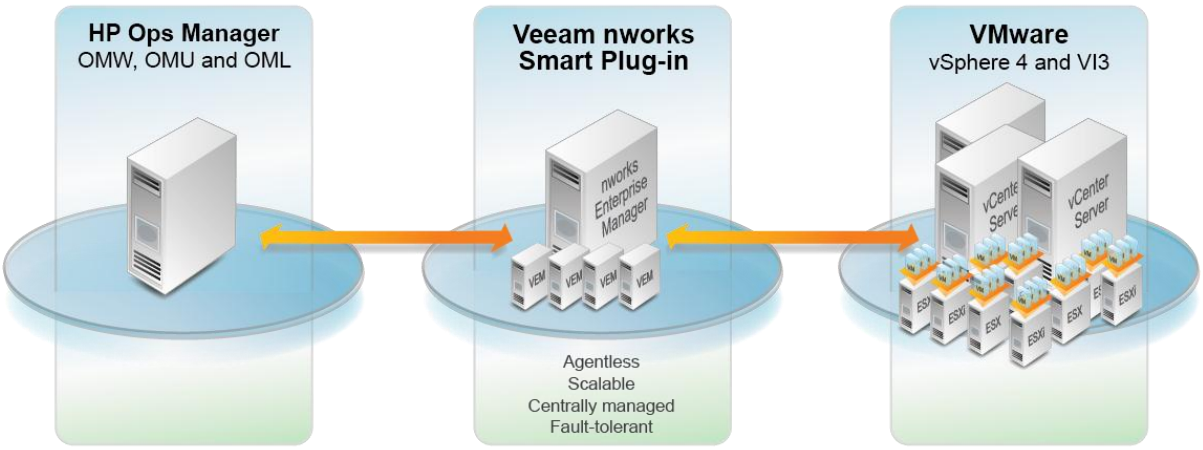
Information Technology Services

Major Accomplishments for FY 2011-2012

Virtual Server Host Management and Monitoring

Previously, the Network Operations Center (NOC) had no way of monitoring the physical machines that host our virtual infrastructure. The physical servers host multiple VMs (Virtual Machines), and are the backbone of Sinclair's VMware and Citrix configuration. If one of these physical servers starts having an issue, it can affect all VMs hosted on the server (anywhere from 3 to 10 virtual servers). Examples of the types of problems that could go undetected include bad CPU fans or power supplies, or even low data store space. In these cases, the NOC would not know about the problem until the Help Desk was already receiving calls.



To help fill this monitoring void, two enterprise-class management products were purchased and implemented, allowing us to view and monitor our virtual infrastructure; the VEEAM NWorks VMware SPI and the Comtrade SPI for Citrix. Both SPIs (Smart Plug Ins) have already proven themselves useful reporting and solving hardware and software problems proactively without incurring any additional downtime.

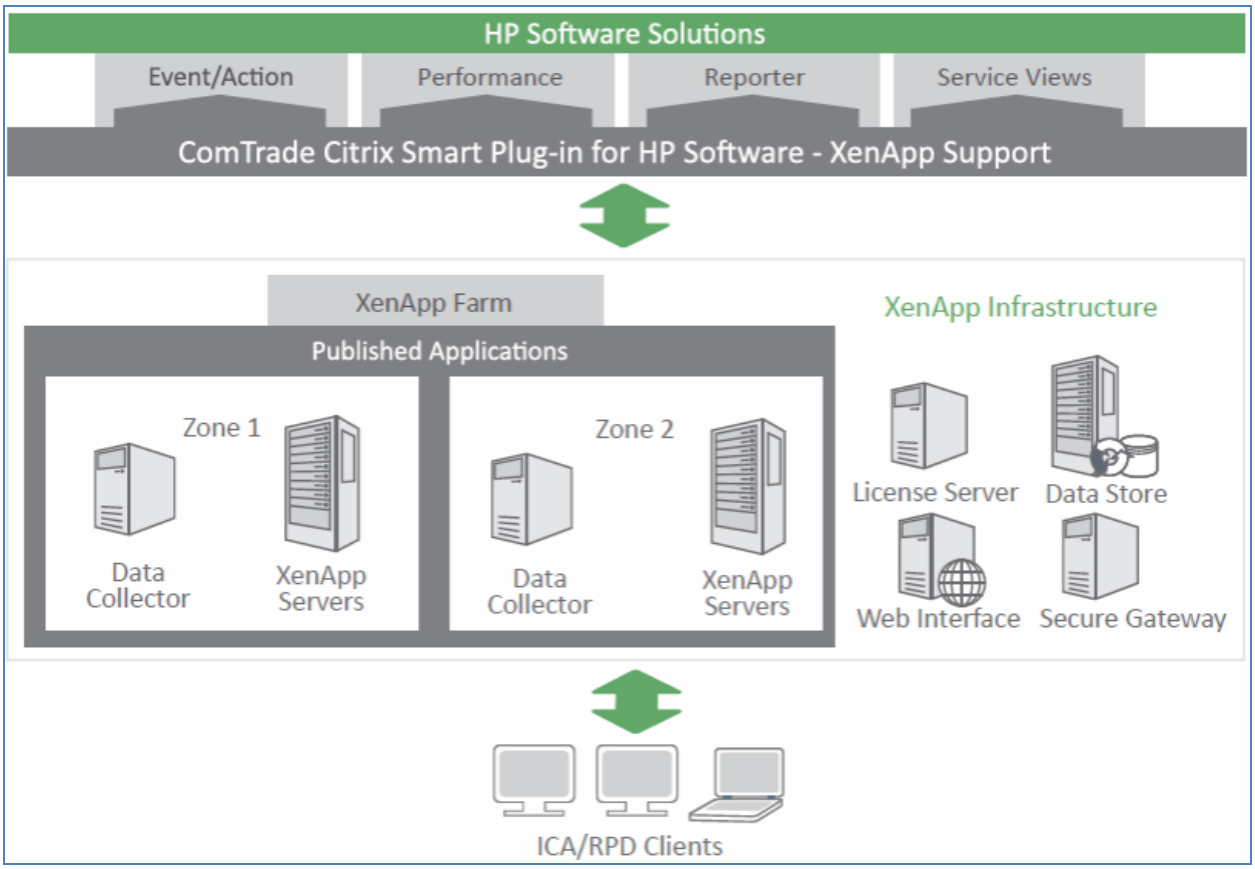


Figure 1 The Citrix SPI integrates with the college's current management environment.

The Nworks and Citrix SPI provide distributed monitoring and management of the VMware and Citrix infrastructure and both are fully integrated into HP Operations Manager. The SPIs provide VM performance, events, configuration, state, and topology information directly into HP Operations Manager, giving the Network Operations Center a common view across Sinclair's physical and virtual infrastructures.

Qualitative/Quantitative Return on Investment: The greatest benefits are the improvements in service availability due to proactive alerts and automatic actions.

Cost savings/Cost avoidance anticipated for the project: The ESX servers host the guest VMs, and are the backbone of Sinclair's VMware configuration. If an ESX host starts having an issue, it can affect all VMs hosted on the server (anywhere from 3 to 10 virtual servers). By proactively monitoring the physical ESX hosts, we are helping to prevent large scale outages which in turn results in the avoidance of costs due to the inability to provide service to our customers. ITS was able to purchase both the Citrix and VEEAM SPIs with the capital requests funds originally allocated just for VEEAM.

Target Completion Date: April 1, 2012

Actual Completion Date: June 21, 2012

Datacenter Power Monitoring

Figure 2 APC Smart Power Distribution Unit (PDU)

Rising data center energy consumption and rising energy costs have elevated the importance of data center efficiency as a strategy to reduce costs, manage capacity, and promote environmental responsibility. Standard rack PDUs provide reliable power distribution, but they do not provide any insight into how much power is being consumed by a piece of equipment. To help aid with this issue, four smart APC PDUs were purchased and installed in Sinclair's Dayton data center providing a much closer look at rack level energy consumption.

APC metered and switched PDUs provide real-time remote load monitoring of connected equipment. The APC unit also allows individual outlet control to power cycle outlets, and manage on-off equipment sequencing. NOC personnel can configure alarms to warn IT and data center managers of potential circuit overloads to prevent accidental power loss to critical equipment. Because of the value that the APC PDUs provide in improving the visibility of power usage, the cost of smart PDUs for each server rack has been included in the approved 2012 – 2013 capital request project, ***"IT Power Upgrade in Support of Virtual Server Capacity Increase & High Density Computing"***

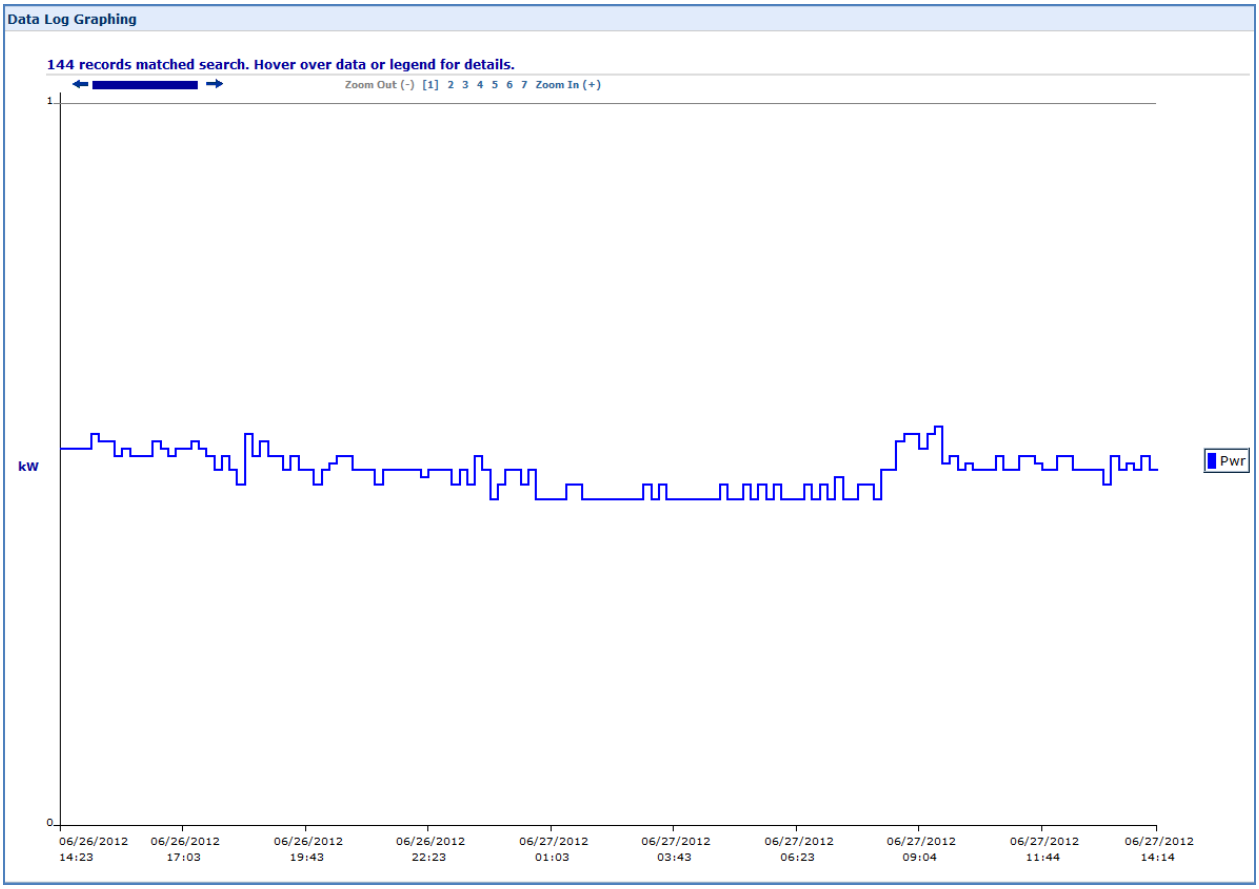


Figure 3 Graph showing energy consumption rise and fall throughout the day

Qualitative/Quantitative Return on Investment: ITS spent $2494 on smart PDUs for the data center. The PDUs provide energy consumption information and insight that was once hidden. These new insights will allow ITS and Facilities Management to drive down energy consumption by helping to identify inefficient IT equipment that should be replaced.

