D. Possible Risk

Technology Risks:
- The campus may not invest sufficiently in staff, support, and procedural considerations to utilize the ISIS tools effectively or efficiently. Campus training, support, and procedural guidance may lag behind the massive technological innovation ISIS represents.
- There is a high dependency on a single market provider (Oracle) for the majority of university enterprise data and administrative systems. Change processes, disruptive events for the provider, and variation in planning horizons could impact university priorities and services.
- Technological viability is increasingly short as innovation, integration, scale, and complexity of data systems are likewise rapidly increasing. These forces will likely create difficult choices due to economic and resource limitations.
- New event and request driven integration may pose immediate security and privacy concerns.

Strategic Risks:
- Increasing internationalization introduces new procedural and technical strains on student data processes. Service and support windows must increase to support Flagship 2030 goals, greatly impacting the support costs and availability costs for providing data. Legal and jurisdictional issues increase external mandates and demands on data, as do cultural and communication barriers. These factors impact support requirements and costs at a time of massive technology change and poor economic condition.
- Adaptation to technological change requires investment in employee and customer development. In recent years, campus and university staff have found increasing development and training requirements challenging and intrusive to their core activities. Conflict in this area may produce less effective application of ISIS tools towards campus priorities. This is both an environmental and Flagship 2030 strategic risk.

Resource Risks:
- Resource constraints are tight given national economic and state funding externalities. An increasing dependency on technology and increased service window will be challenging in the current economic environment.
- The complexity of the new highly integrated systems creates a skills barrier for participation. The flexibility presented will demand skilled resources many individual departments do not currently have and cannot afford to pursue without reallocation of existing resources.

Environmental Risks:
- Organizational, process, and workflow design may not adapt as quickly as technology change requires, reducing effectiveness of the technological investment.
- The intense focus brought to the ISIS implementation and enterprise development environment may be difficult to maintain during the years immediately following initial implementation. This could interfere with opportunities to put tools with limited or targeted scope in ISIS (such as CRM and Document Imaging Tools) into more pervasive use as recommended.
5. Resource Allocation

1. No additional enterprise level technology investments of a significant nature currently appear necessary to achieve the stated recommendations and objectives of this report.
2. Much of the additional cost of ISIS integration comes in the development of services, standards, methods, training, and procedure. The actual allocation for this may be possible in large part to a “reallocation” of departmental resources that are freed up due to ISIS capabilities. Otherwise achieving the service windows needed and the process integration implied represents a significant investment in skilled human resources. Implications include the following considerations:
   a. Accommodating a shift in service away from simple departmental tools to enterprise architectural approaches represents a reallocation priority. New and robust technology will require new investments and constrain out-of-date and less serviceable approaches. Funding and skills allocation challenges follow.
   b. Smaller departments and more isolated organizations with integration needs may require representative technical services more than in the past due to the integration and additional complexity of the new system and its underlying data structures.
   c. Target service windows are multiplicative, not additive, to service resource requirements. Support that could be managed by one or two persons will require as many as five or more skilled support staff as service windows increasingly approach 24 hour, 7 day requirements.
3. Development and integration technologies will require shared resources with high availability or additional investment by those organizations that choose to pursue their own integrations. The development environment, tools, and techniques are markedly different than in the previous data environment. This may represent a cost burden such organizations are unaccustomed or unprepared to accept.
4. The recommendations of this report cannot provide the intended efficiencies or effective processes without due investment in process, roles, and skills. Technology alone is insufficient to create efficiency or effective solutions.

6. Responsible Parties

- ISIS vendors, Oracle, other business partners
- Shared data repository custodians at the department level
- Central system-wide IT, UIS
- Campus-wide IT providers and service organizations (ITS)
- Owner, Stewards, Custodians, and end-user consumers
- Business line or functional process parties impacted by, dependent on, or providing to ISIS

7. Evaluation

How will we know that we are successful?

- Campus departments have a well defined process for requesting and receiving ISIS support and services.
- Computer Support Representatives (CSRs) express satisfaction in being well informed about ISIS and changes to ISIS.
Innovative development of new services still occurs but using a well-conceived architecture for extending the services of ISIS. Services can be built relatively quickly using standard data services approaches.

UIS supports a small number of standard services instead of many custom services that are expensive to maintain and support.

The campus has adopted a common, comprehensive relationship management approach. This approach supports a system for collecting and monitoring student activities, and provides much better communication and follow-through with students.

Campus departments will have access to an up-to-date registry (catalog) of services and applications. Decisions to acquire new third-party systems are based on a careful evaluation of available CU services prior to new acquisitions.

