

Report of the RAB Strategic Plan - Information Technology Support and Infrastructure Working Group

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The Plan for Academic Enrichment: Phase II asks the question “What will ensure that Brown is able to engage in world renowned research and help define new areas of knowledge?” This document then goes on to recommend that if we want to ensure Brown’s continued success and pre-eminence 10 or 15 years from now that we selectively target investments, foster greater collaboration, increase seed funding and provide better support for faculty seeking external funding.

This working group was charged with describing a strategic approach to the technology support needed by faculty in advanced data acquisition, data storage, data management, data integration, data mining, data visualization and other computing and information processing services over the network. This family of technology services has been termed cyberinfrastructure by the National Science Foundation. An adaptive and robust cyberinfrastructure is perceived to be essential not only modern research and scholarship in the natural sciences, but also in many areas of social science, arts and humanities. The following report describes the strategic issues around creating cyberinfrastructure at Brown and proposes a set of approaches to help achieve the PAE goal of ensuring that Brown is able to engage in world renowned research and to help define new areas of knowledge.

This report draws heavily from Jan Hesthaven’s paper, “Cyberinfrastructure in Research and Learning at Brown University: Vision, Status, and Roadmap, 2008” (see attached) and from the Brown IT Strategic Plan (see <https://wiki.brown.edu/confluence/display/itstrategicplan>).

What are the strategic issues?

1. **We need to develop a coordinated set of cyberinfrastructure services and new levels of staff support** to become the university we describe in the PAE. This support is as important to scholarship and research as laboratories and libraries. The hardware and software is not sufficient. Centrally provided staff support of faculty enables the broad utilization of cyberinfrastructure across arts, humanities, social sciences and the natural sciences.
2. **We must conserve precious resources.** Currently, individual researchers or departments must be responsible for arrangements for data centers, storage, data backup, compute resources, systems staffing, database design and special programming to answer research problems. This results in inefficient electrical power use, duplicate and often inadequate staffing and the use of space in very expensive and desirable locations to house machines. A strong set of centrally provided, shared cyberinfrastructure services must be developed in order for our goals to become affordable.

3. **We are falling behind our peers and not realizing the potential of our faculty.** We currently miss opportunities for funding and collaboration, exclude our faculty and students from pursuing entire new areas of exploration and scholarship, and we neglect our duty to expose our students to the tools they must use when they leave Brown. This is especially a problem for junior faculty members in disciplines that traditionally have less available funding. Our inadequate services also make Brown less competitive in retaining faculty recruited by our peers.

How can Brown address these strategic issues?

1. **Establish a center responsible for cyberinfrastructure support for research to in order to provide a home for these services and to focus our efforts.** Establish clear definitions of responsibilities for the center, CIS, the Library, BioMed and departments for the delivery of foundational services. Ensure that the resulting support model has adequate empowerment and sustained funding. Create the appropriate faculty governance oversight to ensure the services delivered by these groups remain useful and adequate for Brown.
2. **Create incentives and policy changes that support collaboration, coordination, sharing and the pooling of resources.** We cannot attain our goals without removing obstacles to the sharing of resources. For most of our faculty, Brown's shared services must save more time and money than other options. An example of this is providing free systems administration to faculty who direct their computational funding into a shared high performance computing resource. We must ensure that our funding models do not create disincentives for faculty participation in shared activities. We must assist faculty during the grant writing process to make it easier for them to request funding that complements Brown's collaborative approach.
3. **Establish and maintain a core set of shared cyberinfrastructure services**
 - a. **Data center facilities** - We must establish adequate space and compelling incentives for faculty to place their equipment into lockable, shared data centers. We cannot continue to create, maintain and upgrade small, expensive, lab-based facilities unless there are compelling reasons to do so.
 - b. **High performance computing** - We must create a foundational computing resource that can be shared by all faculty at Brown.
 - c. **Working storage, digital repository and backup** - Adequate data storage and access services for scholarly activities must be provided. We should strive towards no faculty member being at risk of losing critical work because of lack of storage or inadequate backup services.
 - d. **Staffing** - Hardware and software is a waste without adequate systems administration, storage management, database, and computational assistance staffing.
 - e. **Network** - A reliable and secure internal data network and high speed external network connections are the most fundamental resources needed by our faculty, staff and students.
 - f. **Visualization** - The explosion of data being acquired and generated by faculty requires visualization services to identify, understand and communicate our discoveries.
 - g. **Video conferencing** - We collaborate extensively with our colleagues around the globe. We must ensure that our ability to communicate does not create obstacles for our goals.
 - h. **ID management, data and systems security** - The integrity and security of our work must be preserved. We must be able to safely allow our remote colleagues to view and contribute to our work.