Cost savings/Cost avoidance anticipated for the project: APC PDUs with metering-by-outlet provide greater power management with individual outlet-level power metering and user-resettable energy (kWh) logs for capacity planning and energy efficiency initiatives. Having information on the amount of energy each piece of equipment is using in the server room is the first step in eliminating older inefficient equipment.

Target Completion Date: June 30, 2012

Actual Completion Date: May 25, 2012

Disaster Recovery Systems Planning

In early 2011, Sinclair's IT department, in partnership with Afidence, began a DR (Disaster Recovery) system identification project. Individuals from Afidence began meeting with divisions across campus to identify the college's most critical business

systems and capture a sense of “tolerance” relative to recovery time and system performance during a disaster.

The DR Recovery Systems Planning project which was undertaken this year reviewed the data gathered during the previous project’s meetings and compared the results against Sinclair’s current Disaster Recovery systems list. Using this data ITS developed three DR system scenarios (Best, Better, Minimal) that were based on the number of users and performance required. The systems that were identified as “critical” during the earlier DR system identification project were submitted for funding at the “Best” level to the capital request process for 2012 – 2013.

Current Production Environment

	Server Name	Function	Num. Processor Cores	Memory (GB)	Num. Recipients	Num. Messages / Mailbox /	Notes
	Appaloosa	Mailbox	16	36	4208	100	
	Arabian	Mailbox	16	36			
	Clydesdale	CAS + Hub Transport	8	8			
	Belgian	CAS + Hub Transport	8	8			
	Pinto	Edge Transport	8	8			
	Palomino	Edge Transport	8	8			
	Paint	TMG	8	12			

DR Recommendations

Scenario	Server Name	Function	Num. Processor Cores	Memory (GB)	Num. Recipients	Num. Messages / Mailbox /	Notes
A	ArabianDR	Mailbox	16	48	4300	100	Replicate Current Performance in Virtual Environment. Also includes 1 Global Catalog with 1 Processor Core.
	ClydesdaleDR	CAS + Hub Transport	8	8			
	PintoDR	Edge Transport	8	8			
	PaintDR	TMG	8	12			
B	ArabianDR	Mailbox	2	24	4300	50	Same number of recipients with half the messages per mailbox per day. Also includes 1 Global Catalog with 1 Processor Core.
	ClydesdaleDR	CAS + Hub Transport	3	8			
	PintoDR	Edge Transport	1	8			
	PaintDR	TMG	1	4			
C	ArabianDR	Mailbox	2	24	2150	100	Half the recipients with same number of messages per mailbox per day. Also includes 1 Global Catalog with 1 Processor Core.
	ClydesdaleDR	CAS + Hub Transport	3	4			
	PintoDR	Edge Transport	1	4			
	PaintDR	TMG	1	4			

Figure 4 An example of the “Good, Better, Best” configurations for the Exchange system

Qualitative/Quantitative Return on Investment: Recommendations from this project will help to ensure the college maintains day to day operations in the event of a disaster. All scenarios and recommendations were developed in house and did not require any additional external resources.

Cost savings/Cost avoidance anticipated for the project: Developing and maintaining effective disaster recovery procedures and guidelines is less costly than the permanent loss of student and employee data.

Target Completion Date: June 30, 2012

Actual Completion Date: January 13, 2012

Wireless Mobile Device Policy

Mobile communication devices are used by some Sinclair Community College employees for internal and external communication. The term “mobile communication device” is understood to include any device capable of using the services provided by the public or private cellular and wireless networks. Any device that makes or receives phone calls, leaves messages, sends text messages, surfs the Internet, or download and access email are considered this type of device. Other terms that can be used to refer to these kinds of devices include “Mobile Device”, “mobile communication device”, and “wireless communication device” and specific types of these devices include smartphones iPads, tablets, MiFi’s, etc. These devices can regularly incur charges for their communication services.

Many other colleges have moved to a stipend model for the use of and payment of mobile communication devices for their employees. ITS looked at this model as a possible alternative to the current method of funding the devices, but determined that this would not be a better way of administering the devices and could actually create more complex processes and be more costly to the college. Also, during this fiscal year there was a change to tax law which allows the classification of college provided phones in a way that lessens the need for the employee and the college to implement complicated processes.

During this fiscal year ITS conducted research into policies and procedures used by other organizations, investigated tax laws, and consulted with the college’s attorney to determine what the best approach to this issue would be. It was determined that a new form for requesting devices and procedures to inform users of their rights and responsibilities should be provided. Those items have been drafted and are ready for review by the college’s administration. As mobile communication usage continues to increase and the myriad of operating systems on these devices continue to multiply, a need to maintain up-to-date procedures for supporting these mobile communication devices will increase. ITS has proposed a follow-on project during the next fiscal year to receive approval of the new guidelines and continue to improve the information provided to the Sinclair community.

Qualitative/Quantitative Return on Investment: The greatest benefit of the work that was done on this project is to clarify any confusion over the use and support of these devices.

Cost savings/Cost avoidance anticipated for the project: It was believed at the beginning of this project that pursuing a stipend model could be a way of saving money. However, this model could lead to more complex processes and possibly increasing the number of devices that are funded. We will continue the analysis of alternative approaches in the next fiscal year to ensure the best approach is pursued.

Target Completion Date: June 30, 2012

Actual Completion Date: May 25, 2012

Improved Administrative Security Controls

Administrator accounts are the most powerful and privileged accounts on a Windows-based system or infrastructure. There are different types of administrator accounts, or groups, ranging from Local Machine Administrator that provides full control of a machine through Domain Administrator that provides full access to any device or machine within the Windows domain. Other administrator groups provide full control to specific machines or devices. Every administrator account has a common security vulnerability — misuse or compromise may result in a significant security incident.

ITS has implemented controls that provide Windows 7 users with a 'security enhanced desktop' that provides standard user access rights under normal conditions but allows the user to elevate to Local Machine Administrator access when needed. We have also evaluated our traditional practices for higher-level administrator accounts such as Domain Administrator and service Administrator accounts and have begun implementing solutions to improve security of these practices. The primary focus of these procedures is to ensure these accounts are used only when necessary, not for routine system use, while ensuring the process is not complex or overly burdensome to the user.

Qualitative/Quantitative Return on Investment: Administrator account misuse or compromise can result in a significant breach and associated costs of mitigating the breach.

Cost savings/Cost avoidance: The only cost for this project was personnel resources. Potential cost avoidance was realized by reducing the risk of a breach and the associated costs of breach mitigation.

Target Completion Date: March 30, 2012

Current status: June 8, 2012

Password Complexity

At Sinclair, federal and state laws — most notably FERPA (Family Educational Rights and Privacy Act) — dictate how we handle much of the information we use to support our students and community. Who can access student information, how the College and its employees can use this information, and minimum standards or controls the institution must implement are all part of the FERPA equation. Ohio's data breach notification law dictates specific and extensive notification and remediation requirements, at the institution's expense, in the event of unauthorized access to personal information.

Since the password is the primary protection measure, it is imperative that every UserID is protected by an effective password. The most important characteristics of an effective password is that it should be secret and hard to guess or otherwise 'crack.' Unfortunately, most people do not routinely create effective passwords, and also do not

protect the passwords from discovery. Simple passwords, such as '123456', 'password', 'qwerty', 'abc123', or 'sinclair' are common. Pet, children, or grandchildren names, birth dates, and other easily guessed or discoverable information (information that can be easily found on social network sites like Facebook) are also not effective as passwords.

This project involved implementing technical controls to enforce standards for password "complexity". Password complexity rules essentially force a user to create a more effective, hard to crack password. These password complexity rules are industry-standard, and are technically enforced when an account is initially created and whenever a user changes his or her password.

The rules are:

- Passwords must not:
  - Contain the user's account name
  - Contain more than two consecutive characters of parts of the user's full name
- Passwords must:
  - Be at least 8 characters long.
  - Contain characters from 3 of the following categories:
    - Uppercase characters A-Z
    - Lowercase characters a-z
    - Numbers 0-9
    - Special characters (such as !,$,#,%).

Qualitative/Quantitative Return on Investment: Passwords are the first, and often only, line of defense against unauthorized and/or illicit use of the systems and data they contain. Passwords are the primary protection from cyber-attacks. Using weak passwords increases likelihood of account compromise and can result in a significant breach and associated costs of mitigation of the breach.

Cost savings/Cost avoidance: The only cost of this project was personnel resources to implement procedures. Complexity options are available for all current SCC systems.

Target Completion Date: August 30, 2011

Actual Completion Date: September 29, 2011

Network Infrastructure Upgrades

Information Technology Services (ITS) maintains a plan for the annual renewal & replacement (R&R) of information technology infrastructure components. This plan is used to project expenditures of these components over a five year period to provide the college's leadership with information to aid in budget planning. Each year, during the annual planning and budgeting cycle, the R&R plan is updated with any new information that would change expected expenditures for the coming year as well as the next four years.

Each item that is identified on the R&R plan has a useful life. This useful life along with the total cost of the equipment, determines the funds that must be set aside each year to replace the equipment when it has reached its end of life. Network Infrastructure equipment has an estimated useful life of five years. In fiscal 2012, ITS replaced the edge switches in 11 network closets located in buildings 5, 7, 10, 12, 13 and the Library. The original project scope only specified the replacement of switches in 10 network closets, but through the re-allocation of funds from another project and our relationship with Enterasys, ITS was able to replace two additional switches in the building 5 closet as part to this project. The patch cabling in the network closets listed above was also upgraded to support the increased connectivity speeds made possible by these devices.

The network devices that were used for this upgrade were the latest S-Series switches from Enterasys. They are capable of connecting user devices to the network 10 times faster than the older equipment. Prior to the replacement, network devices were connected to the network switch at 100 Mbps and each switch was connected to the network core at 1 Gbps. The S-Series switches increased those connection speeds 10 fold to 1 Gbps and 10 Gbps respectively.

Figure 5 Enterasys S-Series Family

Qualitative/Quantitative Return on Investment: Maintaining critical equipment within the college's network infrastructure is necessary to prevent failure due to aging of obsolete components. The cost of implementing upgrades in a reactive way rather than as part of a planned renewal process can be much more costly.

Cost savings/Cost avoidance: A budget of $1,000,000 was approved for this project and ITS spent $934,038 on the initial order. This savings of $65,692 was due to additional discounting through our relationship with Enterasys and issuing a PO for the equipment prior to June 30th, 2011.