The Registrar will have an up-to-date inventory of all systems on campus that contain student data.

The protection and privacy of student data continues to be a top-level priority and is well understood by all departments. Policies will be clear, up-to-date, and followed.

The university is using a common, comprehensive identity management system to support security policies and procedures, as well as providing a common, trustworthy source of data for personal identity and affiliations.

Departmental systems that were built for data reporting purposes will be reduced and replaced by effective use of the new university-wide data reporting tools and data warehouse.

The Registrar’s office (and other central IT units, including Institutional Research) provides a standard set of queries and reports that provide a high degree of reliable and accurate student and trend data.

The central data warehouse architecture meets greater than 90% of all campus reporting needs.

Campus recruiting goals are achieved utilizing ISIS data systems.

Retention processes are defined and ISIS data will demonstrate measurable positive achievement of retention goals.

Services or service prototypes exist supporting the latest social computing or technology devices.

“Student of Concern” processes depend heavily on ISIS data and integration services.

Total cost of data access for departments is measurably less due to ISIS data services.

The defined integration architecture is also the architecture of choice for campus developers.

Upgrade schedules, testing requirements, quality and training standards for the development of ISIS integrations are defined and available to all potential providers.
3.3 Partnering with Facilities Management: Construction & Sustainability

Major Issues: As the use of technology in higher education continues to mature, proper infrastructure planning, development and management becomes increasingly critical to delivering the quality experience that our students, faculty and staff expect. User mobility, expanding use of video, cloud computing, growth in research computing and physical development of the campus represent a number of factors that drive the need for IT planning. In addition, procurement, use and management of technology on campus have a significant impact on sustainability, from energy consumption to electronics end-of-life management issues.

A. Background/Rationale

The Boulder campus is undergoing unprecedented growth in facilities, as evidenced by the number and size of projects that are under construction or being planned (e.g. as of March 31, 2010, construction is underway on the 302,318 square foot Center for Community; a 127,724 square foot, 500-bed residence hall at Williams Village; a 281,800 square foot Systems Biotechnology facility in the Research Park; and a 50,565 square foot facility to consolidate the Institute for Behavioral Sciences in Grand View). Additionally, final planning for a high performance computing facility is underway on East campus. Beyond these large projects, there continue to be hundreds of small renovation projects underway. Although these projects vary from renovating a lab for a new professor to constructing a world-class bioscience research center to providing housing for students, there is a common thread that runs throughout virtually all of these projects – the need for information technology.

The Colorado Commission on Higher Education requires that a Facilities Master Plan be developed and approved every ten years to provide a roadmap for physical development of the campus. The current Master Plan was approved in 2001, and it is currently in the process of being updated. Although the Facilities Master Plan provides a roadmap for developing the physical campus environment, it does not specifically address the infrastructure that must be provided to accommodate demand for IT services and telephony.

As our reliance on technology increases and it becomes more ubiquitous, expectations of students, faculty and staff will undoubtedly continue to increase. Our students and workforce are becoming increasingly mobile and expect to be able to access applications and data from virtually anywhere, placing new demands on wireless infrastructure. Shifts in application architecture are occurring, such as cloud computing; demand for video applications is growing in academic and administrative settings, placing an increased burden on the network backbone; and extended building hours and an increasing need to electronically schedule and control labs and meeting spaces are requiring improved tools for managing and monitoring access to space. These are just a small number of trends that are currently impacting technology infrastructure, facilities and service delivery.

The campus does not have comprehensive standards or guidelines that outline the space allowances that should be provided in order to accommodate computing labs, servers and other technology-based infrastructure. As technology continues to evolve and the campus grows, space allocated to IT programs and the sustainability impacts will become increasingly important.
Significant space is used to house servers or data centers. Rough estimates suggest that the campus has at least 40 data centers and many other spaces where servers are housed. The campus recently articulated its objective to transition to a more centralized data-center approach for managing significant technology-related resources. Based on information from the Facilities Master Plan, along with more detailed IT-related programmatic information, the campus has an opportunity to adopt a phased or modular approach for data center development and expansion, optimizing the campus’ capital investment and cost of operations.

A significant amount of space is also used to house computing labs. With mobile computing devices widespread, opportunities may exist to improve the utilization of lab space by reducing the number of desktops and increasing the amount of space that supports students with their own laptops with available power data access. Demand for lab space continues to be high in areas that require large or specialized applications, such as Engineering, Environmental Design and Business. Virtualization technologies and cloud computing options may influence this demand in the coming years.

