

IT Council - Network Advisory Committee (NAC)

Response Report

Executive Summary

Building on the work resulting from the 2011 Network Advisory Committee (NAC) proposal to IT Council, the NAC was charged with examining ways to further improve the wireless network at Missouri State University by identifying stakeholder needs and developing a plan to accomplish the 100% wireless goal of the 2011-2016 Long Range Plan. To that end, the NAC compiled a list of needs and proposed action-items to address them.

- Increase density and effective availability of the wireless network in all technology-enhanced classrooms
 - Action-item: Begin a pilot project to develop and test high-density wireless in technology-enhanced classrooms with an estimated cost of \$31,000.
 - Action-item: Pending results of the pilot, develop and deploy a high-density wireless network to all technology-enhanced classrooms with an estimated cost of \$300,000.
- Administrative procedures and governance of wireless access
 - Action-item: Adopt an access provisioning model where all Missouri State BearPass logins are given access to the wireless network
 - Potential future charge: Develop life-cycle budget for the wireless network
 - Potential future charge: Study impact of the wireless network on the wired network
- Security of wireless connections and devices
 - Prioritize security when weighed against ease of access for end-users
 - Action-item: Eliminate the “access 30” wireless network
 - Action-item: Establish a pre-shared key for Guest and Public wireless networks
- Open wireless in limited areas for prospective students
 - Action-item: Implement a separate wireless network name (SSID) in Meyer Library, Plaster Student Union, and the University Welcome Center
 - Action-item: Establish a pre-shared key (PSK) to ensure security for prospective students
 - Action-item: Develop marketing materials and signage, both printed and digital, to publish the pre-shared key (PSK). PSK could also be shared via welcome packets and electronic communications such as email.
- Emerging technology access to wireless
 - Prioritize the testing and integration of technologies that require wireless access, such as screen sharing from tablets or wireless printing
 - Action-item: Formalize a process by which constituencies of the University community can request review of, and technical or policy changes necessary to implement, emerging technologies that utilize the wireless network in and out of the classroom

Introduction

In March 2011, the Network Advisory Committee (NAC) presented a proposal to IT Council for expanding Missouri State University's wireless network to provide wireless access in all buildings on the Springfield campus by 2016. Over the past three years Computer Services has worked aggressively to expand wireless in an effort to complete the goal of covering 100% of the campus indoor areas ahead of schedule. During this time the entire campus wireless network was replaced with Juniper equipment, bringing all locations up to the latest technology as part of the Next Generation Network project. The Springfield campus is now scheduled to meet the goal of complete coverage by Summer 2014.

The project to provide coverage to 100% of indoor areas on campus represented a significant change to the wireless network, in terms of both providing access and the valuation and perception of wireless networking as a strategic campus resource. By expanding coverage to all buildings, the wireless network has become an integral technology for students in pursuit of their education and completion of course work. As the project progressed, this increasingly wireless student population led to increased demand for faculty access. Both students and faculty now consider the wireless network a necessity for effective communication, collaboration, and interaction with online resources.

In January 2014, the NAC was reconvened and charged with identifying stakeholder needs and developing a plan to accomplish the wireless goal of the 2011-2016 Long Range Plan, with respect to wireless network access for all members of the Missouri State community.

The Network Advisory Committee has met frequently to discuss challenges and opportunities for meeting the increasing needs of wireless network users. Foremost among the topics discussed were:

- Density and effective availability of the wireless network in all technology-enhanced classrooms
- Administrative procedures and governance of wireless access
- Security of wireless connections and devices
- Open wireless in limited areas for prospective students and visitors
- Emerging technology access to wireless (e.g. A/V projection and printing from mobile devices)

The Network Advisory Committee consists of the following members:

- Josh Stuppy -- Chairperson appointed by IT Council Chair
- Jason Lee -- Networking and Telecommunications representative appointed by the CIO
- Brett Becker -- West Plains representative appointed by the Director of IT - West Plains
- Mark Putman -- Faculty Senate representative appointed by the Faculty Senate Chair
- Matthew Stublefield -- User Support Services representative appointed by the CIO
- Rob Martin -- Information Security Executive Committee rep. appointed by the ISEC Chair
- Brooks Travis -- Campus User Support Committee rep. appointed by the CUSC Chair
- Samuel Wagner -- Student representative appointed by SGA President
- Dixie Williams -- Staff Senate representative appointed by the Staff Senate Chair

To address these challenges and serve the needs of the Missouri State community, the Network Advisory Committee has several recommendations. These recommendations can be considered in part or as a whole.

