

Major Challenges to Communications Network Infrastructure at UCSB

Overview

Over the last two decades the availability of the campus network has risen to the status of an absolute necessity for the conduct of research, education, and campus business functions. However, a number of key elements in guiding the deployment and evolution of communications infrastructure¹ have failed to keep pace with the change in the importance of campus networking:

- 1. Campus communications infrastructure standards are outdated, incomplete, and not consistently accepted and applied.*
- 2. Consensus has not been reached on fundamental guiding principles for communications infrastructure projects to achieve a balance between immediate programmatic space usage and budget and longer term institutional space needs and costs.*
- 3. Communications infrastructure project planning and execution processes are fractured and at times lack key consultative elements and a focus on “the big picture.”*
- 4. Overall communications infrastructure guidance and advocacy is diffuse and lacks sufficient authority to ensure that overall consistency, flexibility, and adherence to standards are maintained.*
- 5. A plan and sustainable funding for network infrastructure renewal has not been achieved.*

These issues raise the overall costs of information technology, diminish the flexibility of campus space and its availability to programs, and impede access to resources necessary for research, education, and business functions.

Challenges

- 1. Lack of current, detailed, broadly accepted communications infrastructure standards.**
 - Industry standards and products continue to evolve, and must constantly be assessed and integrated into the complex and unique environment of our campus.
 - Campus communications infrastructure standards must be sufficiently detailed that they may be incorporated into contracting documents, and yet must be flexible enough to adapt to unique building and program requirements.
 - Developing and maintaining standards is a time-consuming and detailed project. Developing and maintaining these standards is difficult to achieve in an environment which has traditionally depended upon the efforts of committees of technical volunteers and also other staff who must also recharge their time.
 - Fully detailed standards development requires technical expertise and knowledge of the interrelation of the standards with other construction disciplines.
 - Standards development requires an understanding of the longer term Information Technology needs and goals of the campus.
 - There are no professionally accredited² communications infrastructure design professionals on staff at UCSB.
 - Without current standards, the success of each project is dependent upon time-consuming consultation, which often does not take place.
- 2. Consensus has not been reached on fundamental guiding principles for communications infrastructure projects to achieve a balance between immediate programmatic space usage and budget, and longer term institutional space needs and costs.**

¹ For purposes of this document, “Communications Infrastructure” includes network wiring, jacks, distribution panels, wire trays and conduits, building distribution, and communications closets.

² The Bicsi Registered Communications Distribution Designer (RCDD) is the predominant certification in this area.

- Projects are often tailored to immediate occupant needs or programmatic requirements. However, these shorter term objectives are not always balanced with the longer term institutional needs for space usage.
- While it is not expected that every space should be wired for every potential use, two key elements can greatly enhance the overall effectiveness, flexibility and adaptability of the wiring infrastructure, and thus improve the flexibility and adaptability of space.
 - i. Wiring pathways with adequate common capacity should be established and preserved to allow later adaptation of space and increase in capacity without major renovation costs.
 - ii. Adequate and dedicated wiring-closets for network equipment should be established and maintained to ensure both the capacity and security of network equipment.
- Frequently, short-term savings are mandated and achieved at a much higher long-term cost and with impediments to the flexibility and adaptability of spaces. The overall long-term cost impact to campus, although hard to quantify due to multiple funding sources over time, is most certainly significant.

3. Lack of consistency in the process of planning and executing communications infrastructure projects.

- Numerous campus groups (divisions, departments, programs), many which have developed unique sets of “best practices” and preferences, initiate communications infrastructure projects, often resulting in implementations that are not consistent throughout campus.
- There are currently several campus organizations providing infrastructure project services. While the actual infrastructure construction is generally performed by outside vendors, from the *project initiator’s* perspective, the *providers* are Facilities Management, Communications Services, and the Office of Information Technology. Each of these providers also implements projects with their own unique set of “best practices” and philosophies.
- Projects are also initiated as a part of new building construction and renovations. Depending upon the scope and origin of a project, the planning and execution processes and results differ. New building projects, renovations, and minor projects each yield different results.
- Once a project is initiated, the degree of customer consultation varies, resulting in varying effectiveness of the wiring implementation and the overall life-cycle costs.