Data center consolidation has the potential to not only improve the efficient use of space, but it also provides a significant opportunity to reduce energy consumption. Data centers are known to be energy hogs, with approximately 40 percent of the cost of operations directly related to energy. Accordingly, they serve a key role in addressing the campus’ sustainability and carbon neutrality goals. Consolidation would result in the elimination of specialized cooling units that are oftentimes inefficient and take advantage of large-scale, high-efficiency equipment and modern space and HVAC design that capitalizes on the heat generated by the equipment as a heating source for other parts of the building or even separate buildings. It would also enable the campus to expand the use of virtualization technologies, which more efficiently utilizes hardware capacity, reducing the number of servers and energy consumption.

The volume of electronics equipment purchased by the university presents challenges. The campus has a well-recognized electronics-recycling program to ensure an environmentally appropriate outcome for the surplus equipment; however, some IT staff on campus have expressed an interest in being able to exchange equipment directly with other departments prior to officially declaring a piece of equipment surplus. This practice has the potential to extend the life of some equipment, reducing surplus volume and saving the university money. In addition, there is currently very little involvement of vendors in reclaiming their electronics equipment at end-of-life. Opportunities may exist to leverage our purchasing volume to require support on the part of the vendor for addressing recycling or reuse of electronics.

B. Accomplishments to Date

- Facilities Management recently partnered with ITS to successfully renovate the Marine Street Computing Center. As a result of the project, energy consumption has been reduced, the space is more functional, additional capacity has been obtained and building occupants are more comfortable.

- Facilities Management and ITS continue to work on plans to finalize development of a high performance computing center at the CINC facility as well as other potential options for developing a centralized data center for campus research and administrative computing.

- ITS is running a pilot of virtualization desktop infrastructure with thin clients with a vendor partner. The outcome will be an assessment of the benefits of VDI technology, and any cost or other beneficial savings it may provide to the campus.
A baseline has been developed detailing current energy use by computer model and lab that is potentially applicable to departments across campus.

Action Plan

A. Explicit Assumptions

These recommendations assume that the campus continues to support the data center consolidation concept. They also assume that campus sustainability programs remain a high priority. Many of the recommendations outlined in this chapter are intended to support the President’s Climate Commitment and the Governor’s Executive Order Greening State Government.

B. Specific Recommendations

1. Develop an IT infrastructure master plan that would help ensure that core infrastructure, such as the network backbone, telephony capabilities, wireless infrastructure, space, etc., are sufficient to accommodate the demands anticipated in the Facilities Master Plan as well as ongoing changes in the use and management of technology. Additionally, in order to ensure that the Facilities Master Plan serves as an effective baseline, make sure that strong IT representation is achieved in developing the Facilities Master Plan.

2. To successfully meet campus demands for services, Facilities Management and ITS must collaborate to improve the understanding of the impact that changes in IT modality and trends have on facilities. This understanding, combined with a clearly articulated campus IT strategy, will facilitate development of effective standards and guidelines that result in facilities and other infrastructure that will accommodate the campus’ needs today and in the future. In order to accomplish this, campus governance should designate roles and responsibilities in Facilities Management and ITS to develop, communicate and enforce standards and guidelines as well as collaborate in regard to program planning and building design. Increased collaboration will help ensure proper consideration and accommodation for communications infrastructure, power, cooling, physical security and space. In addition, IT participation on the Boulder Campus Planning Commission may also be considered in order to heighten awareness of IT issues on the Commission.

3. IT facilities and infrastructure should adhere to the vision and associated standards for campus IT. All standards, whether they define space allowances or specific technologies, should be consistently applied regardless of who manages the resources. For example, classroom IT equipment standards that are applied to centrally scheduled classrooms are not consistently followed for departmentally-controlled and funded classrooms, causing some support issues for ITS. In addition, incentives should be developed to encourage significant change, such as data center consolidation.

4. Define and inventory data centers, and implement a program for an energy conservation/sustainability review of all existing facilities in collaboration with data center owners, ITS and Facilities Management.

5. Enhance the annual review program for computer labs to validate whether the labs meet programmatic needs based on the changing mobility requirements of students, options for
delivering specialized or complex applications (e.g. virtualization or thin-client technologies), among other factors. In addition validate that sound sustainability practices are being followed in the management of lab equipment.

6. To support end-of-life management of electronics, investigate development of an intra-campus online exchange, whereby staff from across campus could post surplus items for direct transfer to other departments prior to declaring the equipment surplus.

7. Work closely with the Procurement Service Center in conjunction with their strategic sourcing efforts to place responsibility for reuse or recycling of electronics on vendors, when possible.

