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**Northern Arizona University**

**Information Technology Strategic Plan**

**2015-2019**

**NAU Information Technology Strategic Plan for 2015-2019**

## Introduction

# Mission

# Northern Arizona University's Information Technology (IT) resources provide the highest quality technology-based services and systems, in a cost-effective manner, to support the university's mission and goals as they apply to student learning, academic research, and community service.

# Vision

To achieve its goals, Northern Arizona University must continue to take advantage of the latest information technologies to remain competitive among its peer universities and to meet students’ expectations. A highly integrated, extremely reliable, nearly always on IT infrastructure, which provides first class academic and administrative services and systems, is our vision.

Northern Arizona University's IT infrastructure environment consists of a variety of information, computing, and telecommunication systems designed to meet the needs of a complex higher education institution. The University envisions an electronic learning community that meets the needs of on-campus and extended campus students, faculty, and programs while supporting outstanding teaching and learning, research, and efficiently managed administrative systems.

As Northern Arizona University’s “digital utility,” our administrative and academic systems employ web-delivered solutions that are user-friendly, promote a self-service capability, and support the better use of data for decision-making. Such systems will make important information more readily available, thereby improving the access to the University's information resources and enhancing the effectiveness of information analysis across university departments. Our administrators, scholars, and researchers expect the University’s IT systems to be like other utilities…always available. This level of service requires our systems to be built using high reliability and redundant techniques. Northern Arizona University is committed to providing such “always on” services.

The Information Technology Strategic Plan for 2015-2019 reflects the unique mission of our university in the state of Arizona to provide both a premier residential campus and an extensive and growing distributed learning program for students throughout the state and the world. Our student population has become more diverse in age, technical ability, background, location, and learning experience and preference. In order to meet these diverse and ever-changing student attributes, Northern Arizona University has developed a variety of synchronous and asynchronous course delivery methods to reach these non-traditional, and often underserved, students. In fact, our university has a long tradition of meeting the needs of students across the state, particularly in rural areas, with a variety of course delivery methods tailored to suit individualized needs. Online student services are an invaluable and cost-effective means of providing distributed learning students access to academic and administrative systems wherever and whenever needed. Our university is committed to provide all student services in an easy online, self-service fashion.

This plan strives to support the NAU Strategic Plan and its many goals. Details of specific connection to the university’s Strategic Plan are described throughout this plan.

## IT Strategic Planning Climate

In order to fulfill Northern Arizona University’s academic missions across a wide variety of student venues and collegiate programs, information technology plays a critical role. Several significant issues provide a great challenge to the IT resources of Northern Arizona University to successfully perform its crucial responsibilities. Here are the top three issues facing the University’s IT resources today.

* **Hiring Qualified Staff**

Information Technology Services (ITS) leadership has been unable to keep up with salaries, as compared to the commercial IT salary market, which also impacts their ability to hire qualified staff. The improving U.S. economy and the increasing demand for IT professionals have also adversely contributed to this dilemma. This situation has unfavorably impacted ITS since we are taking on more IT projects to support campus initiatives and experiencing pressure from other University departments to take over historically departmental IT functions such as running servers and performing system administrative tasks that they can no longer adequately manage. Flagstaff’s relatively higher cost of living also adversely impacts our hiring of new staff and, together with lower salaries than the commercial IT sector, makes hiring qualified candidates very tough.

* **Strategies to Do More with Less**

With reductions in state budgets, the ITS organization has strategically attempted to reduce the impact of budget cuts through the use of current and emerging technology options to reduce the ITS operational budget. These techniques include using open source software (Linux, Tomcat, Apache, uPortal,, etc.); outsourcing (student email to Google; Blackboard hosting our Learn environment); server virtualization (Citrix XenServer, Microsoft Hyper-V, etc.); thin client desktops (GreenPC, computer labs, ResHalls, etc.); and student Virtual Lab (Window Terminal Services). ITS continues to weigh these and other options when contracts or equipment upgrade cycles come up for renewal or replacement. Each solution is analyzed to calculate the savings or other benefit to be realized by making a switch.

* **Support and Deployment of Services to Mobile Devices**

Over the last several years, ITS has been challenged to support a significant increase in mobile devices showing up on campus. Smart mobile devices, including Androids, iPhones, iPads, and other tablets are becoming part of the habitual way many employees and students are accessing their email, browsing the Internet, and communicating with others. These devices are challenging in two major ways. First, the numerous devices from many different vendors make supporting everyone very difficult. Some operating systems running on employee mobile devices will not easily work within the enterprise policy, security and operational environment. Making mobile devices work in the enterprise network requires additional expense and hardware. Many devices require one-on-one support from an IT technician to get the device to work with enterprise systems. The second challenge is making University applications run adequately on a small mobile device. Often the small viewing area of a mobile phone creates problems with viewing webpages. Additionally, some application vendors may not have a suitable interface for mobile devices. Inevitably more ITS resources will be devoted to support the growing usage of mobile devices within the University.