Density and Availability

As the project has neared its goal of 100% wireless network availability in indoor campus spaces, a new challenge has emerged. Faced with students who own an increasing number wireless devices, the wireless network is not always able to support the demand placed on it by full classrooms and busy common spaces. The Board of Governors recognizes in their 25-Year Assumptions (<http://www.missouristate.edu/bog/assumptions.htm>) that wireless use and demand for wireless access will only increase in the coming years. The committee recommends undertaking a new pilot project to increase the client support density of the wireless network, with the goal of significantly, and sufficiently, expanding capacity in high-demand areas. To begin, additional access points should be placed in areas for which capacity complaints are currently being received, and in other areas identified as currently having an inadequate number of access points for the number of classroom seats available. The NAC recommends a preliminary target for this project of adding enough capacity for all students seated in a technology-enhanced classroom to simultaneously use at least one wireless device each.

The NAC compiled data on current classrooms from the Springfield campus and how many access points are in the vicinity of each classroom. We determined that, while each access point can accept up to 100 connections, average bandwidth usage observed on the campus wireless network limits the usable connections per access point to approximately 25. To achieve the target of allowing each student in a classroom space to use at least one wireless device, we estimate that an additional 300 access points would be needed.

The NAC recommends a pilot project to evaluate three questions:

1. What is the maximum usable capacity of the existing wireless network installation?
2. How well does the proposed installation reach the capacity goal?
3. How should we meet the additional challenges presented by large lecture halls?

To answer these questions the NAC suggests evaluating two buildings representative of heavy classroom density. First we would invite a large number of people test with their wireless devices in various parts of the building to establish a baseline. Then we would install additional access points and run the tests again. This data will help guide future installations and improve estimates especially for the more challenging large lecture halls, with the specific testing methodologies subject to modification by the Networking and Telecommunications Group (NTG).

The NAC identified two buildings that we feel meet the criteria for the pilot project:

1. Siceluff Hall
 - a. 26 technology classrooms

- b. 17 estimated additional APs
 - c. classrooms are in close proximity
2. Hill Hall
- a. 20 technology classrooms
 - b. 14 estimated additional APs
 - c. 2 large lecture halls

Potential Costs

Each installed wireless access point (AP) costs approximately \$1,000.

Access Point *	\$407.71
Network Infrastructure and Licenses *	\$239.41
In-House Installation and Materials **	\$335.00
Total	\$982.12

* These prices will expire in August 2015 at which time we will have to renegotiate our discount.

** Contracting labor to complete projects faster will cost more.

Pilot project funding necessary for 31 APs for Siceluff Hall and Hill Hall would be approximately \$31,000.

If the pilot project proves successful, establish a time frame to improve the wireless network campus-wide and bring density and availability to a level capable of supporting one wireless device per classroom seat. The estimated cost of the full project would be \$300,000, pending the results of the proposed pilot project.

Administrative Procedures, Governance, and Funding

Missouri State University currently provides wireless network access using a complex series of checks and rules to grant permission. By default, wireless access is denied unless a user is a member of a funded constituent group (registered students and faculty), or is a staff employee whose access is funded by their department—or themselves. This has led to additional administrative efforts, confusion for students, and has not scaled well in the current era of ubiquitous coverage and almost universal wireless device ownership.

Currently, students only gain access to the wireless network after they have registered for classes, and access is granted overnight by a script that checks the student’s enrollment status. Admitted students who still need to enroll do not have wireless network permission, which inhibits access to departmental web pages, the course catalog, and degree audits, among other resources. Students handled outside of the normal enrollment process, such as EMBA students or those enrolled through the Library Science partnership with Missouri State University, also regularly encounter challenges accessing wireless that

require intervention from Computer Services support staff.

Faculty gain access to wireless once they are listed as an Instructor of Record for a course. New faculty who have been hired but not yet assigned as an Instructor of Record will have a BearPass login but not wireless access, inhibiting their ability to access Blackboard and other Missouri State resources necessary for course building.

Staff can only access wireless if their department pays a monthly fee —or if the staff member elects to pay the fee themselves. Currently 442 of the 1,726 full-time and part-time staff have wireless access. In addition to this number, a staff member who enrolls in classes or becomes an Instructor of Record gains access to the wireless network.

The NAC contacted our benchmark institutions to determine how they handle funding and access for their wireless networks. All respondents indicated that wireless access for all students, faculty, and staff was considered mission critical, across the board. Access is granted at those institutions to all account-holders.

Universal access would empower all employees to find more efficient and effective means to do their jobs. This would help achieve the 2011-2016 Long-Range Plan (LRP) goal that “new electronic workflow processes will be developed for efficiencies and better sustainability.” The NAC also believes that all employees, in some way, support the student body and should share the student experience where possible, in order to better serve as ambassadors to the students and help answer questions that students may have.