- i. **Monitor our progress** – We must create benchmarks identifying the services provided at our peer institutions to ensure that our foundational resources assist us in retaining Brown faculty and in enabling them to be productive.
4. **Utilize a wide range of funding options** – E&G and BioMed funding will need to be dedicated for some core activities and other funding can be obtained through granting agencies, stimulus funding, collaboration efforts and development opportunities. We should ensure that essential services and replacements have ongoing rather than one time funding.

Where are we now?

We have briefly described the cyberinfrastructure support needed for Brown to become the research and teaching institution of our PAE expectations. Additional details of that vision can be found in Hesthaven's paper on cyberinfrastructure (attached) and in the Brown IT Strategic Plan.

There are a number of activities already in progress that will contribute to the goals we've outlined. A Research Storage Working Group chaired by Cliff Hirschman was charged last year with developing a detailed proposal for addressing our data storage and backup needs and has delivered a draft report.

A data center working group co-chaired by Jan Hesthaven and Terri-Lynn Thayer has been chartered and asked to come up with an assessment and a comprehensive approach to Brown's research and administrative data center needs.

We have been working closely with IBM and the state of Rhode Island to describe the need for a Brown-based Center for Advanced Research that would be able to provide computing support as well as serve as a gathering point for collaborative efforts. A detailed plan for this Center is being developed, several related proposals are pending, and additional funding options are being explored.

CIS has just completed the upgrade of the Brown network backbone to 10GB capacity. This is essential to support the movement of large volumes of data and multimedia used in internal and collaborative efforts. Options for upgrading Brown and OSHEAN's connection speeds to Internet2 and the commodity internet are being investigated.

A Brown Digital Repository pilot has been initiated by the Library with the intent of providing a powerful tool for the storage, retrieval and archiving of all types of digital information.

A new media working group delivered a report on video and multimedia support last fall. A steering group chaired by Nancy Dunbar has been assembled to evaluate the proposal and to set priorities.

Brown has become a member of the InCommon federation to reduce the identity management barriers for faculty, students and staff who need to collaborate between universities (see <http://www.incommonfederation.org>).

What next steps do we propose?

Although we are making good progress on many fronts, we need to put the overall plan in place, formalize our structures and assign oversight. This is especially important in the face of the constraints imposed by the economy and also the opportunities presented by stimulus funds that are being made available.

We need to formalize the creation of a cyberinfrastructure service center and identify a faculty member who can serve as the leader for the development of support services around campus. The center needs to serve as a clearinghouse for cyberinfrastructure opportunities, information and services as well as provide coordination across campus. The faculty leader should have a joint reporting relationship to the Vice President for Research and the Vice President for Computing and Information Services and adequate staffing support.

A regularly meeting research technology steering committee is needed to guide the work of organizations committed to enabling this vision. This group could be a subcommittee of the Research Advisory Board and could regularly update the Computing Advisory Board and others. The membership should be primarily faculty who are knowledgeable about cyberinfrastructure and who have a stake in the success of the services that we will create at Brown.

The leader identified above, working with the steering committee, the Library, CIS and other relevant groups, needs to coordinate the work and proposals prepared by the various working groups and create a short-term and long-term plan for achieving our goals. This plan needs to include the process by which we will fund these endeavors, the staffing needed and the process in the university by which they will be delivered.

To understand our existing resources, we need to identify the full time and part time staff that currently provides cyberinfrastructure support across campus. We should also begin the benchmarking process of gathering peer examples of cyberinfrastructure services.

As noted earlier, the work described in this report is essential for Brown to compete in the future for top-tier faculty and students and to become the university we described in our Plan for Academic Excellence.