

MEMORANDUM

To: Bill Flounders, Operations Manager
From: **Todd Merport**, Computer Systems Manager
Subject: 2010/11 Year-End Report
Date: 8/25/2011

I. INTRODUCTION

The NanoLab computer group maintains a hardware and software infrastructure that supports purchasing, accounting, inventory, real time lab access controls, member qualifications, equipment reservations, on-line tests, and desktop support (and more). We have transitioned from maintaining two facilities to one as operations in the Microlab were transferred to the NanoLab.

The challenge given to the computer group during this period was to maintain the Wand (90's database applications) for the Microlab and grow Mercury (three tier application software) in the Nanolab, all the while, minimizing challenges for lab members. Activities generated with the Wand were uploaded into the Mercury system along with a big chunk of the Wand database. Data from these systems were processed by Mercury.

Getting the data from the Wand into Mercury required quite a bit of clever programming, but the real challenge was responding to accounting adjustments in the Wand database and appropriately reloading Mercury. Olek developed the database synchronization system. His timeline of accounting tasks for one accounting period is shown below:

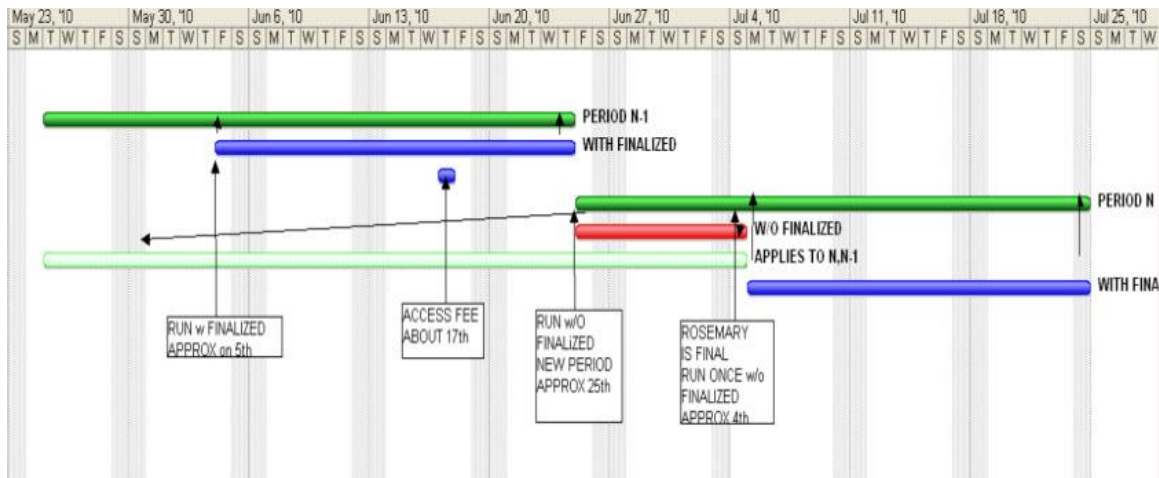


Figure 2 NanoLab Cory Hall Infrastructure Synchronization

Mercury has been in service for two fiscal years and has processed 400,000 activities. In January Mercury took over management of equipment in Cory Hall including: centura, afm2, p5000, cmp, novellus, and autoprobe. Mercury maintains a table and procedures that insures that members are present at the equipment location.

Changrui took on the task of installing RUMS for Cory Hall and the NanoLab on Windows 2003 servers (from Windows 2000 Server). This was a daunting task because the sub-systems needed by the RUMS system have changed on Windows 2003 Server -- SQL Server, IIS Server, SMTP Server, and various system security and API changes. Changrui also managed staff moves and decanting of computer systems in the Microlab.

II. COMPUTER GROUP STAFF AND THEIR PRIMARY DUTIES

Susan Calico, Information Systems Analyst II: Susan setup the Symantec Endpoint Protection server and managed the migration of clients to this system. She developed procedures and documentation for the Toshiba PBX. Susan also maintained PC system security and developed web pages.