8. Increase coordination among ITS, Facilities Management and other campus IT organizations regarding infrastructure related to backup power to reduce duplication of efforts and costs.

C. Long & Short Term Objectives/Timeline

Short-Term:

1. Develop IT Infrastructure Strategic Plan to support the campus Facilities Master Plan; (2) designation of roles and responsibilities in Facilities Management and ITS by campus governance to increase understanding and collaboration on issues impacting facilities; (3) develop standards that articulate the campus’ vision for management of technology; (4) review and update lab oversight process to ensure effectiveness and include sustainability; (5) enhance electronics end-of-life management; (6) survey, identify and begin sustainability audits of data centers; (7) begin uniform and consistent enforcement of standards; (8) and, improve coordination of backup-up power infrastructure management.

Long-Term:

2. Reduction of energy consumption through consolidation or efficiency improvements of data centers; (2) evolve standards, balancing changing needs and technology with long-term sustainability.

D. Possible Risks

The recommendations outlined in section B present a number of risks. In general, however, they can be categorized as business risks as opposed to technology or security risks. In other words, failure to successfully execute the recommendations could result in an inability to deliver the quality or range of services desired by the campus community.

Adoption of new standards or strict adherence to existing standards could potentially negatively impact the cost of new construction or renovation projects.

E. Resource Allocation

The recommendations outlined above may require the addition of a new planner position in ITS or Facilities Management. If required, the overall cost would likely be in the range of $80,000 to $100,000, including salary and benefits. Although there would be an ongoing, operational
component to the position, at least a portion of the funding could be recovered from project recharge.

Funding is currently available through Xcel Energy rebates as well as Department of Energy and Governor’s Energy Office grants for energy conservation projects. These one-time funding opportunities should be pursued to address deficiencies in existing data centers or development of consolidated centers.

F. Responsible Parties

ITS; Facilities Management; Campus Administration; Procurement Service Center

G. Evaluation

- Review the reduction in number of data centers on campus compared to the baseline.
- Monitor consumption of electricity, steam and chilled water in facilities housing data centers.
- Monitor the volume of electronic equipment that is directly transferred between departments.
- Monitor the volume of electronic equipment that is returned to vendors at the end of equipments’ useful life.
- Adherence to standards or guidelines.
- Successful completion of a campus IT infrastructure master plan.
3.4 Housing and Dining Services

**Major Issues:**
1. How can the relationship between HDS and ITS be enhanced?
2. How might we improve IT involvement in the enhancement/expansion of Residential Colleges (from planning initiatives to implementation)?
3. Major Issue 3: What are the major IT needs or initiatives for HDS and its customers?

**A. Background/Rationale**

HDS and ITS have provided shared critical services to students living in the residence halls most notably for telephony and networking. The desire to increase residential academic programs will increase the joint reliance on an effective relationship between HDS and ITS. Past friction areas point to differing sets of business drivers and principles within the two departments. As such, to enhance the relationship HDS and ITS leadership will identify and communicate a shared set of principles that guide the relationship. Through a shared set of principles both departments will have a shared understanding of business needs and how those align with Campus goals. Based on a shared understanding both departments will jointly seek solutions to meet business needs, jointly seek to make the most effective and efficient use of technology in a financially responsible manner for both departments to meet business needs, and collaborate on new technology.

Campus governance, HDS, and ITS need to be clear and open about funding models and IT costs. For example, there exists a perception that ITS network funding model can not be changed since it was mandated from the CFO whereas HDS sees the network funding model inequitable and out of sync with other institutions. Hence, HDS is asking ITS for an alternative solution that is less costly for both HDS and ITS. The lack of clarity results in the potential for conflict or harm to the relationship. It also results in the potential for conflict or poor decisions. Specific funding issues that must be resolved include the network funding model and educational technology for Residential Academic Programs (RAPs).

As the campus moves forward with Residential Colleges funding, policies and standards will need to be addressed. Questions regarding funding and oversight for RAP classrooms will need to be resolved through campus leadership. Since the same faculty and students will be using academic technology inside and outside of the Residential Colleges, common solutions and processes should be in place. Failing to do so will be both inefficient and confusing to HDS and ITS customers.

ITS and HDS have a jointly vested interest in providing fast and reliable network service to student residents that does not adversely impact academics and research. Additionally, ITS and HDS have a vested interest in providing open and up-to-date information about network performance and service issues.

Students find it difficult to get good reception in some areas of the residence halls and many other residential areas (i.e. Family Housing or Bear Creek Apartments) on campus. Additionally, students would find improved IT support within the residence halls highly desirable.