Target Completion Date: December 31, 2011

Actual Completion Date: May 20, 2012

IPv6 Planning

The purpose of this project was to develop a plan to support Internet Protocol version 6 (IPv6) in the campus network. IPv6 is the Internet's "next generation" protocol designed to succeed Internet Protocol version 4 that is widely used today. To communicate over the network, computers and other devices have numeric addresses analogous to telephone numbers. These numeric addresses are known as Internet Protocol (IP) addresses. As the Internet and the number of people using the Internet grows exponentially, so does the need for unique IP addresses.

The Internet Engineering Task Force (IETF) is the organization that develops Internet technologies. In the mid 1990's, the IETF developed a draft standard for IPv6, anticipating the need for more IP addresses in the future. IPv6 allows more users and devices to communicate over the network by using bigger numbers to create IP addresses. With IPv4, every IP address is 32 bits long, which allows for 4.3 billion unique addresses. In comparison, IPv6 addresses are 128 bits long, allowing for 2.3 Quintillion addresses. In other words, about one address for every square inch of the earth.

The reason for this project is that the supply of unique IP addresses is running out. In fact, as reported by potaroo.net, the supply of IPv4 addresses is already exhausted. So new requests for addresses going forward can only be fulfilled by using IPv6 addresses. As such, Sinclair has to be prepared to accommodate this addressing scheme. Much of the infrastructure equipment Sinclair uses is already compatible with IPv6 and the newest Microsoft Operating Systems, Windows 7 and Server 2008, come with IPv6 enabled.

The output of this project is a documented plan to implement IPv6 in the Campus network and support IPv6 addresses external to Sinclair's network. This plan will be used as the basis for the IPv6 Implementation Project in Fiscal 2013.

Qualitative/Quantitative Return on Investment: This project was investigational in scope and there was no ROI associated with this project.

Cost savings/Cost avoidance: This project was investigational in scope and there were no costs associated with this project.

Target Completion Date: June 30, 2012

Actual Completion Date: June 30, 2012

Systems/Network Procedure Improvements

Procedure Title:	Date:
	Procedure No:
Written/Revised By:	
Approved By:	

Figure 6 The header from ITS procedures documentation

The purpose of this project was to determine the most critical processes performed within ITS and then ensure that documentation exists for those process. There are various reasons to document critical processes, such as compliance, operational needs, management of risks and continuous improvement. This project was undertaken to primarily focus on the last two reasons, management of risk and continuous improvement.

Established procedures are a control activity necessary to effectively manage risks. These procedures document an individual's and/or department's knowledge of a process so that the process is accomplished in a standardized manner, minimizing the chance for unregulated activities to creep into those processes. This documentation is also important if an individual leaves Sinclair so that their knowledge of that process will be retained. In addition, some processes are only used very seldom and this documentation can help ensure that the process is executed in a standardized manner.

Documented processes also provide a base from which continuous improvements can be made. They provide a standardized method for executing processes with clear goals for the process. Changes implemented to improve those processes can then be compared to the original to ensure the goals of the process are still being met.

Within ITS, the Systems and Network Administration Department already had many of its most critical processes documented. However, changes in technology resulted in some of these procedures becoming outdated and not reflecting current processes. Procedures such as the server installation process, Citrix troubleshooting and maintenance, UNIX management and troubleshooting as well as disaster recovery procedures were updated to reflect current processes. In addition, new procedures were created around new technologies, such as the EMC disk array and the HP Network Attached Storage (NAS) system. Various network diagrams were also updated and created to reflect their current state.

The Server Configuration Management (SCM) database is a tool managed by ITS to track services offered by ITS and map those services to the specific devices that help provide those services. While the SCM listed the primary services provided, in many cases, those primary services depended on other services, or functions, to provide that primary service. We found that in some cases, these dependencies were not accurately tracked in the SCM. As part of this project, data in the SCM database was reviewed and those dependencies were added to the database. This will help more accurately predict downtime when a system malfunctions or maintenance is needed.

Qualitative/Quantitative Return on Investment: The time spent documenting processes will lead to more consistency in performing those processes and quicker resolution of problems.

Cost savings/Cost avoidance: Having documented processes will reduce errors in executing those processes, thus avoiding the costs that downtime would incur.

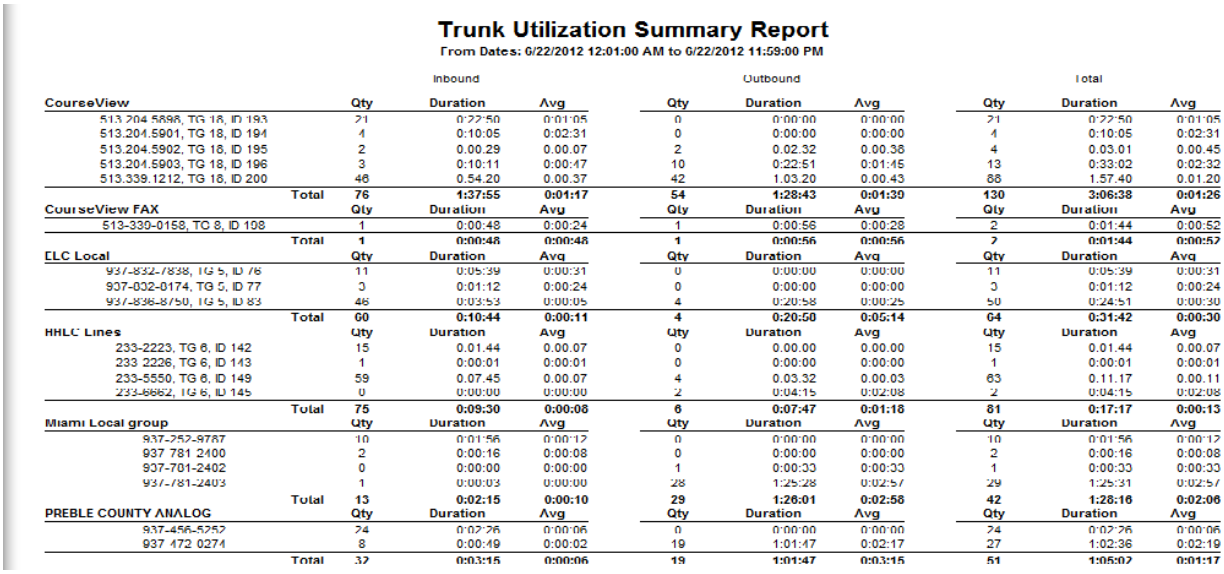
Target Completion Date: June 30, 2012

Actual Completion Date: June 30, 2012

ShoreTel Reporting Software

Two of the most used functions of the phone system to handle the call volume are the auto attendant feature and voice mail. As college departments have had to service ever increasing call volumes with the same amount of staffing there has been a heightened interest in getting data on phone operations in individual departments. The ShoreTel system has several reports inherent within its system but the reports do not adequately give an administrator the ability to measure and evaluate most departments' phone operations.

With the help of Palitto Consulting, a customized software portal was developed to extract the data residing in the ShoreTel system and customize reports to view statistics based on the call event records for the two functions mentioned above. These reports give increased drill-down capability from the standard reports that are a part of the ShoreTel system. Secondly, this new capability is set up on a web-based server so that the primary ShoreTel server is not overused with the report processing and that the raw data can be kept on a separate server as well.



Trunk Utilization Summary Report

From Dates: 6/22/2012 12:01:00 AM to 6/22/2012 11:59:00 PM

	Inbound			Outbound			Total		
CourseView	**Qty**	**Duration**	**Avg**	**Qty**	**Duration**	**Avg**	**Qty**	**Duration**	**Avg**
513.204.5898, TG 18, ID 193	21	0:22:50	0:01:05	0	0:00:00	0:00:00	21	0:22:50	0:01:05
513.204.5901, TG 18, ID 194	4	0:10:05	0:02:31	0	0:00:00	0:00:00	4	0:10:05	0:02:31
513.204.5902, TG 18, ID 195	2	0.00.29	0.00.07	2	0.02.32	0.00.38	4	0.03.01	0.00.45
513.204.5903, TG 18, ID 196	3	0:10:11	0:00:47	10	0:22:51	0:01:45	13	0:33:02	0:02:32
513.339.1212, TG 18, ID 200	46	0.54.20	0.00.37	42	1.03.20	0.00.43	88	1.57.40	0.01.20
Total	**76**	**1:37:55**	**0:01:17**	**54**	**1:28:43**	**0:01:39**	**130**	**3:06:38**	**0:01:26**
CourseView FAX	**Qty**	**Duration**	**Avg**	**Qty**	**Duration**	**Avg**	**Qty**	**Duration**	**Avg**
513-339-0158, TG 8, ID 108	1	0:00:48	0:00:24	1	0:00:56	0:00:28	2	0:01:44	0:00:52
Total	**1**	**0:00:48**	**0:00:48**	**1**	**0:00:56**	**0:00:56**	**2**	**0:01:44**	**0:00:52**
ELC Local	**Qty**	**Duration**	**Avg**	**Qty**	**Duration**	**Avg**	**Qty**	**Duration**	**Avg**
937-832-7838, TG 5, ID 76	11	0:05:39	0:00:31	0	0:00:00	0:00:00	11	0:05:39	0:00:31
937-832-0174, TG 5, ID 77	3	0:01:12	0:00:24	0	0:00:00	0:00:00	3	0:01:12	0:00:24
937-836-8750, TG 5, ID 83	46	0:03:53	0:00:05	4	0:20:58	0:00:25	50	0:24:51	0:00:30
Total	**60**	**0:10:44**	**0:00:11**	**4**	**0:20:58**	**0:05:14**	**64**	**0:31:42**	**0:00:30**
HHLC Lines	**Qty**	**Duration**	**Avg**	**Qty**	**Duration**	**Avg**	**Qty**	**Duration**	**Avg**
233-2223, TG 6, ID 142	15	0.01.44	0.00.07	0	0.00.00	0.00.00	15	0.01.44	0.00.07
233-2226, TG 6, ID 143	1	0:00:01	0:00:01	0	0:00:00	0:00:00	1	0:00:01	0:00:01
233-5550, TG 6, ID 149	59	0.07.45	0.00.07	4	0.03.32	0.00.03	63	0.11.17	0.00.11
233-8862, TG 6, ID 145	0	0:00:00	0:00:00	2	0:04:15	0:02:08	2	0:04:15	0:02:08
Total	**75**	**0:09:30**	**0:00:08**	**6**	**0:07:47**	**0:01:18**	**81**	**0:17:17**	**0:00:13**
Miami Local group	**Qty**	**Duration**	**Avg**	**Qty**	**Duration**	**Avg**	**Qty**	**Duration**	**Avg**
937-252-9787	10	0:01:56	0:00:12	0	0:00:00	0:00:00	10	0:01:56	0:00:12
937 781 2400	2	0:00:16	0:00:08	0	0:00:00	0:00:00	2	0:00:16	0:00:08
937-781-2402	0	0:00:00	0:00:00	1	0:00:33	0:00:33	1	0:00:33	0:00:33
937-781-2403	1	0:00:03	0:00:00	28	1:25:28	0:02:57	29	1:25:31	0:02:57
Total	**13**	**0:02:15**	**0:00:10**	**29**	**1:26:01**	**0:02:58**	**42**	**1:28:16**	**0:02:06**
PREBLE COUNTY ANALOG	**Qty**	**Duration**	**Avg**	**Qty**	**Duration**	**Avg**	**Qty**	**Duration**	**Avg**
937-456-5252	24	0:02:26	0:00:06	0	0:00:00	0:00:00	24	0:02:26	0:00:06
937 472 0274	8	0:00:49	0:00:02	19	1:01:47	0:02:17	27	1:02:36	0:02:19
Total	**32**	**0:03:15**	**0:00:06**	**19**	**1:01:47**	**0:03:15**	**51**	**1:05:02**	**0:01:17**

Figure 7 A report that shows the utilization of inbound/outbound call volumes

Qualitative/Quantitative Return on Investment: Increased use of the phone system capabilities with customized reports based on Sinclair's needs. This will give more timely information to evaluate operations of departments to adjust to the changing needs of a department.

