



CASE STUDY Education

Brandeis University Expects to Save \$2 Million With Network Rightsizing

As a top-notch private university, Brandeis prides itself on delivering outstanding network connectivity wherever faculty, staff, and students live, learn and conduct research. When the time came to build new science and dormitory facilities, architectural and budgetary challenges associated with the planned wired Ethernet network – as well as growing demand for mobile network access - provided the impetus to assess the tradeoffs between wired and wireless LANs. The findings indicated that rightsizing the network edge, using Ethernet only where necessary and Wi-Fi everywhere else, would both save money and deliver better connectivity.

Among the issues that led to this conclusion were design and architectural challenges in the new science center that impacted the Ethernet cabling plan. For one, the specified Category 6 Ethernet cable was thicker than the architect had originally estimated. Given the larger diameter cable, pipe fills quickly exceeded the desired percentages necessitating some design concessions and addition of new risers. It was decided that through a combination of migration of existing and future users to the wireless edge Brandeis' day-two networking needs could overcome this challenge. Other design challenges included reducing the total number of network closets in this five story building to two. This also created new engineering problems because some cables needed to be extended beyond their 100 meter maximum length. Laboratory researchers were also requesting greater flexibility with regard to where they could operate computers, and virtually no amount of cabling or data ports could satisfy their mobility needs.

Different challenges were faced with the new dormitory. While IT's previous policy of "one port per pillow" ensured that every student had network access, cable maintenance proved very costly. Students would frequently move laptops without unplugging the Ethernet cable, causing ports to break and cables to be pulled out of the walls. Hundreds of hours were spent each summer testing and repairing cables and ports in the dormitories.

More challenging yet were the growing number of students who brought wireless laptops to school with the expectation that wireless access would be universally available. Offering both ubiquitous wireless and one "port per pillow" was expensive, especially given the age of Brandeis' edge switches. Switches had not been refreshed in almost five years, and were approaching the end of their service lives. This delay (to extend the life of their old switches) was a strategic decision by Brandeis that anticipated the wireless trend coming. Now, however, they faced a decision. Replacing every switch and almost all of the cabling on campus was expected to cost more than \$4,000,000 – too much given the other demands on the IT Department, and increasingly unnecessary, given students' preference for wireless.

The cost of Ethernet cabling and new switches, combined with the growing demand for mobile connectivity, convinced the Brandeis technologists to investigate a wireless alternative solution. This conclusion was drawn from two studies: the first showed that usage of the first-generation campus wireless LAN was rising fast, the second found that even mid-range Ethernet switches cost several times more than an 802.11n wireless access point yet handled about the same number of concurrent devices. The implications of both studies was to cut the cord, cut the costs...and better serve a user base that had already moved away from wired access.



Requirements:

- Reduce Ethernet costs in new dormitory rooms by 30%
- Overcome distance and pipe-fill issues in the new science building
- Provide high-reliability pervasive Wi-Fi connectivity to better meet needs of students and researchers campus-wide
- Centrally manage the campus wireless network

Solution:

- Aruba 6000 Controller
- Aruba AP 125 802.11n Access Points
- Aruba AP 70 802.11a/b/g Access Points
- Remote Access Point license
- Policy Enforcement Firewall

Benefits:

- Saved hundreds of thousands of dollars in the first year in new construction cost overruns by eliminating ports, cables, switches, risers, and relay closets
- Reduced wired ports in the new dormitory
- Validated the construction of all-wireless dormitories in the future
- Identified potential \$2 million in savings associated with a campus-wide network refresh

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Brandeis decided to rightsize the network edge in the new science building and dormitory by reducing the number of wired ports and pervasively deploying Aruba 802.11n wireless LANs. The result was a 30% reduction in cabling costs in the dormitory, and a 30% reduction in the science building. The Aruba network also addressed the architectural challenges, and saved thousands of dollars, by eliminating the need to create new paths to address distance issues including adding additional risers.



“By shifting a larger portion of users in both buildings from Ethernet ports to wireless LAN, Brandeis was able to reduce up front capital costs, and lower ongoing operating expenses by hundreds of thousands of dollars,” said John W. Turner, Director of Networks & Systems at Brandeis. “Based on these realized savings, Brandeis anticipates we can potentially save more than \$2,000,000 on upgrades to the wiring plant and edge switch infrastructure by rightsizing our entire network as we undergo a campus-wide network refresh.”

Today 95% of users in the new dormitory connect wirelessly via the Aruba 802.11a/b/g/n network. This high level of adoption convinced Brandeis that student data access could be 100% wireless in all future dormitories. Since 802.11n is delivering more than sufficient bandwidth without the expense of upgrading to GigE cabling at the access

layer, Brandeis projects that cabling expenses in future dormitories will drop by 75 - 85% as Ethernet is eliminated from dorms.

Greater reliance on 802.11n also presages lower operating costs: Aruba’s wireless access points consume about 1/18th as much power as closet switches required to support wired access. Taken together with the reduced need for copper and plastic wiring devices – the manufacture and disposal of which are environmentally impactful – the rightsizing program furthers Brandeis’ Campus Sustainability Initiative. Additional details about this environmental and climate change initiative can be found on-line at <http://www.brandeis.edu/campussustainability/>

Aruba connectivity solutions have been part of Brandeis’ remote access programs for years. Remote Access Point (RAP) technology has enabled professors, vice presidents, and IT staff to securely access servers and use Cisco VoIP phones from their homes at a fraction of the cost and complexity of deploying an integrated services router. The VoIP switch is programmed so that both the office and remote VoIP phones ring at the same time, minimizing missed calls when users are working remotely from home. RAP improves the work-life balance, and further reduces the university’s carbon footprint.

“Rightsizing our campus network with Aruba’s gear has allowed Brandeis University to complete projects under budget, deliver the most desired kind of connectivity to our users, and help the environment,” continued Turner. “The case for rightsizing worked in so many ways, we just had to do it.”

Organization Overview:

Brandeis University has more than 7,000 students and staff, and is consistently rated one of the top 30 universities in the United States. Located in Waltham, Massachusetts, 9 miles from Boston, Brandeis occupies more than 100 academic and residential buildings on a 235 acre campus. Brandeis has an active Campus Sustainability Initiative that seeks to reduce the impact of the university on the environment and climate change.

“Network rightsizing based on Aruba’s wireless LAN reduced the access layer costs and complexity in our new buildings, and is projected to save more than \$2 million dollars during the upcoming campus-wide network refresh.”

John W. Turner
Director of Networks & Systems
Brandeis University



WWW.ARUBANETWORKS.COM

1344 Crossman Avenue, Sunnyvale, CA 94089 | Tel. +1 408.227.4500 | Fax. +1 408.227.4550