Madeleine Leullier, Computer Resource Specialist II (Supervised by Bill Flounders): Madeleine creates Unix and Windows accounts, gives direction to members regarding computer issues, manages the HP Design Jet plotter, designs and posts documents on the Nanolab web site using a variety of technologies.

Todd Merport, Applications Programmer IV Nanolab: I maintain our Unix servers, write and modify applications, supervise, and do tasks necessary for the development and maintenance of NanoLab Computer Systems.

Olek Proskurowski, Information Systems Analyst III: Olek develops applications for the Nanolab, performs system administration, and has become the guru of the GuruPlug devices from Marvell Technologies (used as a secure equipment networking device). He maintains the Apache/Tomcat/BIRT installation and Ingres installations.

Changrui Yin, Information Systems Analyst III NanoLab/IMPACT/BCAM: Changrui performs Windows system administration tasks, database application development, and web site design and maintenance. He manages the RUMS systems and oversees replication of lab equipment computers.

III. SYSTEM ADMINISTRATION

We continue to maintain several types of system platforms (as shown on table 1), but will probably look to moving to a Windows/Linux (Red Hat) environment (perhaps in some cases using virtual systems provided by the Campus IT department). Although both Solaris and Red Hat require subscriptions to receive patches, there is a campus wide agreement for Red Hat support. So we may be migrating away from Solaris. Also up-to-date community releases for Ingres are not provided for Solaris (compiling required). We reduced our profile of Solaris systems from nine to six systems. Two of the systems have been replaced by plug computers.

There are two identity databases used for members (Cape2 and Silicon2) and an additional two for staff (EECS and CalNet). Although a few minutes of extra overhead may be needed for additional accounts, it does provide some extra security; i.e., no mono-culture. Use of a single CalNet id may provide some opportunity for consolidation, but that will require further investigation as BNLA members are not issued CalNet ids.

Olek specified and installed a database server for Mercury on a Dell Platform with a Linux operating system. This improved the speed of Mercury and eliminated occasional deadlocks.

Changrui setup the SEP server and installed a new server for user profiles and documents. This will reduce the number of roles required by microlab2 (used as a web server and file server). Staff should see a speed improvement for logins.

I setup the Cape2 server and associated migration scripts.

IV. SOFTWARE

Most of the software developed this report period was enhancing, optimizing, and debugging elements of Mercury. Olek implemented many forms and reports (and related changes to the database) including the on-line safety quiz and picture galleries. He modified some of the inner sanctum of the accounting system to fully implement multiple projects per member. (See Olek's comments).

The client/server side of Mercury saw some action, too. The server side of Mercury connects directly to the RUMS database for gas usage calculations (instead of the LabView program). The form classes were broken up from one giant class to more of an object oriented design. Classes were created to define fields in the forms and retrieve data from the fields as well. These changes make the forms easier to modify and less buggy. I think there is a lot of room for improvement in the underlying code of the Mercury Client/Server, especially the client. Some of the collections classes have been deprecated (`java.util.Vector`) and many areas can be cleaned up and cleared of dead ends.

V. FURTHER POINTS BY

Olek Proskurowski:

- Run daily db synchronization between Wand and Mercury.
- Resolved any discrepancies in monthly reports between Wand and Mercury and assisted in creating monthly BFS upload.
- Set up new Dell/Linux based database server.
- Migrated Mercury database to new server and version of Ingres.
- Carried out final transition from Wand to Mercury.
- Assisted office staff in moving inventory management from Wand to Mercury.
- Trained Microlab members on new Mercury system.
- Conducted computer part of Nanolab Orientation.
- Designed and implemented online tests. Online tests allow design taking and grading test online completely eliminating paper based tests.
- Implemented multiple projects per member feature.
- Added multiple new features to MercuryWeb: member/staff galleries, suspensions, equipment manual upload, recognitions, suggestions and various reports.
- Installed security patches for apache and tomcat servers.