Cost savings/Cost avoidance: This project was estimated to cost $17,000 but with added capabilities and modifications, the total cost of the project was $21,500.

Target Completion Date: March 31, 2012

Current status: The original date was March 31, 2012 and it was delayed because of other projects. It will complete by July 13, 2012. The portal is up and running with final testing and installation to be completed by July 13, 2012.

Fixed Mobile Communications

The concept of fixed mobile convergence is the trend towards seamless connectivity between a fixed and a wireless telecommunications network. It implies a physical network that will allow cellular telephone sets to function smoothly with a fixed infrastructure such as a phone system or a private wireless network. The ultimate goal of this convergence is to optimize the transmission of all data, voice, and video communications to and among clients, no matter what their location or device. In other words, this convergence means that a single device can connect through and be switched between the wired network of the phone system, the cell network, and the on-campus wireless network.

Based on the emerging technology and our current phone system's provider recent purchase of a company which provides this service, SCC chose to install the ShoreTel Mobility Router(SMR) along with client software which provides bridging and switch connectivity between a cell carrier and Wi-Fi networks. This router is a highly scalable network appliance that meshes the wireless LAN, the carrier cell network, and the ShoreTel phone system together to extend voice and Unified Communications to mobile devices. It lets users make and receive calls from both ShoreTel system and the personal cell numbers by automatically selecting the best network (Wi-Fi or cellular) with fast and automatic network handover.

In the process of enabling the SMR to work with the ShoreTel phone system, the main server was replaced due to the R&R schedule and two system software upgrades had to be performed.

Qualitative/Quantitative Return on Investment: With this technology, SCC can benefit from a lower cost of providing in-building voice coverage by leveraging the existing wireless network, reduce mobile calls costs through the least cost routing while on campus, and maintain call quality and cell phone battery life. Ultimately, this will gain efficiencies in common wireless devices and reduce our dependence on cell phones for everyday use while on campus.

Cost savings/Cost avoidance: The total projected cost of this project was $50,000. However, with cost efficiencies in installation the project will cost $20,000.

Target Completion Date: April 1, 2012

Actual Completion Date: May 15, 2012

Wireless Network Needs Identification

As the availability of wireless devices and e-books as an alternative to hard copy text books continues to grow, the need for wireless access in the classroom will be increasingly important. Currently the wireless access on campus is mainly in public spaces, and only classrooms that are adjacent to these spaces have coverage. A small number of additional classrooms have coverage based on the need to support laptops that have been purchased for a particular academic program.

This fiscal year ITS worked with the Instruction division to develop a plan for determining how classrooms that should have wireless capability will be identified and created a list of 40 rooms to be done for FY 13. Also, the cost for the wireless equipment, cabling, and installation was identified and budgeted for in the Instruction Division's FY 13 capital process.

Figure 8 Wireless access is provided throughout public spaces on campus

Qualitative/Quantitative Return on Investment: This project supports the Bookstore's initiative to rent netbooks and sell e-books, which will result in increased revenue. Developing a plan for strategically placing wireless in classrooms is more cost effective than unplanned, reactive installations of equipment that would occur over the next few years.

Cost Savings/Cost Avoidance: There was no cost for this project as it identified the scope of the work to be done and provided an estimated cost requested in the FY 13 capital budgeting process.

Target Completion Date: December 31, 2011

Actual Completion Date: December 15, 2011

Cable Television System Upgrade

The Sinclair Cable Television system is used by Sinclair for more than just the distribution of broadcast entertainment. It is a video distribution network that ITS can use to transmit video throughout the campus. Satellite conferences and other video events can be viewed in virtually any classroom on campus using the campus television system. In addition, the CastNET campus messaging system and the Qflow system used by the Counselor's office, Financial Aid, and Enrollment Services are broadcast to monitors throughout campus using the campus television system.

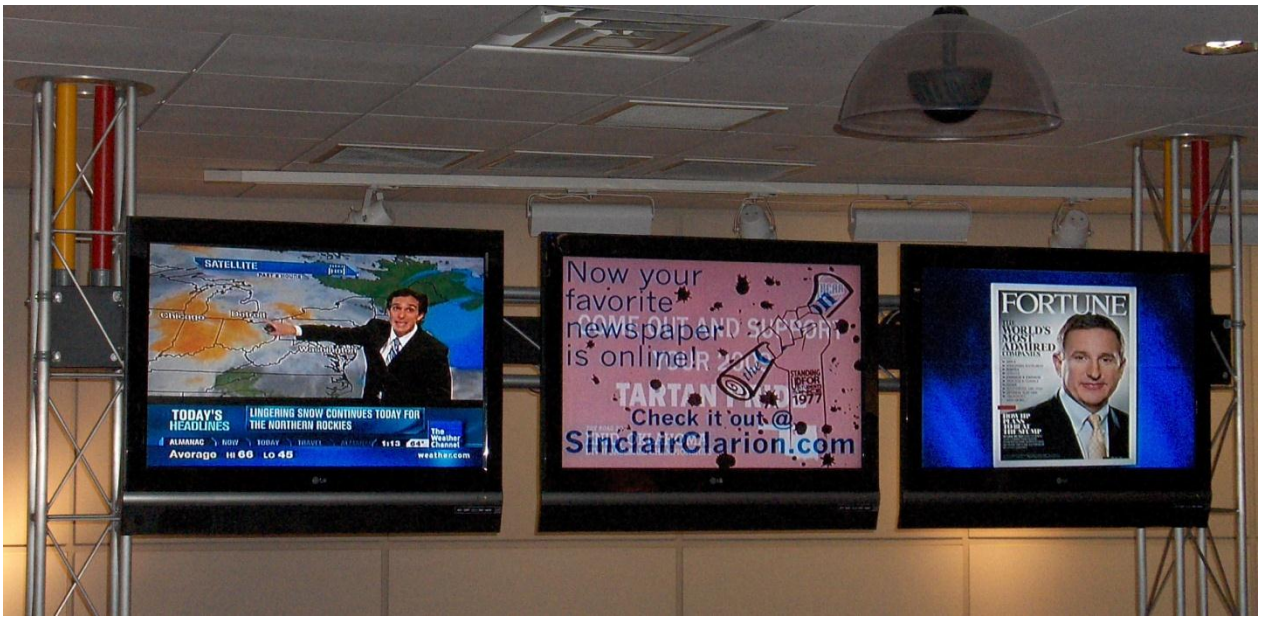


Figure 9 The campus cable TV system displays multiple types of video in building 14.

This year we completed a project to upgrade the campus television system to transmit digital signals while leveraging the existing infrastructure. ITS hired Heapy Engineering to provide design, contract administration, and field observation for the upgrade of the CATV Head End for Digital and HD Broadcast. The specifics of this contract included the college being provided the design for new frequency agile Digital Cable decoders to

receive and decode channels to baseband audio/video and feed into the existing analog NTSC modulators currently used for the AV System. This upgrade provides the college with the ability to have some digital content on both the analog and digital sides of the CATV Head End until a full switch over to Digital can be completed.

Qualitative/Quantitative Return on Investment: Updating now to a system designed to leverage technologies used throughout campus reduces future maintenance and upkeep costs. The college will also be able to broadcast in digital and provide a clearer picture.

Cost Savings/Cost Avoidance: This project was budgeted for $ 250,000 and the upgrade was done for $ 139,564 for a savings of $ 110,426 for the college.

Target Completion Date: December 31, 2011

Actual Completion Date: May 31, 2012

Multimedia Podium Expansion

In Fiscal year 2009 a project was created to analyze multimedia presentation equipment needs for Sinclair's Downtown Dayton campus and to provide a recommendation including costs for installing standard multimedia presentation systems in all remaining classrooms and labs throughout the Dayton campus.

This analysis determined a minimum set of equipment for every classroom and lab space on campus and in fiscal year's 2010 and 2011, ITS worked with Facilities Management and the Instruction division to upgrade 65 classrooms to the new multimedia standard. This brought the total number of multimedia-capable classrooms to 274.

As of the beginning of FY12, the college had 34 remaining classrooms that did not have a standardized multimedia setup installed. During this year the remainder of these rooms had equipment installed, completing this multi-year project.

Qualitative/Quantitative Return on Investment: Sinclair now has a total of 308 classrooms with multimedia functionality on the Dayton campus and at the remote sites, enabling the ability to for rooms to be more efficiently scheduled and for all faculty to be able to rely on a standard set of equipment to use in all Sinclair academic spaces.

Cost savings/Cost avoidance: Effective use of space translates into time savings for instructors who can count on the same presentation equipment being in any classroom in which they are scheduled to teach.

Target Completion Date: May 31, 2012

Actual Completion Date: May 31, 2012

Help Desk System Update

BMC Service Desk Express is used by IT (Help Desk, Network, NOC, Technical Support, and System Development & Maintenance) and Facilities Management to assign, view and track requests, run reports and allow Sinclair faculty, staff or students to enter work requests to report problems and check the status of requests.

