



## **Networking Annual Report 2006-2007**

### **Networking, an overview**

Networking is responsible for the design and maintenance of the college network and the system administration of many of the host computers that reside on that network. The network and systems are maintained in a state of high reliability and security. We maintain efficient means for users to interact with these systems. This often requires installation or creation of new software applications. It also involves many aspects of instruction for end users and other staff members within LITS, including application development questions.

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### **Academic year 2006/2007**

The highpoints of the year involved:

- Replace Clapp network equipment to use new Clapp wiring, including the introduction of Aruba wireless access points
  - Wireless use in dorms, beginning with the newly renovated Mead
  - Replacing the Administrative Computing HP systems with newer HPs
  - Introduction of Ella, the learning management system based on Sakai and the phasing out of WebCT.
  - Use of the (unfinished) Five College fiber project fibers.
  - Transition the network topology from a flat Class B network to a routed VLAN structure.
  - Replaced the locally developed network registration process with Classic Network's appliance and software while maintaining a great deal of the original "look and feel" of the Mount Holyoke registration system.
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### **Wireless**

The wireless project has spanned the entire academic year and will continue into the next academic year(s). Therefore, "wireless" has its own section in this report. Other projects are presented within semesters below.

### **Summary**

Over the year, the following came online with Aruba wireless:

- Clapp

- Mead
- Pearsons Annex
- Wilder
- President house
- Ham
- Macgregor
- Safford
- Porter
- Brigham
- Buckland
- 1837
- Prospect
- Willits hotel

### **Aruba wireless and Mead, the first wireless dorm**

By the end of the Summer 2006, the infrastructure for wireless in Mead was complete. The Aruba access points were in and we had installed the new Aruba access point controller, but the system had not been set up for production use.

### **Aruba consulting**

On September 18, 2006 Aruba came to campus to provide consulting and support for transitioning to the Aruba system in a production environment. After a period of testing, we went into production with the Aruba wireless equipment in early October. **Pearsons Annex, Clapp**

Clapp and Pearsons Annex had Aruba wireless installed in October, 2006.

### **Wilder**

In mid October 2006, Kevin and Mike did a wireless site survey in Wilder which was to be the third residence hall with full wireless coverage using Aruba.

By early November, the wiring for the access points in Wilder was complete, though there were some punch list items. By late November, Wilder was online with wireless.

### **President house**

In November, we replaced the single Lucent access point in the president's house with enough Aruba access points to cover the house.

### **Ham and Macgregor**

In March, we developed a plan to use existing wiring in Ham and Macgregor for wireless. This involved placing access points in student rooms, a practice we have generally tried to avoid. Without this plan, however, the costs would have been high.

Using these plans, our electricians were able to get the wiring done within a few days and Kevin got the access points installed in March and April.

### **Safford, Porter, Brigham**

In January, we put together a plan to install wiring for access points in Safford, Prospect, and Brigham. These buildings were not as easy to wire as Wilder. These required more

in-building conduit paths installed. This work was outsourced and the wiring work was done before the spring semester began. The buildings were brought online for wireless in the spring.

### **Buckland, 1837, Prospect**

In June, plans were drawn up to outsource the wiring for access points in Buckland, 1837, and Prospect. The wiring was done during the summer and was ready for the Fall 2007. Our electricians did Prospect; Buckland and 1837 were outsourced.

### **Willits hotel**

During the summer, our electricians provided wiring for access points for the Willits hotel. That area was online with wireless by the end of the summer. The SSID of "Willits" provides guest access to the Internet.

### **Remaining residence halls**

By the end of the summer 2007, we had the following residence halls needing wireless:

- Rockefeller
- Mandelle
- Abbey
- Torrey
- Pearsons
- Dickinson

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## **The Fall, 2006**

### **Clapp wiring done, switches installed, Aruba access points in place**

The Clapp rewiring project was finished by the end of August, although the Hooker renovation project had not quite finished. New Cisco switches were installed early September, including a power over ethernet (POE) switch to power the new Aruba access points in Clapp. The building was cut over to the new equipment before classes began.

### **Webmail/Webshell upgrade**

To speed up the Horde Webmail system, early in September we began the development of a new server for Horde's Webmail/Webshell. In mid October, we upgraded the server from a Dell 2650 (MIST) to a Dell 2850 (YARD). This change was generally invisible to the users.

### **SIS data transfer among the colleges**

In mid October, Mount Holyoke enabled the system for SIS data transfer among the colleges.

### **New disk to disk backup server**

In November, DECK, the new disk to disk backup server was brought online. This enables complete replication of MHC/AMBR user data. Incremental backups are done from those data. Windows systems also back up to this system.

### **Mail system disks**

In late November, the mail file system (which holds all inboxes) was spread out onto two

disk systems to improve performance. The change was very successful in avoiding overload on the system. When overloads occurred, a positive feedback situation occurred which caused further slowdown. This change resulted in that situation not occurring.