- Replaced hydraserver with dreamplug based computer.
- Installed guruplug to allow access to/from gcapg2 tool.
- Installed perle serial to ethernet server to support tystar monitoring.
- Assisted Todd with system administration.

Changrui Yin:

- Windows Servers Administration
 - System Security and recommended patches
 - Maintaining SEP antivirus server and 70 clients.
 - Building the new file/printer server (Windows server 2008), Nanolab2.
 - Installing Microsoft server 2008 on the lab camera server
 - Migrating Rums2 (Rumsnano) and Rums3 (Rumscory) from Windows server 2000 to Windows server 2003 with new computer hardware and resolving the email problem.
 - Maintaining the machine shop web site and resolving MSJMS problems.
 - Backups (cape, rums, rums2, rums3, mshop-server, microlab2, microlab3, Microlab5, Neon, Nanolab2).
 - Moving staff's roaming profiles and documentations to Nanolab2 from Microlab2.
- Staff and lab computers support
 - Building/rebuilding multiple staff and lab computers
 - Windows account setup for New Nanolab and machine shop staff
 - Backup lab equipment computers.
 - Migrating emails to calmail server for the Nanolab and machine shop staff.
 - Moving staff and lab computers to SDH from Cory.
 - Installing computer software (AutoCAD, Solidworks, Microsoft Office, etc.)
 - Troubleshooting software/hardware problems on staff computers and lab terminals
- Printer support
 - Moving the printers and plotter from Cory to SD
 - Troubleshooting printing problems on the staff computers and printing servers
 - Plotter user support
- UNIX System Administration
 - Supporting staff on the UNIX applications

VI. FUTURE PLANS

Changrui has been tasked with creating an accounting system for the Machine Shop and integrating it into the Machine Shop Jobs Database. Olek will be working on a purchasing module for Mercury when BearBuy is released in addition to a bar coding and scanning system. The NanoLab web page will be redesigned. The cameras in the NanoLab will be networked/firewalled so access to the system will be available outside the private network. The cameras will be used for a NanoLab entrance and Tech Museum display.

VII. SUMMARY

The movement of equipment and roll out of software for the NanoLab has been successful due to the patient planning of Bill and Katalin and follow through by computer staff. We look forward to shoring up our hardware and software this upcoming year while continuing to provide new applications.

III FIGURES AND TABLES

Function	Platform	Operating System	Count	Responsible
Desktop	Dell (Mostly)	Windows XP	36	changrui, merport
Web, DB, Mail, Apps	Oracle	Solaris 10	6	merport, olek
Web, LabView	Dell	Windows 2003 Server	2	changrui, merport
Terminal Services	Dell	Windows 2003/8 Server	3	changrui, merport
FileSystem, Web, Database, Anti-Virus	Dell	Windows 2003 Server	3	changrui, merport
Lab Terminals (Nanolab, Cory Hall)	Dell	XP	26	changrui, merport
Interlock Controllers	Control By Web	LINUX	3	merport, olek
Interlock Controllers	Agilent 34980A	LINUX	1	merport , olek
Networked Printers	HP, Brother		11	changrui, merport
PBX	Toshiba,Adtran			All, Synetel,Telepacific
TOTAL			91	

Table 1 Hardware Summary

Function	Primary Technologies	Operating System	Responsible
MercuryClient., MercuryServer	Ingres,Java	Solaris 10	merport, olek
MercuryWeb	Ingres, Java, Netbeans,Apache	Solaris 10	olek, merport
Wand (Purchase)	C,Ingres	Solaris 10	merport,olek
RUMS2, RUMS3	Labview, SQL Server	Win2k3	changrui,merport
Mail Filter (microdomo)	Sendmail, perl	Solaris 10	merport, olek
PUMPS	SQL Server, IIS, .NET, Access	Windows 2003 Server	changrui, merport
Machine Shop Jobs	SQL Server, IIS, .NET	Windows 2003 Server	changrui, merport
GASES	SQL Server, IIS, .NET,Access	Windows 2003 Server	changrui, merport
Mask Request	MySQL, Apache, PHP	Solaris10	merport , olek,
CAD (gds2tap)	C, csh	Solaris 10	merport, olek
Interlock Utilities (Hydra)	Perl, SCPI	Linux	merport, olek
Nanolab Web Site	CSS	Solaris 10	scalico , leullier