Residence halls security relies on CCure locks on all external doors. Students need access to their residence hall buildings 24/7. As such, all units supporting card access systems (HDS - Buff OneCard, Housing Facilities Management, and ITS) need to ensure that systems are available. There exists a perception among students that Buff OneCard needs to be made more
durable so that students do not have access issues after hours or have to purchase new cards. However, data indicates that the cards are highly durable and this information needs to be better communicated with the residence hall students. This same need for better communication can be identified for other ITS or HDS services.

Future issues such as smartcard technology have been proposed by RTD and other campus areas and will require analysis and coordination of campus areas involved. There is a need to meet and discuss such possible card changes, costs, and benefits. Additionally, the new ISIS system is requiring changes to interfaces for all systems accessing or uploading SIS data. Such changes will impact all other downstream IT related systems.

Action Plan

A. Explicit Assumptions

Housing and Dining services will be represented in some form as part of the developing governance structure (e.g., as a member of an administrative computing committee)

B. Specific Recommendation

1. Establish a set of core principles to guide the relationship and business decisions, for example:
   - We understand that both organizations have a set of core competencies which are recognized by both organizations
   - Clearly defined business needs will drive business, service and technical decisions
   - IT investments will seek to make the most effective and efficient use of resources throughout the life-cycle of the service
2. HDS and ITS will work to identify administrative computing services or technologies that can be shared or pooled so as to gain efficiencies. An example, is Kronos which while not used by all employees is used by departments to support business needs.
3. The creation of a monthly program or service review meeting with HDS and ITS to discuss challenges related to services to enhance communications. Key issues are, academic technology, smart classrooms, networking, telecom/phone, security, smartcards, ISIS interfaces, digital signage, emergency notification, web development, e-commerce, cell signal strength planning, IT processes and procedures development and establishment of standards and policies. Additionally, a quarterly leadership meeting with the CIO and HDS executive director, and their direct reports, should be established. The purpose of the meetings will be to review tactical and strategic plans as well as challenges and opportunities in the HDS/ITS relationship. Such a meeting could potentially mirror discussions ITS currently has with external partners. Lastly, active participation by HDS in campus IT governance will help to ensure that policies, strategic plans, and business needs are addressed early on.
4. Campus governance, HDS, and ITS need to continue to work collaboratively to develop mutually acceptable funding models that are well understood and transparent.
5. Active participation by HDS in campus IT governance discussed in section 4.1 will help to surface the needs for IT resources (e.g., bandwidth) required by Residential Colleges and student residents. By surfacing such needs, potential IT governance support can be garnered for joint identification and funding solutions that would address what are currently competing interests.
6. It must be recognized that wireless networking is considered a necessary infrastructure component to support residential academic computing. As such new wireless technologies (e.g., 802.11n) can no longer be considered an augmentation to existing wired network service.

7. Cell phone reception needs to improve especially given the increased reliance on cell phones for both personal and emergency communications. A plan needs to be developed to improved this infrastructure with milestones and deadlines.

8. An effort to evaluate the feasibility of replicating the walk-in service center at Norlin Commons in additional locations closer to students (C4C or Williams Village) or courier service for warranty work through the Bookstore.

9. Buff OneCard has an established advisory group whose relationship with broader IT governance should be understood and formalized. Buff OneCard should share processes of their services and interface connections with campus groups. A process needs to be developed for coordination of Buff OneCard systems processes that impact campus departments. For example, should the campus move from magnetic stripe cards to smart cards it would require coordination between HDS, ITS, PDPS, and Facilities Management. Such a process would also address service issues such as network availability requirements for card access systems.

10. HDS and ITS need to formalize the process for identifying new academic technology equipped classrooms, determining funding, and support requirements.

C. Long & Short Term Objectives/Timeline

- Residence Halls network bandwidth service level agreement - 1 to 2 years
- Establish common principles and regular service review meetings - 1 year
- Communicate and share Buff OneCard roadmap - 1 year.
- Develop strategy for cell phone coverage on campus - 1 to 3 years.
- Develop strategy for improved walk-in IT support for personally owned equipment within the residence halls - 1 to 3 years.

D. Possible Risk

E. Resource Allocation

Cost of the project: Recommendations for additional collaboration, such a regular leadership meetings, do not represent additional direct cost to the University. Other items in the recommendation section will need to be evaluated to determine the cost and sources of funding.

F. Responsible Parties

Campus leadership, Campus IT Governance, CIO, HDS Executive Director

G. Evaluation

Potential evaluation criteria include:
- Student satisfaction survey
- Cost savings
- Number of jointly commissioned and completed projects