### **Network outage**

On November 30, one of the core network electronics modules crashed and took down the network. When that module was replaced, another crash occurred. Cisco had us upgrade the firmware. That stopped the module crashing. However, network problems persisted. It looked a bit like a broadcast storm, though it wasn't exactly that. This resulted in extremely poor network performance. The troubleshooting was difficult, but Fred isolated the problem to a switch in Mead. That problem had triggered a software bug in the Cisco equipment which the firmware upgrade fixed.

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## **The Spring, 2007**

### **Network topology and network access control planning**

Two interrelated projects were done in parallel: network topology changes and access control planning.

In the spring, Fred began to modify the Cisco 6509(b) switch configuration so that the flat Class B network would begin to be carved up into routed VLANs. This change was required by the Aruba equipment and would be required for a new network access control system. It would also have the benefit of reducing excessive broadcast traffic on a single LAN segment (although it probably would not have prevented the network outage November 30, 2006).

The actual segmenting of the network into routed VLANs in production (other than a Voice over IP VLAN) did not begin until Fall 2007.

Networking attended a NERComp conference on network access control and in the spring looked into Bradford, SouthWest netreg, Classic Networks, and Cisco clean access. We selected the Classic Network product because it had the functionality we needed at the best price.

The Classic Network appliance and network access control software (CAT) were installed in April and networking attended a training session on campus for the use of the product. In that training session, we enumerated various requirements that had been promised with the product but which were not there. We were promised that they would all be operationally by August 1, 2007. Most were.

### **HVAC problems in Kendade machine room**

By January 2007, the number of problems with the air conditioning units for the Kendade machine room became so great that Facilities began a plan for replacing at least one of the Stulz units. One replacement was accomplished, but the project for improving the duct work and the emergency tertiary system continues in Fall 2007.

### **Ella on Sakai**

Ron had spent a very large amount of time getting Sakai up and running. In the spring,

the system was used in a pilot project with some courses, though WebCT continued to be the production learning management system. The Ella/Sakai experience was generally good, although it has occupied a large amount of Ron's time and the time of RIS.

### **HP systems**

In March, we accepted delivery of HP systems to replace HP systems for Administrative Computing. The disks for these systems reside on a SAN which is housed in Kendade. Two of the HPs reside in the Library and two in Kendade. All attach via fiber channel switches to the SAN disks. Fred has been to training for the operation of the HPs and the SAN and is currently the only one on campus who knows how to set up the disks and the SAN fiber channel switches.

### **Five College fiber project**

In April, there was a sufficient amount of the fiber project completed that Mount Holyoke was able to use some to connect via the "East ring" to UMass and turn off the two Verizon DS3 circuits, saving about \$11,000 per month.

The fiber project was not finished and this configuration did not allow for automatic failover from the East ring to the "Stick" (the second path to the Internet "meetme" point at 1 Federal St. in Springfield. However, UMass assured us that if the East ring suffered a catastrophic failure, we could be manually re-routed to use the Stick fiber.

### **Meeting Maker**

Meeting Maker was upgraded in preparation for the fall change in daylight savings time.

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## **The Summer, 2007**

### **Network access control and routed VLANs**

By early August, most of the required updates to the Classic Networks appliance and software were in place and we began implementation.

In early testing, we discovered a number of problems with the persistent client and also found from others using the product that the persistent client was not used as much as we expected. For simplicity, we decided to go with the one-time registration client assessment tool (CAT) and require re-registration each semester as we had done in the past.

In reprogramming the local side of the network registration process in August, we figured out how to avoid a sudden and major shift to putting the residence halls into routed VLANs. This required Mike to make some minor changes in the Classic Network appliance software (with grudging approval of Classic Networks).

The process of shifting to the routed VLANs was started with the wireless side for those residence halls with wireless. The reduction of broadcasts in the individual VLANs is important for wireless performance, since wireless is generally a slower and shared medium and is more prone to performance issues under high broadcast loads.

With the changes in the Classic Network appliance software, we were able to integrate portions of our locally developed registration system so that it worked to register computers on the un-routed primary VLAN as well as computers on the routed VLANs which were controlled by the Classic Network appliance. This enabled a smooth transition.

### **Mary Lyon rewired**

The pre-Category 3 wiring in Mary Lyon was replaced during the summer and the Cisco access points were replaced with Aruba access points. It was found in testing, however, that in an earlier renovation of the Registrar's area, some of the wiring there had not been upgraded and so that part of the job was not done.

To maintain connectivity for those in the building, we provided desktop computers with temporary USB wireless connections.

### **Mary Woolley not rewired**

Due to time constraints on our electricians, the project to finish upgrading the wiring in Mary Woolley was postponed. Most of the building does have up-to-date wiring, but there are some areas that do not and which need to be addressed.

### **Oracle on Sakai**

Ron converted Sakai to run on Oracle in preparation for production use of Ella in the fall. This was a major change, but it was successful.

Submitted by  
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