Table 2 In-House Software

NanoLab Computer Systems Infrastructure Cory Hall

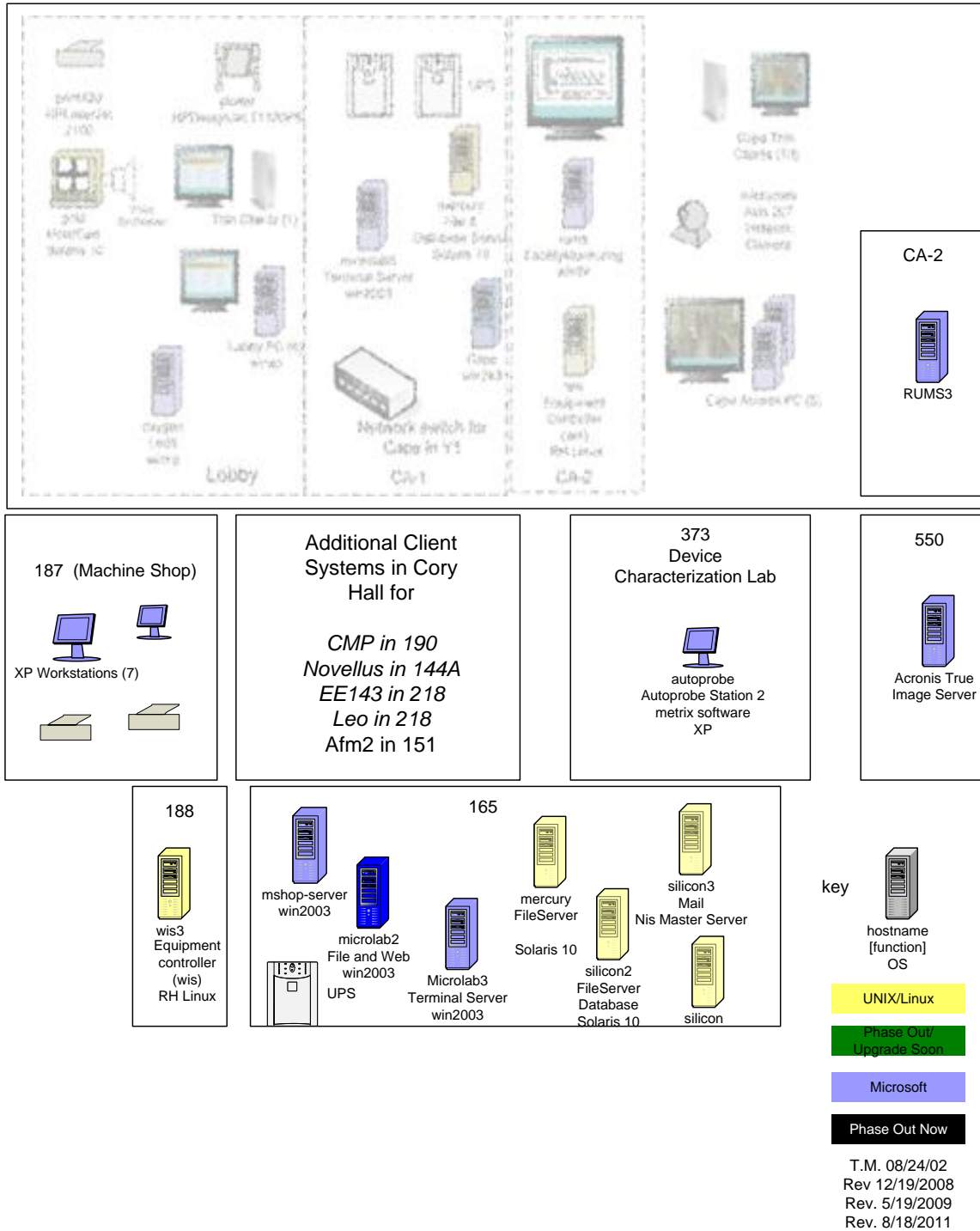