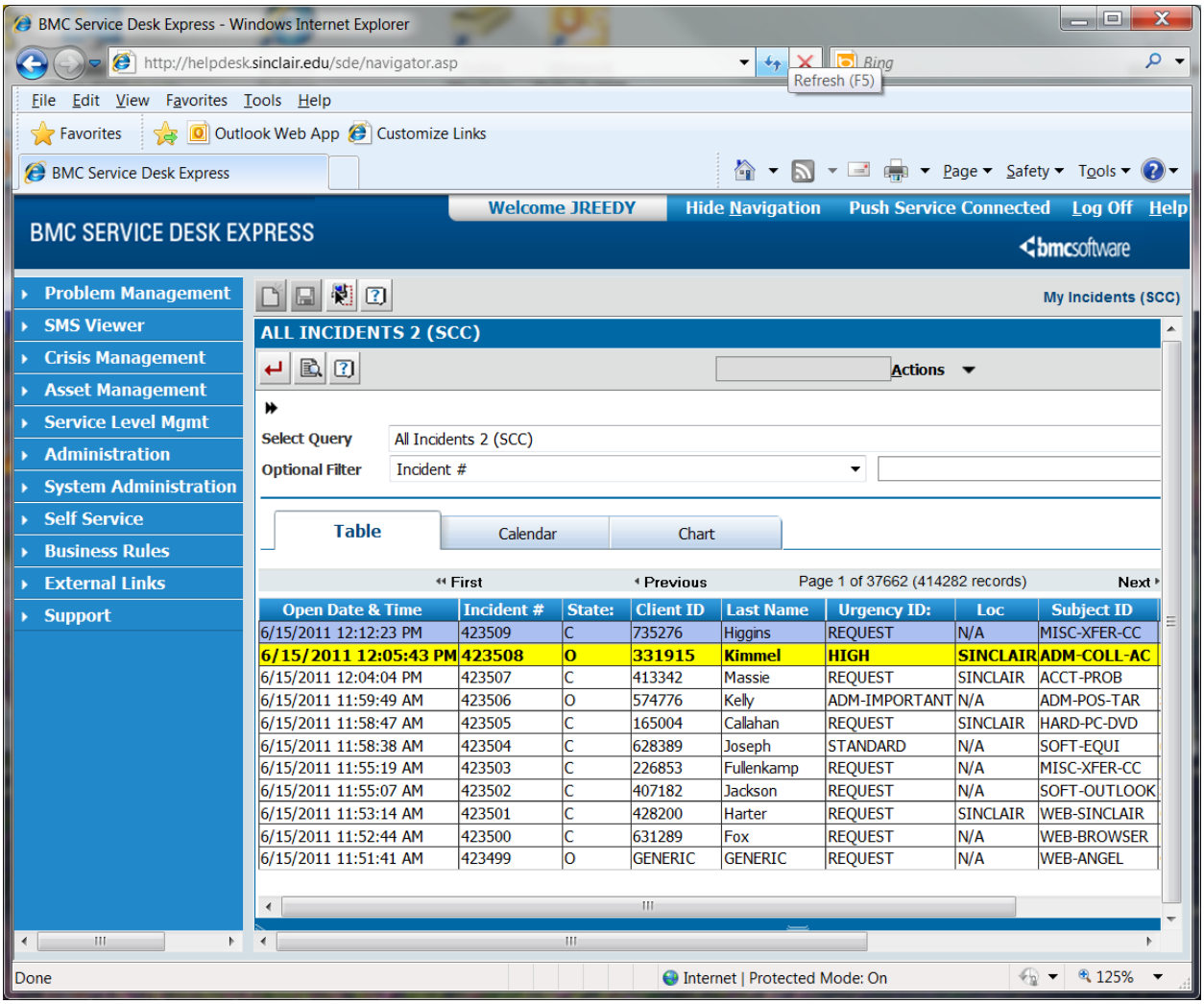


Figure 10 The Help Desk's BMC Service Desk Express software

This project's goal was to coordinate the installation, test and implement the upgrade of BMC Service Desk Express Suite Version: 9.2 to BMC Service Desk Express Suite Version: 10.1. This upgrade would allow IT and Facilities Management to maintain vendor's support and have additional functionality.

To upgrade, ITS needed to import data, business rules, client information, support staff members, groups and transaction data. Because of the complexity of the project, IT contracted RightStar to come to Sinclair and setup a test system. After testing was

complete RightStar would help Sinclair implement the test system into the production environment. The timeline for this project was planned to take a month from test to full implementation. During that time no changes could be made to the live system, this included form changes, business rules, email formatting, subject changes, etc.

Qualitative/Quantitative Return on Investment: Assign, view and track requests, run reports.

Cost savings/Cost avoidance: Maintain vendor's support

Target Completion Date: 4/30/2012

Current status: RightStar setup the test system the week of March 5, 2012. After RightStar upgraded the system the server's CPU performance began spiking to almost 100%. RightStar was unable to resolve the performance and ITS is working directly with BMC to resolve the issue.

Fax Server

As paper forms have been replaced by electronic documents and web forms, the requirements by most offices for fax machines has continued to decline. However, many offices still have the need for fax machines on a regular basis, and most people have the need to send or receive a fax on a very infrequent basis. These factors have resulted in Sinclair offices having a total of 170 fax machines. Some of these fax machines have very high usage, but many of them have almost no usage.

This year ITS investigated alternatives for providing a centralized, network-based fax server that would allow the replacement of separate fax machines around campus. The system that was sought would be usable by every user on the network, and therefore would not require the continuation of the installation of separate fax machines and the associated costs to maintain an analog phone line for each machine.

During our investigation we determined that there is a wide variety of fax server alternatives and many of these solutions provide much more capability than what was being sought. We identified a system that was strictly a fax server and worked with a vendor to install the system on the Sinclair network and test it's functionality. This testing was beneficial in that we learned much about these types of systems and how they integrate with the college's network and the ShoreTel phone system. However we were not satisfied with the vendor's ability to support the system.

We next contacted Ricoh, who provides support for our satellite copier fleet to determine if they had a system that they would recommend. We learned that Ricoh supports OpenText's RightFax and that this system appears to have some tight integration with the Ricoh copiers that Sinclair uses as well as the Equitrac system for providing chargeback. We decided to move forward with a proof-of-concept with this system to determine whether it is the system that we will implement. This project will continue into next year to finalize the evaluation of RightFax and either to evaluate other products and possibly develop plans for implementing a solution.

Figure 11 A typical standalone fax machine and a Multi-Function Printer which includes fax capabilities

Qualitative/Quantitative Return on Investment: This evaluation project has not yet led to a recommended solution to implement, so neither the cost nor the return has been determined. This was an evaluation project to determine whether there was a system that could meet our needs and therefore did not have any cost associated. If a system is selected then a ROI analysis will be performed to determine whether to move forward. The solutions that are available have a wide range of prices, however, limiting the scope of this project should allow the cost to be somewhere between $10,000 and $15,000.

Cost savings/Cost avoidance: The ongoing costs related to the replacement of fax machines and the maintenance of analog phone line equipment would be eliminated or greatly reduced.

Target Completion Date: June 30, 2012

Current Status: The proof-of-concept of the RightFax system began on June 19, 2012.

Print/Copy Chargeback Expansion

During fiscal 2010 ITS evaluated pay-for-print solutions to determine which system would provide for the best replacement of the GoPrint system that had been in place for several years in a number of academic labs. The solution that was chosen was Equitrac, which replaced GoPrint and was subsequently installed in all remaining academic spaces during fiscal 2011. In the beginning of fiscal 2011 ITS also switched the satellite copier fleet to use Equitrac for performing chargeback. These copiers had

previously used the Tartan Card system for allowing departmental chargeback, which did not provide adequate reporting and management control.

Having all printer and copier chargeback under the Equitrac system has provided significant improvements in the quality of data that is available regarding the usage of campus printers and copiers. During this fiscal year the plan was to migrate the remainder of campus printers, which are in administrative offices, to Equitrac. This provides much better access to information by budget managers and decreases costs by reducing waste and improving user accoutability.

The project began with testing the communication, training, and implementation components of the project with volunteer departments. After this pilot phase was completed we started implementing building-by-building. Initially the buildings were done with several weeks in between. Eventually we began doing a building per week, except for during times that could cause problems, such as the beginning or end of a quarter. The focus was on buildings that are primarily used for instruction so faculty could experience the change before the end of Spring quarter, rather than face this change along with the change to semesters in the Fall.

Along with the implementation of charging for printing through Equitrac, ITS also transitioned the purchasing of supplies from departments to ITS. A new web-based system was implemented to allow departments to order their print consumables and have them delivered to their offices. The implementation has gone very well and only 2, primarily administrative buildings, remain to be converted.

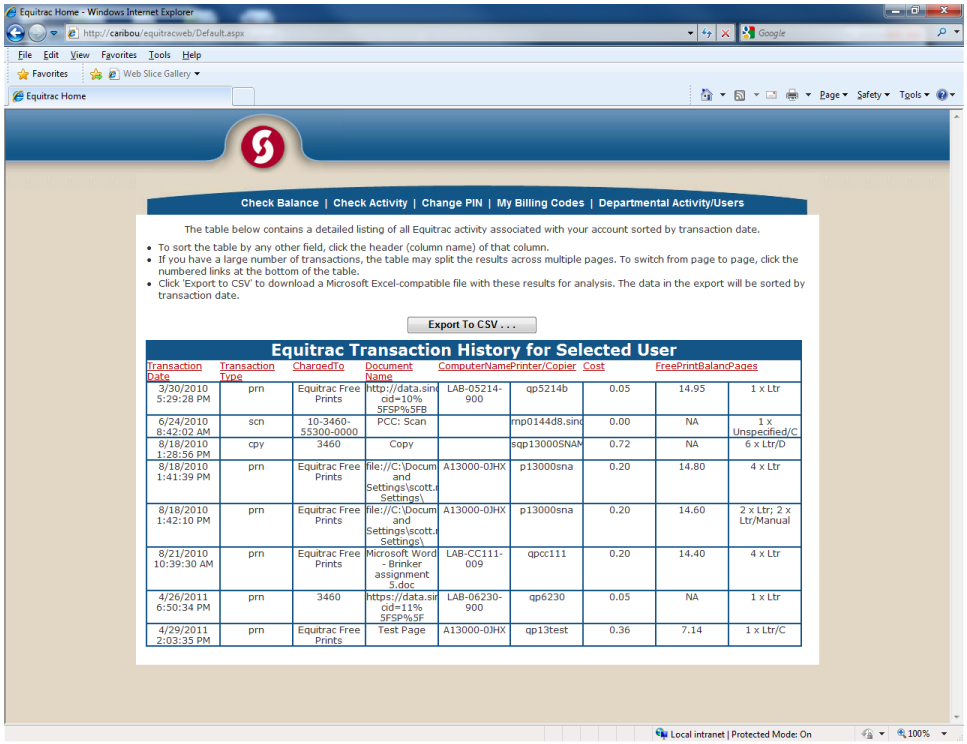


Figure 12 The Equitrac website provides information on print and copy charges

Qualitative/Quantitative Return on Investment: There are no additional costs for this project as the Equitrac software has already been purchased and the payback for that investment was realized after implementation in academic spaces.

Cost savings/Cost avoidance: The cost savings that would be realized by implementing departmental chargeback of employee printing has been estimated at $388,695 over a 5 year period.

Target Completion Date: June 30, 2012

Current Status: Equitrac has been implemented in all administrative offices except for in buildings 7 and 10. Those offices will be implemented during July 2012.

Crestron RoomView Server Replacement

Crestron RoomView Express is a powerful audio/video asset management software tool that gives ITS the ability to easily track and manage AV equipment in classrooms across all 5 of Sinclair's campuses. While connected to each room, RoomView displays system and projector power status, lamp life, alerts, and other vital statistics.
This past year, Information Technology Services was able to migrate the 5 year old installation of Roomview Express from an unsupported Windows 2000 server configuration, to a new state of the art Windows 2008 R2 server. This new server has plenty of memory and processing power to handle Sinclair's current and future multimedia room inventory as well as the ability to add additional automation features such as HVAC and lighting control.

