

Case Study: California State University Benefits From Monitoring Individual Network Port Utilization

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California State University (CSU) has worked very hard to properly size its networks. During network refresh planning activities, anecdotal evidence indicated that network utilization was growing at a fast pace, and that projected funding for future refresh cycles needed to take that into consideration. While doing research to determine the actual pace of network utilization growth, CSU found that the number of wired ports could be reduced by 50%, while maintaining the existing level of service. This Case Study takes a look at the process and the benefits of knowing who is actually using the network.

Key Findings

- Fifty percent of the wired ports, after accounting for future growth and rightsizing the network equipment, were able to be eliminated, because they had not been used in the past six months.
- Operating system upgrades with the new equipment levels were completed in half the time, thus continuing to provide service to the same number of end users.
- CSU was able to complete the wired equipment update and expand its connectivity by two to three times the number of end users by deploying a wireless network. The additional cost of the wireless LAN project was still less than the original projections for upgrading only the wired infrastructure.

Recommendations

- Organizations should continually monitor utilization rates for all ports, including data and PBX. At a minimum, the assumptions associated with the design of their network architecture that are based on port utilization growth trends should be validated annually.
- Ensure that vendors are aligned with your goals, and not pushing a particular technology. Be prepared to address the changing requirements (switching or wireless LAN [WLAN]) of the user community.

WHAT YOU NEED TO KNOW

The need to change the network does not always mean expanding or growing the infrastructure. Understanding the expected user experience and the usage scenarios will allow enterprises to review the requirements versus the existing resources. Knowing which ports on the network are actually being utilized can significantly change the access layer planning and design to meet the needs of end users.

CASE STUDY

Introduction

The CSU system is the nation's largest, with 23 campuses and seven off-campus centers. It services almost 450,000 students, in addition to 48,000 faculty and staff. The campuses extend the entire length of the state, from Humboldt in the north to San Diego in the south.

The Challenge

The problem CSU faced was no different from many enterprises. Anecdotal evidence indicated increased network utilization, as requests for network access often translated to adding more ports. The problem that CSU faced was that the growth could have exceeded the current plan for the wired upgrade that is currently in progress. This had the potential to increase costs significantly, and could have prevented CSU from addressing some of its other refresh plans, which included implementing a wireless network for additional access layer connectivity.

Approach

In order to provide evidence of the increased use and a basis to seek additional funding for expanding the wired network, the CSU began research on the number of ports that were being used regularly on the network. Using a software monitoring application, CSU began a study to document the usage pattern of the network ports on each campus. The initial investigation took three months, and the data collection has become part of a systemwide, semiannual report.

Results

Upon reviewing the data, the following recommendation was developed. Any access layer port that did not see any traffic for more than six months was identified as an "unused" port. Future growth was also important, so as part of the recommendation, CSU created an algorithm to address future needs. Once the total access layer ports in a department were identified as "in use," CSU rounded up to the next available switch model, with a policy of assuring that a minimum of two ports per switch remained

open for future growth. For example, if 14 access layer ports in a department had been used in the past six months, then the departmental switch would be rounded up to the next model – in this case, a 24-port access layer switch with a minimum of two ports available for growth. In this scenario, there would be 10 additional ports available, so the solution also met this criterion.

- Based on this exercise, CSU was able to go from an infrastructure of 235,261 access layer ports to 94,733. More than 50% of the ports installed on the campuses had not been used for six months or longer. Instead of increasing the number of ports, the university was able to provide the same level of wired service, with room for growth, and eliminate more than 140,000 ports.
- In the refresh project, this meant that CSU could eliminate more than 2,000 switches of various configurations that were not being used, and this could equate to more than \$30 million in equipment savings alone.
- This savings did not include any electrical or HVAC savings now that fewer switches were in operation. Additionally, it did not include annual maintenance charges on the equipment that was eliminated, which arguably could account for another \$4 million in savings.
- Operating system upgrades for the updated equipment were completed in half the time, while still providing service to the same number of end users.
- Using the savings from the wired upgrade and still within the original budget, CSU was able to expand its existing WLAN project. Wireless access has ballooned to five to 10 times the previous connectivity now that students, as well as faculty, are able to access the network using laptops.

Critical Success Factors

- CSU had clear goals to document the utilization of the infrastructure.
- CSU leadership analyzed the network utilization data and approved the recommendations for the reduction of equipment, and moved ahead with the WLAN portion of the project that expanded the use of the infrastructure.
- All unused ports were initially turned off. If the port is needed, a request can be made and it will be turned on. CSU has experienced less than a 1% fluctuation in the number of total active ports in the system, although the port locations may have changed.



Lessons Learned

- **Don't automatically believe that additional requests for network access indicate increased utilization rates for ports without performing actual monitoring.** – This approach could cause organizations to end up overprovisioning, as opposed to keeping a central pool of extra ports to meet the end-user requirements.
 - **Always keep an open mind about the results.** – The intent of the original research was to quantify growth to accurately project refresh expenditures required for additional equipment.
- CSU was able to collect and assess the data that allowed for the savings, and that were applied toward the expansion of WLAN coverage in CSU's systemwide infrastructure project, enabling the system to better serve the needs of its students.
- **Re-evaluate existing policy to see if the assumptions that were originally developed still exist.** – CSU continues to monitor the number of switches and ports that are in use, and utilizes the data to refine network infrastructure refresh projections.