Figure 2 NanoLab Cory Hall Infrastructure

Computer Systems Infrastructure Sutardja Dai Hall

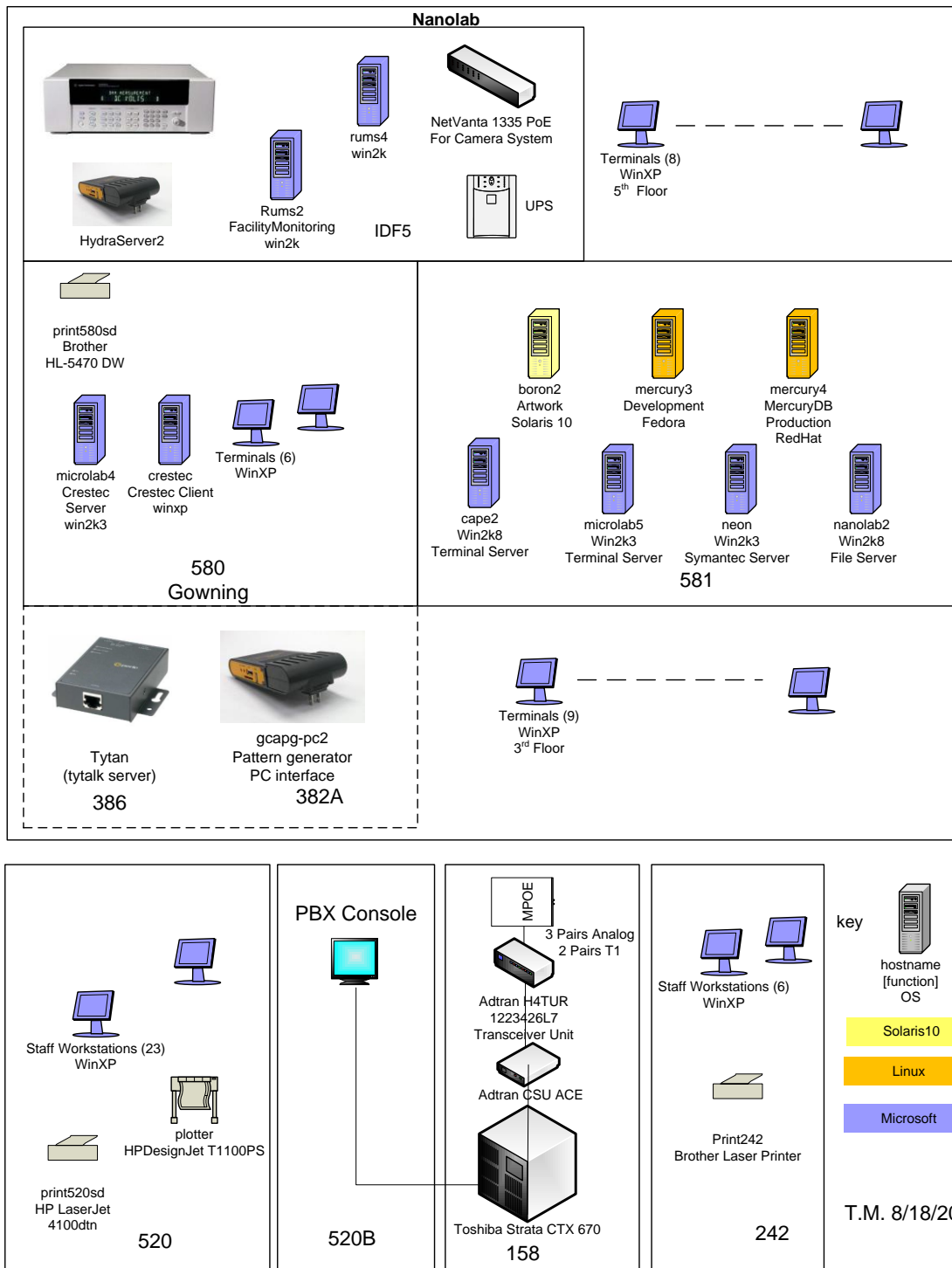