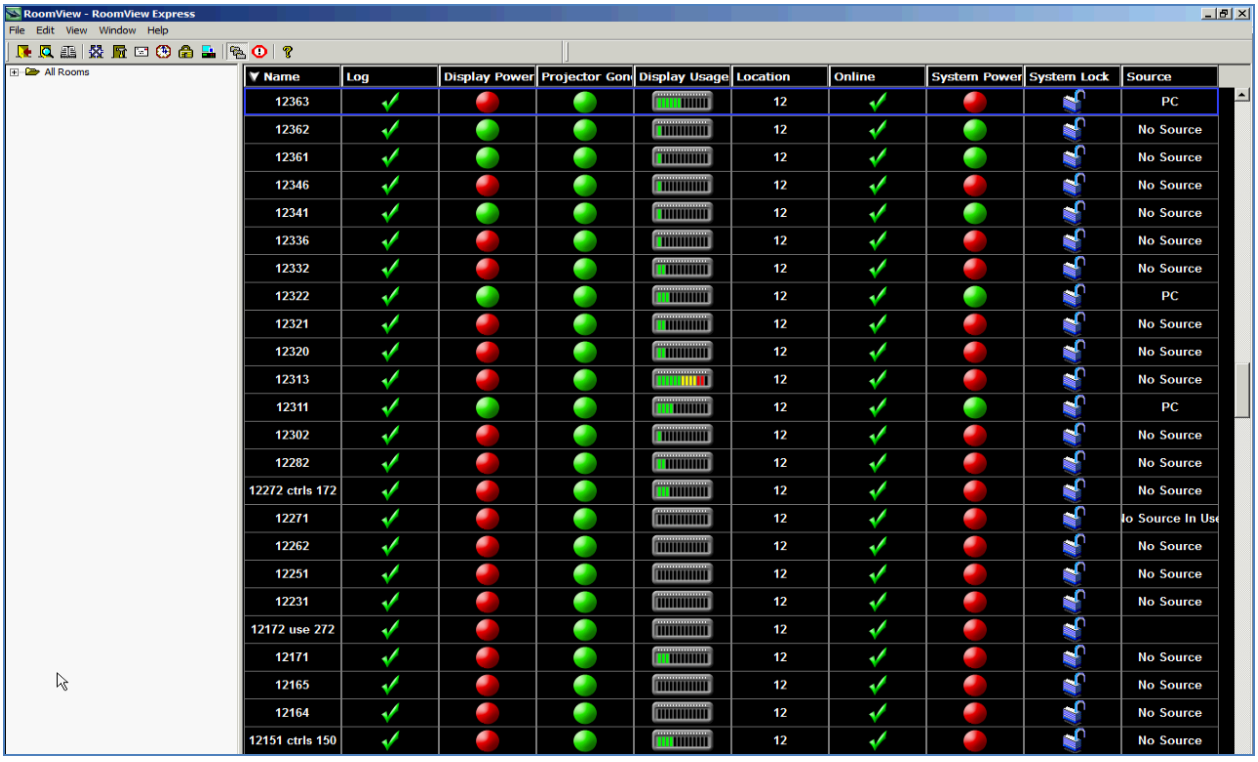


Figure 13 The Roomview Express console shows the state of all classroom projectors

Qualitative/Quantitative Return on Investment: The Windows 2000 server had exceeded its useful life and was replaced with previously allocated R&R funds. There were no additional Crestron Roomview software license costs or maintenance. Increased productivity is realized due to employees spending less time going room to room to gather projector statistics, all the data is available at their fingertips.

Cost Savings/Cost avoidance: Microsoft support for Windows 2000 officially ended July 13, 2010. No security fixes, patches, or service packs have been released since then, placing the college at risk. Moving to the latest version of Windows provides Sinclair with increased security and stability, both of which have the ability to save the college money.

Target Completion Date: December 30, 2011

Actual Completion Date: October 4, 2011

Software De-duplication Implementation

Data De-duplication is the process of eliminating duplicate or redundant data to improve storage utilization. De-duplication identifies identical sections of data and replaces them with references to a single copy of the data. De-duplication is able to reduce the required storage capacity as only the unique data is stored.

In June 2011, Information Technology Services implemented de-duplication via Data Domain hardware appliances on the Dayton and Courseview campuses. This year, ITS utilized the de-duplication option built into our Symantec backup software to enable de-duplication at Miami Valley Research Park (MVRP).

A Symantec Netbackup de-duplication media server was installed at MVRP, utilizing an existing server, and backups are successfully being de-duplicated and stored on disk. After the weekly and monthly backups complete successfully, the data is replicated to the Dayton campus via optimized replication providing site level recoverability in the event of a disaster.

Previously, MVRP backups were sent to a backup tape and then sent to the Dayton campus via campus mail services. If data needed to be restored at MVRP, ITS sent the tape back, a User Support Technician would load the tape into the drive, and a NOC Technician would begin the restore. Thanks to data de-duplication a full set of weekly and monthly backups of all 7 MVRP servers are stored on disk, onsite, providing the site with instant restores from disk.

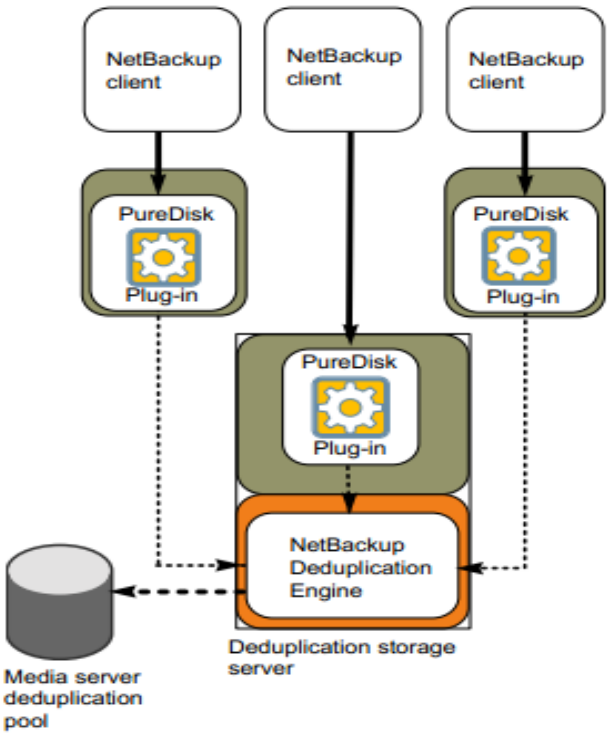


Figure 14 The process of de-duplication of backup data using Symantec NetBackup

Qualitative/Quantitative Return on Investment: Quantitatively, there are cost savings from less hardware and tape media purchases. Quantitatively, increased productivity is realized due to employees spending less time on backups, restores, and tape media management and troubleshooting.

Cost Savings/Cost avoidance: De-duplication lowers storage costs, as duplicate data is not stored, and shortens backup/recovery times as there are no tapes to mount or search. Performing de-duplication using built-in capabilities of the NetBackup software does not add any cost as would buying hardware de-duplication appliances.

Target Completion Date: June 30, 2012

Actual Completion Date: April 25, 2012

Hosted Virtual Desktops

At the start of spring quarter 2009, a remote access solution utilizing Citrix XenDesktop went into production. At the time of implementation, virtual desktops were installed within Sinclair's existing VMware virtual infrastructure. In fiscal 2011, a project was defined and completed that replaced the VMware virtual infrastructure with a Citrix XenServer infrastructure.

This Hosted Virtual Desktop project involved creating a new Microsoft Windows XP image in the XenServer environment and increasing the number of virtual desktops available to the users.

Both a Windows 7 and a Windows XP image were created in the XenServer environment but only the Windows XP image was used to create virtual desktops as there was no academic need to offer a Windows 7 virtual desktop at that time. In fact, as we were rolling out Windows 7 to the physical desktops across campus, we found that some applications did not support Windows 7. In those cases, the Windows XP virtual desktop was used to run those applications.

The number of virtual desktops available to the users was increased from 40 to 100. Information Technology Services (ITS) monitored those virtual desktops throughout the year and found that number adequate for the number of users and did not need to further expand the number of virtual desktops deployed this fiscal year.

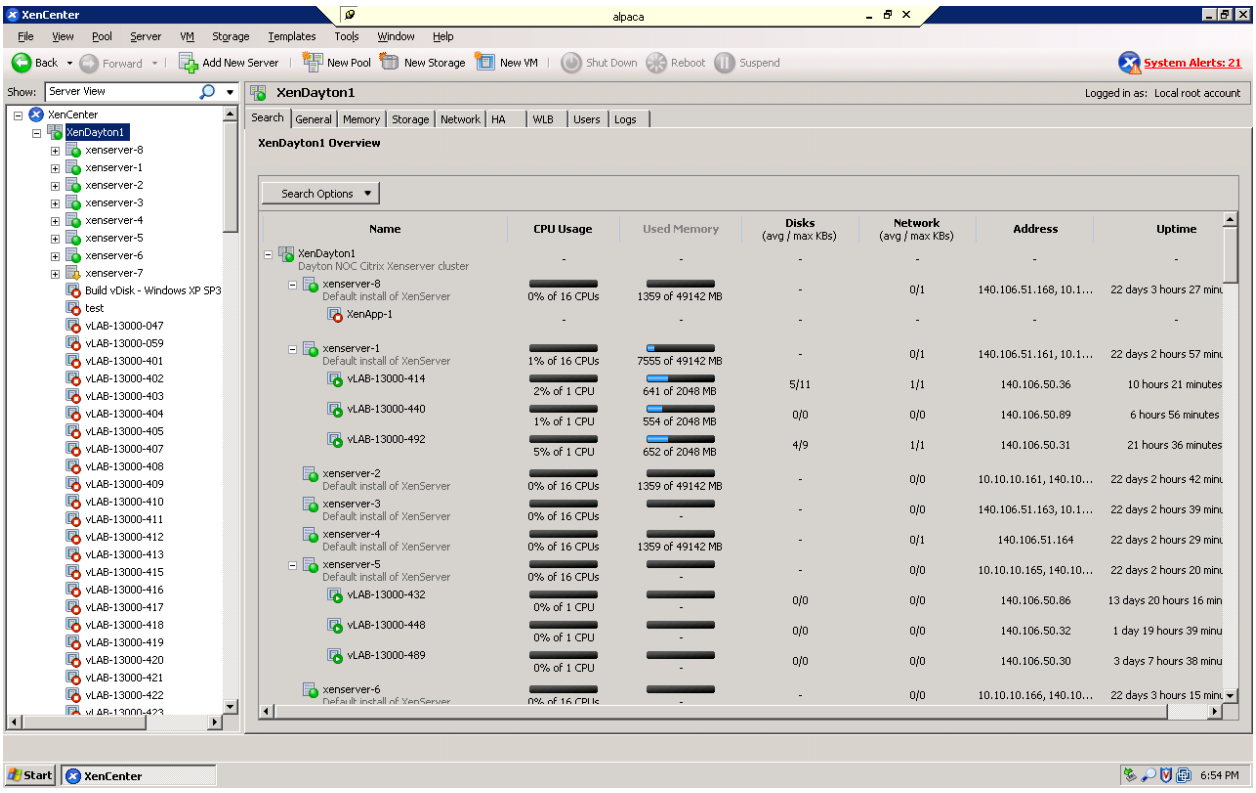


Figure 15 The Citrix XenCenter console

Qualitative/Quantitative Return on Investment: Running Citrix virtual desktops in a Citrix virtual server cluster will provide improved support and decrease conflicts that could make the system unavailable.

Cost Savings/Cost avoidance: There were no costs associated with project as it used resources purchased in earlier projects.