The NAC recommends simplifying access to wireless by providing wireless access to all BearPass logins, by default. This will eliminate significant support challenges and create a presumptive state of access to the wireless network, thereby improving the experience for users and reducing administrative overhead.

Of particular note under this model, once students have created their BearPass accounts (which they can do after being admitted to the University) they would immediately have access to wireless. This, then, would enable them to access departmental web pages, the course catalog, degree audits, registration, and other online resources while on-campus via their wireless devices. If they need assistance there are numerous locations across campus to get help including the Computer Services open-access computer labs, ResNet, the PSU and the distributed user support community.

Potential Costs

The expansion of and life-cycle budget for the wireless network is currently funded by a combination of sources. Per year, these are currently:

Administrative and Information Services (AIS)	\$100,000
Student Computer Usage Fund (SCUF)	\$50,000
Office of the President for faculty access	\$47,700
Greenwood Laboratory School	\$13,000
Departments or individuals for staff access	\$26,520
<hr/> Annual Total	<hr/> \$237,220

Granting access to all BearPass logins would address students as well as faculty and staff. As such, departments currently paying for staff members would no longer be billed for wireless access. A funding source would need to be identified to address the addition of staff to the wireless network since the increase load would result in additional equipment and maintenance costs. Computer Services estimates that providing wireless access to all staff would cost approximately \$40,000 per year.

Recognizing that access needs will continue to increase over time, and that an evolving life-cycle funding model will need to be developed, the committee recommends further discussion by to-be-identified stakeholders on the subject of changes to the funding model for wireless network access and infrastructure expansion.

Security

The Network Advisory Committee discussed, at length, the balance between ease of access for users and protection of user data on a wireless network. In particular, we examined the current wireless offerings, *access 40* (a high security access method that uses WPA2 encryption) and *access 30* (a medium security access method that uses WPA encryption), and *guest* (a minimal security access method that uses no encryption) that is used by approved vendors and people attending conferences on campus.

The committee reached the conclusion that wireless connectivity needs to be made as easy to access as possible, but that we also have a responsibility to safeguard users' network traffic and data. As Missouri State expands wireless network availability to guests and other campus visitors, the NAC is conscious of the sort of sensitive traffic that might be transmitted over wireless, and therefore we feel it is important to make that connection as secure as possible.

Therefore, as the wireless network changes and grows in the future, the NAC advises that security be a priority when weighed against ease of access, and that the goal of ensuring wireless communication is protected by strong encryption be paramount in decision-making. With this in mind, the NAC recommends changing the *guest* wireless network to the same level of encryption that *access 40* uses.

The NAC also recommends that *access 30* be removed. This less secure method of connecting was created at a time when many devices could not connect to the more secure *access 40*. Now that almost

all devices support *access 40*, the less secure *access 30* is no longer needed.

The NAC also recommends that *access 40* be renamed to something more intuitive and expressive, such as:

- MSU
- MSU Wireless
- MSU Community

Potential Costs

No costs would be incurred by improving the security of *guest*, eliminating *access 30* or renaming *access 40*.

Open Wireless in Limited Areas

At the request of the President, the NAC investigated a wireless offering that would provide internet access to prospective students, and those accompanying them to campus, while in Plaster Student Union, Meyer Library, and the forthcoming MSU Welcome Center. The discussion focused primarily on ease of access as well as the security considerations brought forth above. The NAC concluded that this wireless offering should use the highest level of security currently available (WPA2).

Our recommendation was to implement a Pre-Shared Key network (similar to a home network) that has the high security with a readily available password (aka pre-shared key). The password could be displayed via signage or printed publications, in welcome packs, or via alternative electronic communications (text message, email, etc.). The NAC's recommendation is to use "Welcome2MSU" as the name of this network.

Potential Costs

The NAC recommends signage advertising the wireless network be posted in public areas, which would have a small incidental cost to create and print.

Emerging Technology Access

The Network Advisory Committee has identified several technology requests from students and faculty that require a level of device integration with the wireless network that is not currently available. Screen sharing from mobile devices, to either classroom instructor stations or projectors, and printing from tablets or smartphones are the most common requests today, but the NAC is confident that new technologies will emerge that will, likewise, require integration with the campus wireless network.

To best support the educational mission of the institution and its faculty, as well as the academic pursuits of our students, the NAC recommends that Missouri State University prioritize screen sharing and wireless printing.

The NAC further recommends that IT Council oversee the development of a process by which students, faculty, and staff can submit requests for the trial, testing, and integration of new technology that relies on wireless networking. This process may involve a form submitted by the individual or group which is then reviewed by an ad hoc committee or standing workgroup. At this time, no process has been created for such requests, and the NAC feels this would be a simple but valuable resource for the University community.