Figure 3 NanoLab Infrastructure

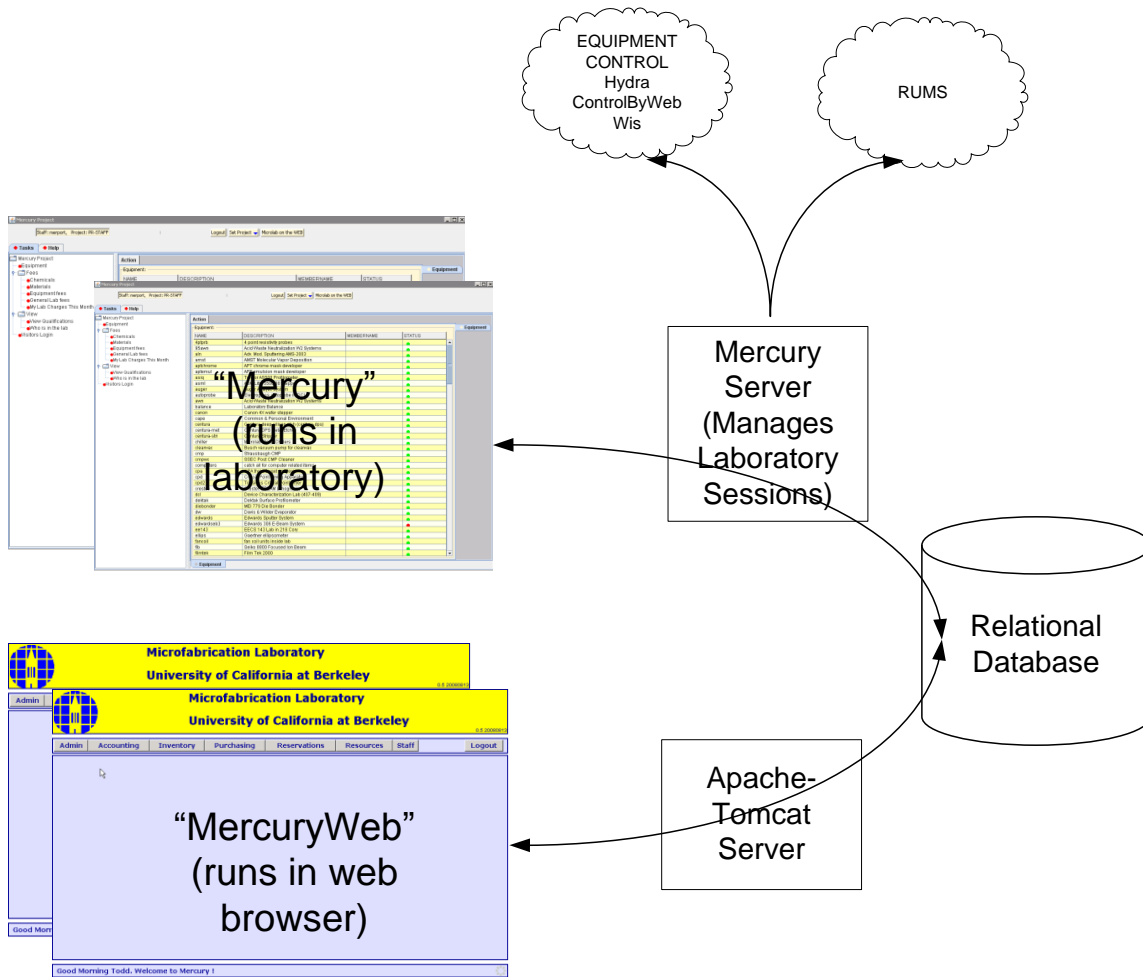
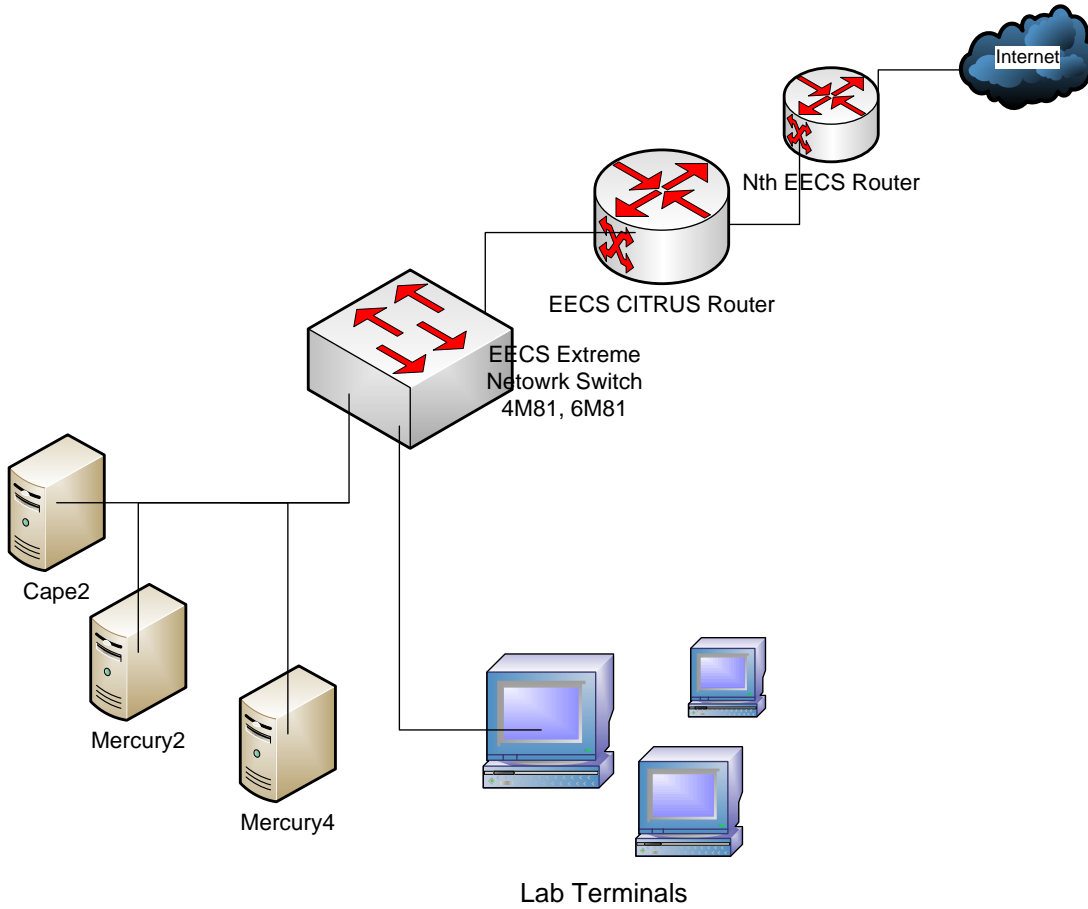


Figure 4 Mercury Architecture



NanoLab Simple Network
Diagram
T.M. 8/25/2011

Figure 5 Simplified Network Diagram