Target Completion Date: June 30, 2012

Actual Completion Date: June 30, 2012

Digital Asset Management System Replacement

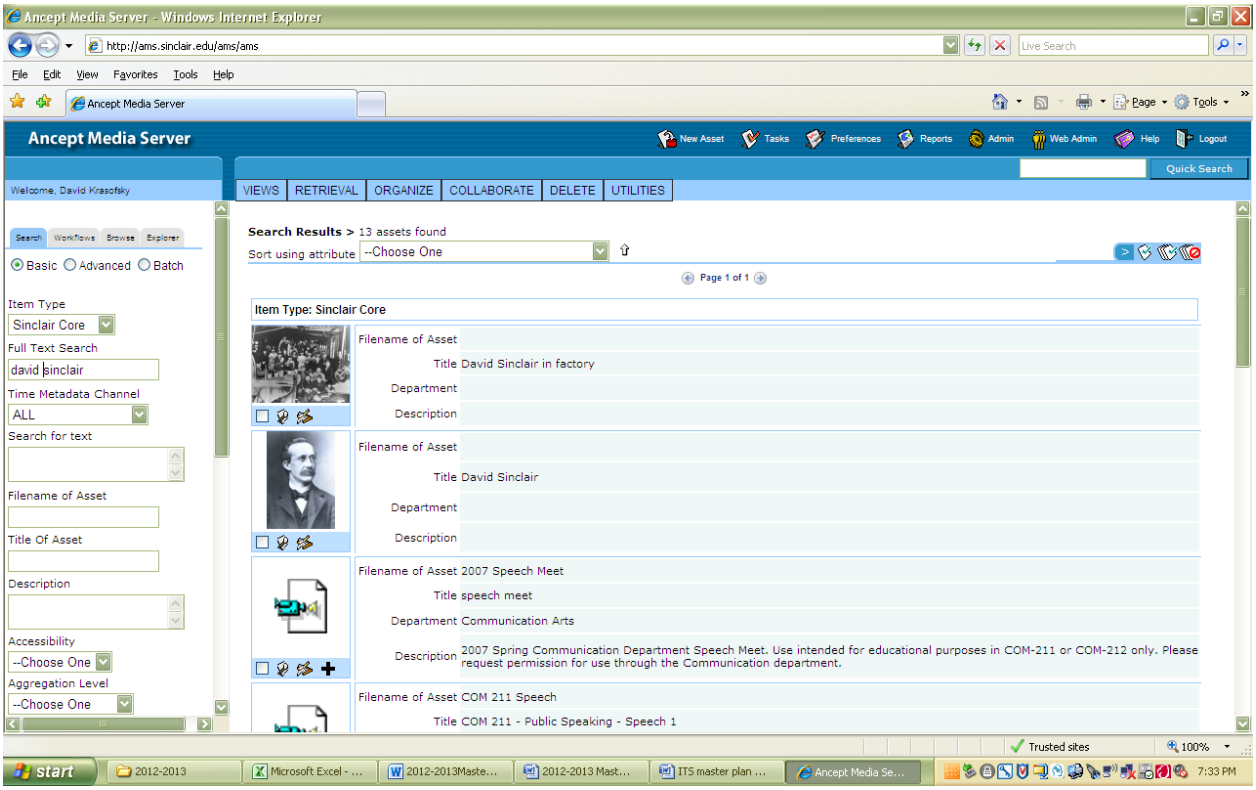


Figure 16 Digistore's New Web Interface

In 2005, Sinclair's Information Technology Services (ITS) department in partnership with Distance Learning, implemented "digistore.sinclair.edu", a Digital Asset Management system. This system enabled faculty and staff to store and catalog large documents, files, and rich multimedia content for sharing with students, faculty and staff as learning objects or stand-alone media files.

In fiscal 2011, ITS staff met with representatives from Distance Learning to review the Digistore system's capabilities and to benchmark it against available products that may better meet the needs of Sinclair's students, faculty, and staff. After review, it was determined that the current Digistore system is satisfactory for today's usage. However, our current system may not meet our future needs as we move to more high definition (HD) content, mobile access, 3D video and "youtube" like functionality. Systems that provide for these future needs could potentially be realized synergistically with our current system. In other words, our current capabilities could be expanded by adding to our existing system rather than replacing our current system.

Due to these findings, ITS and Distance Learning decided to go forward with upgrading Sinclair's current system in fiscal 2012. ViewCast, formerly Ancept, was contracted to help ITS perform this upgrade. Four physical servers were purchased to replace the existing hardware and the latest versions of component software were installed. All user accounts and data were migrated from the old system to the new system. Since the new versions of the software present with a slightly different user interface, Distance Learning assisted the users with using the new system and updated the training documentation. Web Systems was involved with reconfiguring the single sign-on and Digital Asset Management System License Agreement web page used to access the Digistore system.

Qualitative/Quantitative Return on Investment: This project helps to ensure that the storage and retrieval of digital assets remains reliable, robust and current with the prevailing technologies.

Cost Savings/Cost avoidance: Replacing the aging hardware decreases the probability of a hardware failure and the costs associated with the loss of services and/or data.

Target Completion Date: September 5, 2011

Actual Completion Date: October 4, 2011

Telecommunication Equipment UPS Management Improvements

ITS maintains over 33 telecommunication closets on the Dayton campus and across 5 different remote sites. Each of these closets contains critical IT infrastructure equipment. To protect this equipment from failure, each closet is equipped with multiple UPSs (uninterruptible power supplies). The capabilities and management of these devices has changed significantly over the past 6 months.

Prior to this project, all UPSs were not being configured in exactly the same way, which resulted in telecommunication closet blind spots. There were areas on campus where ITS could not verify telecommunication equipment was being adequately protected. The Network Operations Center lead an initiative to verify each and every closet UPS, ensuring a proper configuration (NTP, DNS, NAC, DHCP reservation, and weekly Self-Test) and verifying successful SNMP error/warning reporting to the HP Operations Manager console.

As of June 2012, all 76 closet UPSs in the 33 telecommunication closets have been configured successfully and a procedure has been put in place to ensure all newly purchased closet UPSs are configured exactly the same way.

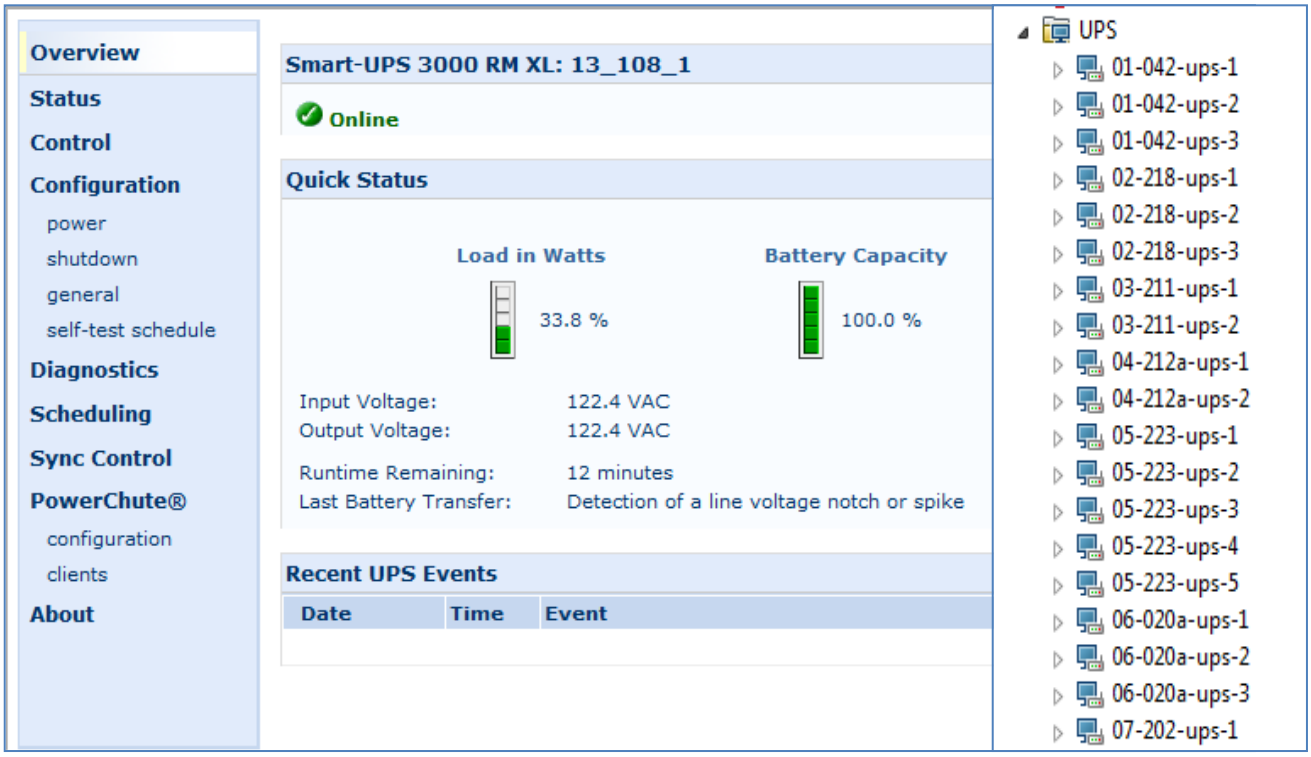


Figure 17 UPS Configuration Screen and Operations Manager UPS Inventory

Qualitative/Quantitative Return on Investment: Investing time and money into the monitoring and protection of the telecomm closet equipment now could prevent a multimillion dollar loss of equipment and data in the future.

Cost Savings/Cost avoidance: Telecomm closet downtime can squander productivity for both students and employees. Proactively monitoring and managing the telecomm UPSs helps to ensure campus wide network availability.

Target Completion Date: February 1, 2012

Actual Completion Date: May 25, 2012

Wireless NAC

In early 2005, Information Technology Services (ITS) began implementing a number of technologies on the campus network which were commonly known as “Network Access Control” or NAC. These technologies have since expanded and developed and now collectively comprise Sinclair’s Secure LAN Strategy. This strategy encompasses technologies that use intelligence built into the network devices to automatically limit network communication based on device and/or user ID. This puts the control over the

network's security into the hands of the College rather than at the mercy of the various devices that can be connected.

Since the time that the Secure LAN Strategy was implemented, newer technologies were released by Enterasys, the college's network infrastructure vendor, which improved the security of the network while still allowing users access to the resources they need. The Enterasys NAC Appliance is a device ITS implemented in fiscal 2011 to take advantage of these new technologies. However, at the time of implementation, these new technologies were only available to protect devices physically connected, or wired, to the network. It did not protect Sinclair from devices connected wirelessly. Updates to these devices as well as upgrades to Sinclair's wireless infrastructure made it possible to implement some of these newer technologies within the wireless infrastructure.