4. Absence of a single, readily available source of advocacy or authority in supporting the “best interests” of campus Information Technology needs during project planning and execution.

- Project initiators and occupants have varied levels of experience in crafting a project scope that suits both their needs and longer term and broader network objectives.
- Project initiators need support in the planning and implementation phases of their projects to ensure their needs are being met and balanced with longer term needs.
- Communications infrastructure provider organizations have varied levels of knowledge of and involvement in the overall networking objectives of the campus.
- Many of the current support resources which might be available to the project initiators are recharge funded. Thus, these resources are not always utilized to their full benefit.
- During Value Engineering phases, the resources to advocate for the importance and long-term needs of networking are not always involved and thus essential network space and pathways are sacrificed to achieve near-term savings.

5. Lack of a plan and sustainable funding model for infrastructure renewal.

- In the last two decades several major revolutions in network wiring technologies have occurred, and such revolutions can be expected to continue.
- As industry standards and technology evolve, there is a continuing need to upgrade communications infrastructure to support information technology.
- There is currently no plan which establishes guidelines for ongoing campus communications infrastructure renewal.
- There is currently no sustainable funding model for communications infrastructure renewal.

Recommendations

1. **Develop a Communications Infrastructure Master Plan.**

In the same manner in which the campus has developed a master plan for its physical development, the campus should develop a Master Plan which should articulate:

- A shared campus vision for networking infrastructure.
- Core principles in the design and implementation of communications infrastructure.
- Design Standards to guide in the development and application of standards.
- A consistent campus process for the planning, design, review, implementation of communications projects, renewal of network wiring, and currency of standards.

2. **Create an updated Communications Infrastructure Standards document utilizing professional consulting services.**

A comprehensive and detailed standards document is a key element in addressing the communications infrastructure needs of the campus. The in-house development and maintenance of such a detailed document is currently beyond the resources of the campus. The campus should therefore develop and issue an RFP to obtain the professional services of a certificated organization to assist in preparing updated standards. The firm retained should work very closely with campus constituencies to develop standards sufficiently detailed that they can be incorporated into contracting documents, and yet flexible enough to adapt to unique building and program requirements. The developed standards should then be used consistently by all organizations in the implementation of wiring projects.

3. **Create a Campus Communications Infrastructure Design Review Committee.**

The campus has succeeded in achieving building project consistency and an adherence to design principles through the use of the Campus Design Review Committee. In the same manner, the campus should create a Communications Infrastructure Design Review Committee that should:

- Represent the major stakeholders in communications infrastructure projects and the various divisions of the campus.
- Assist the project initiators and occupants in understanding their networking needs and how they fit in to the bigger networking “picture” on campus.
- Review the design for all major communications projects and building projects.
- Not be a substitute for proper planning and good network architecture, but should support those functions.
- Assist in achieving consistency in best-practices across multiple projects and providers.
- Assist in identifying needed communications projects and establishing priorities.
- Arbitrate conflicts in the balance between the needs of the occupant-customers, providers, and the “bigger picture” of networking on campus.
- Provide advocacy for networking needs particularly during the value-engineering stages of a project.
- Be vested with sufficient authority to make strong recommendations during all phases of a project.
- Be supported by a position such as a campus “Network Architect” to provide continuity and focus.

4. **Develop a sustainable network funding model which supports the goals of the Communications Infrastructure Master Plan.**

A critical element in achieving the network vision of the campus will be developing a sustainable funding model which supports the Communications Infrastructure Master Plan.

Networking has become crucial to campus operations, and substantial amounts of money are expended in creating communications infrastructure. And yet, these infrastructure implementations are inconsistent, do not always meet customer expectations, and in some cases require costly modifications almost immediately after implementation and throughout their life-cycle. The combined effect of these four recommendations should significantly improve consistency in communications infrastructure and would better leverage project budgets to achieve overall campus goals.