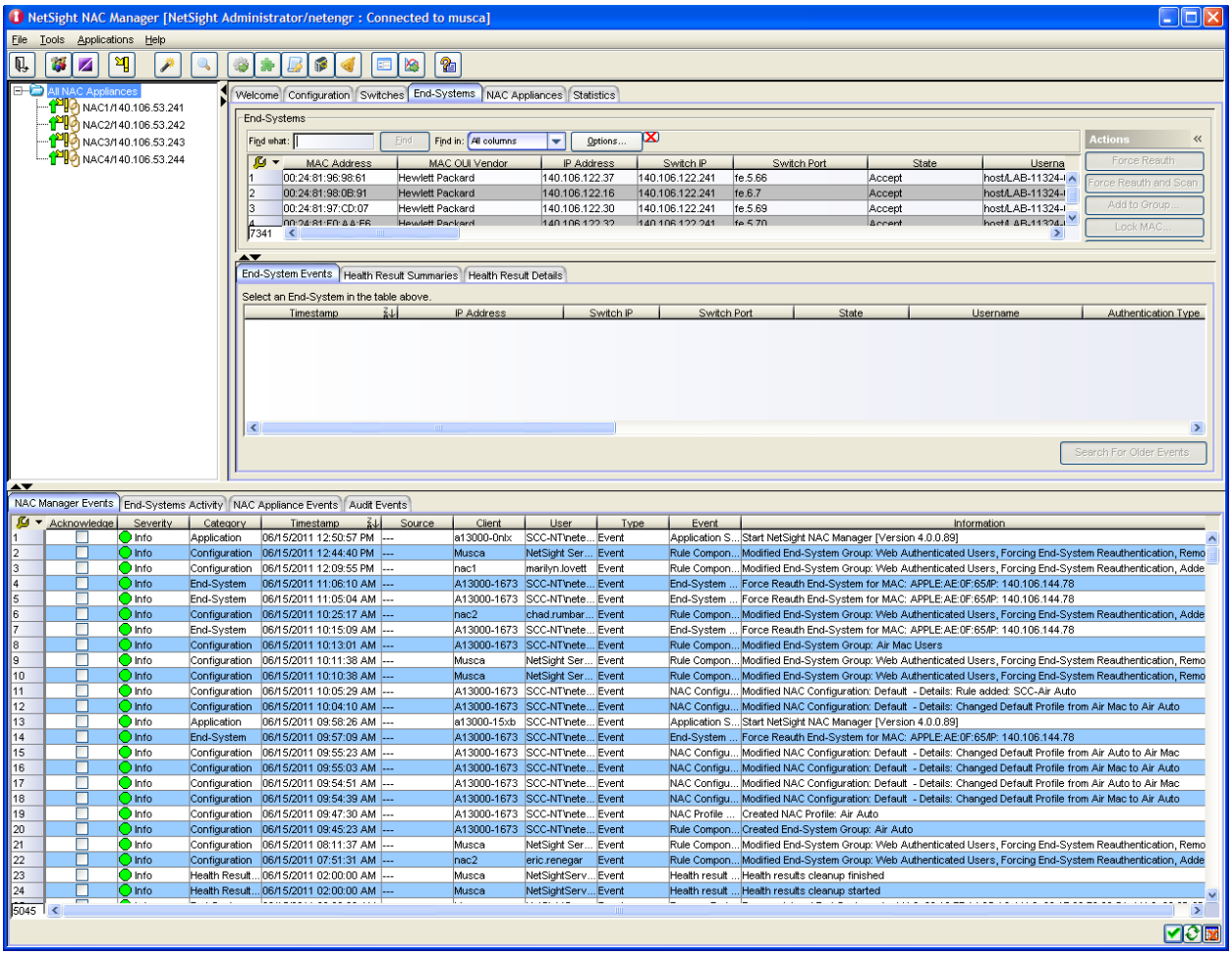


Figure 18 NAC Manager interface used for managing the NAC system

This project incorporated NAC policies into the wireless infrastructure. A NAC policy is a rule, or set of rules, that define the type of access a user has to the Sinclair network based on the users login ID and/or device type. The use of policies allows ITS to reduce the number of Wireless networks it had to manage since the policy controls access to network resources. In addition to providing enhanced, and more granular,

security within the wireless network, the reduction of networks should result in less confusion to the users as well as make the wireless network more manageable.

Qualitative/Quantitative Return on Investment: The main benefits associated with this project are qualitative in terms of more efficient management and increased user satisfaction due to limited user options.

Cost savings/Cost avoidance: There were no direct costs associated with this project as this project utilized technologies already purchased.

Target Completion Date: June 30, 2012

Actual Completion Date: September 26, 2011

Foundry-to-F5 Migration

Information Technology Services (ITS) maintains a plan for the annual renewal & replacement (R&R) of information technology infrastructure components. This plan is used to project expenditures of these components over a five year period to provide the college's leadership with information to aid in budget planning. Each year, during the annual planning and budgeting cycle, the R&R plan is updated with any new information that would change expected expenditures for the coming year as well as the next four years.

Each item that is identified on the R&R plan has a useful life. This useful life along with the total cost of the equipment, determines the funds that must be set aside each year to replace the equipment when it has reached its end of life. Network Infrastructure equipment has an estimated useful life of five years. The Foundry Server Iron devices that provided server load balancing functions had reached the end of their useful life and were due for replacement in Fiscal 2012.

Before replacing equipment through the R&R process, the current equipment model and vendor is compared against prevailing technologies. ITS decided to replace the two Foundry devices with two devices manufactured by F5 Technologies. After the F5 appliances were installed, all the servers were migrated from the Foundry devices to the F5 devices. At the end of the project, the Foundry devices were removed from the computer room.

Figure 19 F5 Big-IP Load Balancing Device

Qualitative/Quantitative Return on Investment: The F5 device will provide ITS with enhanced load balancing capabilities, some of which were used when load balancing the Angel servers.

Cost savings/Cost avoidance: There was no cost savings/cost avoidance associated with this project and the equipment was purchased within budget.

Target Completion Date: September 5, 2011

Actual Completion Date: October 31, 2011

CIS Server and Network Upgrade

The purpose of this project was to complete the transition of the CIS servers into the Information Technology Services (ITS) production environment. In 2008, ITS began providing support and management for the CIS department's labs, networks and servers. The original configuration consisted of standalone servers located in building 14 communicating with PC's over separate networks located in buildings 4, 5 and 14. CIS users also had to use unique login names and passwords to access CIS resources. They could not use their my.sinclair.edu user ID's that they used for all other college related functions. ITS used virtual servers, application virtualization and Enterasys network equipment to upgrade the CIS infrastructure.

The three standalone servers were replaced with two new physical servers hosting 7 virtual servers. These physical servers were installed in the data center in building 13. Moving the servers to the data center provides a secure facility with UPS, fire suppression, backups and monitoring. In addition to moving the servers, the CIS servers were integrated into the sinclair.edu domain which allows CIS students to access CIS resources using their network login ID's and also enabled ITS to use automated scripts to provision CIS resources for each CIS student and CIS class.

The move of the servers to the data center and the use of one login ID allowed ITS to remove the CIS specific networks from buildings 4, 5 and 14. ITS also replaced the Cisco equipment with standard Enterasys network equipment; thus creating and implementing an overall design for this network that allowed for integration into the Sinclair network as well as removing complexity from the CIS network.

Qualitative/Quantitative Return on Investment: The CIS infrastructure is now secure with an uptime of 100% providing CIS students the ability to login anywhere on campus, and in some cases, off campus, to complete their assignments. CIS students can also use one login to access all of their classes on campus. The servers are monitored 24 x 7 and included in the standard backup process. Adding CIS applications to App-V, where possible, has also given the CIS department the ability to offer more classes and sections using other labs on campus. Setting up applications for CIS classes is more efficient with MSSQL, my SQL, Apache, PHP, IIS and .NET Framework permanently loaded on their virtual servers.

Cost savings/Cost avoidance: These changes have provided CIS students with a stable environment for their classes. Upgrading the server hardware, adding virtual

servers, upgrading the network equipment, changing the network design and streamlining the CIS student login process was done with no additional cost beyond the use of R&R funds.

Target Completion Date: September 1, 2011

Actual Completion Date: September 1, 2011

McAfee Client Upgrade

On December 30th, 2011, McAfee VirusScan 8.5 reached "end-of-life" on McAfee's software lifecycle. At the beginning of fiscal 2012, this version of VirusScan was the predominant version installed on PC's and servers. To allow all of Sinclair's PC's and servers to remain on a supported Anti-Virus version and remain current with virus definition update files, Information Technology Services (ITS) created a project to upgrade the version of VirusScan installed on PC's and servers to version 8.8.

Before the VirusScan application itself could be upgraded, ITS upgraded the McAfee Agent for Windows on all PC's to version 4.6 using McAfee e-Policy Orchestrator (ePO), the server application used to manage McAfee VirusScan. The McAfee ePO application was upgraded to version 4.5 Patch 4 since this version was a pre-requisite before upgrading the agent on Widows servers. After the ePO upgrade, McAfee Agent 4.6 was installed on all Windows servers.

ePO was then used to upgrade VirusScan on all PC's to version 8.8. VirusScan 8.8 was also added to the core image so that newly installed PCs would have the correct version of the software. For many servers, specific VirusScan policies had been created so that VirusScan would not interfere with the applications installed on those servers. These policies were recreated in VirusScan 8.8 and ePO was once again used to upgrade VirusScan on the servers. In November 2011, McAfee released ePO version 8.6.1, which was installed in December 2011.

Qualitative/Quantitative Return on Investment: With ever increasing viral and malware threats, keeping the Anti-Virus software current is imperative in ensuring a secure computing environment.

Cost savings/Cost avoidance: There were no costs associated with this project, as software upgrades are included in our software maintenance agreement.

Target Completion Date: December 30, 2011

Actual Completion Date: December 30, 2011

Remove Polyserve and Replace with Windows Server Cluster

In fiscal 2009, Information Technology Services (ITS) implemented a software product for the clustering of Microsoft SQL Servers called Polyserve. This software was implemented due to a need to provide high availability for the growing Angel portal system. Prior to 2009, the Angel database ran in a Microsoft clustered environment. In

this environment, all the server hardware that is part of the cluster must be identical. Due to the rapid growth in the number of users using the Angel portal, the server resources provided by the Microsoft cluster were becoming inadequate. However, ITS did not want to lose the high availability provided by the Microsoft Cluster.

After researching alternatives, Polyserve appeared to be the software solution that would meet our needs. The Polyserve software would allow for the clustering of servers with different hardware specifications, which appeared to meet our needs. We could use a more powerful server for the Angel database, while still providing the high availability of the cluster.

After using this software, it became apparent that Polyserve would not meet our needs. While the software could work with servers of different hardware specifications, there apparently was a limit as to how different the hardware could be. In the case of the Angel database, the server required was too different from the other servers in the cluster that it would not meet our service level expectations for uptime and the Angel database server had to be removed from the cluster and ran as a stand-alone server. Since the Polyserve software was expensive and the main reason it was purchase was for the Angel database server, there was no justifiable reason to continue using the product. In addition, we wanted to upgrade from Microsoft SQL 2005 to Microsoft SQL 2008, which would have required an upgrade of the Polyserve software.

In fiscal 2012, using the funds allocated for renewing the Polyserve maintenance, we purchased four new servers that were configured as a Microsoft cluster and installed Microsoft SQL 2008 onto those servers. Having a new, separate cluster was advantageous as it allowed ITS to migrate the databases in the off-hours with minimal impact to the users. All of the databases except two were migrated to the Microsoft SQL cluster by November 1st, 2011. One of those databases is related to the Angel portal and will be migrated during the August 2012 downtime event. The other database is used for the SDE Help Desk System and will not get migrated until problems with the SDE upgrade are resolved.

Qualitative/Quantitative Return on Investment: We were able to purchase four new servers for the new SQL cluster and one database server for Angel with the money saved from not renewing the Polyserve maintenance. All five servers were more efficient and provided more resources than the servers they replaced.

Cost savings/Cost avoidance: Removing Polyserve saved Sinclair $52,000 in annual maintenance costs.

Target Completion Date: June 30, 2012

Actual Completion Date: The project will be completed in August 2012, when the remaining two databases will be moved from the Polyserve cluster to the Microsoft SQL Server cluster.