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| **Northern Arizona University Information Technology Strategic Plan 2015-2019**  **Strategic Information Technology Goals**  **Within the context of the NAU Strategic Goals** | | | | | | |
| **NAU Strategic Information Technology Goals** | **NAU Strategic Goals** | | | | | |
| Student Success | Nationally Recognized Research Excellence | Global Engagement | Diversity, Civic Engagement,  Community Building | Commitment to Native Americans | Innovative, Effective, and Accountable Practices |
| Student Learning and Success: Provide high quality academic systems and services to meet the growing needs and expectations of all NAU students. | X | X | X | X | X | X |
| IT Infrastructure: As NAU’s “digital utility”, where all critical business and academic systems are operated, our core infrastructure must be engineered and maintained in the most highly reliable fashion. | X | X |  |  |  | X |
| Administrative Effectiveness: Business operations must be supported by dependable, secure, flexible and scalable services and systems which ensure maximum efficiency and effectiveness. | X | X |  | X |  | X |
| IT Risk Management: The core RM mandate is to ensure IT operations are properly managed with respect to risk acceptance. | X | X |  |  |  | X |
| Academic Technology: All AT endeavors must coordinate and support faculty and student uses to enhance student success. | X | X | X |  | X | X |

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| **NAU Strategic Information Technology Goals** | **NAU Strategic Goals** | | | | | |
| Student Success | Nationally Recognized Research Excellence | Global Engagement | Diversity, Civic Engagement,  Community Building | Commitment to Native Americans | Innovative, Effective, and Accountable Practices |
| Research Computing: Provide IT systems and services which enhance and expand NAU’s research and associated academic programs. | X | X | X |  | X | X |
| IT Strategic Alliances: Improve long-standing strategic alliances with other state universities and vendors to maximize cooperation and effectiveness. | X | X |  |  | X | X |

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| **Northern Arizona University**  **Information Technology Strategic Plan 2015-2019**  **Metrics**  NAU will track the following metrics to assess progress within each goal of the IT Strategic Areas. The tables below will list the goal, the metric for that goal, our current progress, and our target at the end of five years. | | | | |
| IT Strategic Area | Goal | IT Metric | Current Progress | Target 2019 |
| Area #1:  Student Learning and Success | Goal: Provide high quality academic systems and services to meet the growing needs and expectations of all NAU students. | % of students who find Student Technology Center IT support as satisfactory or very satisfactory on IT survey | 68% | 90% |
| % of course sections active in LMS | 68.2% | 80% |
| % of faculty actively using Blackboard Learning Management System (LMS) | 89.1% | 85% |
| % of students actively using the LMS | 96.7% | 95% |
| % online course sections using LMS | 96.1% | 95% |
| % in-person course sections using LMS | 57.2% | 75% |
| # of university courses taught in hybrid mode (part online & part face-to-face) | 275 | 400 |
| % of support calls handled by first tier at Student Help Desk | 94% | 98% |
| # of support calls to the Student Help Desk | 54,623 | N/A |
| # of students served by the STC walk-in service | 3,600 | 2,500 |
| # of ResNet students served by in-room service call | 364 | 550 |
| % of students visiting the MyNAU portal at least once a month | 27,901  (99.3)% | 23,943  (95%) |

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| **Northern Arizona University**  **Information Technology Strategic Plan 2015-2019**  **Metrics** | | | | |
| IT Strategic Area | Goal | IT Metric | Current Progress | Target 2019 |
| Area #2:  IT Infrastructure | Goal: As Northern Arizona University’s “digital utility”, where all critical business and academic systems are operated, our core IT infrastructure must be engineered and maintained in the most highly reliable fashion to meet the needs of our campus users. | % of centrally hosted servers operating in a virtual environment | 70% | 70% |
| % of campus on central wireless network | 100% | 100% |
| % of time core campus network is operational\* | 99.99% | 99.9% |
| % of time major systems available:\* |  |  |
| Oracle/PeopleSoft CS | 99.88% | 99.9% |
| Oracle/PeopleSoft HCM | 99.88% | 99.9% |
| Blackboard Learn | 99.89% | 99.9% |
| O/PS Financials | 99.99% | 99.9% |
| Data Warehouse | 99.99% | 99.9% |
| Faculty and Staff Email (Microsoft Exchange) | 99.6% | 99.9% |

\* Note:Available time excludes planned outages.

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| **Northern Arizona University**  **Information Technology Strategic Plan 2015-2019**  **Metrics** | | | | |
| IT Strategic Area | Goal | IT Metric | Current Progress | Target 2019 |
| Area #3:  Administrative Effectiveness | Goal: Business operations must be supported by dependable, secure, flexible and scalable services and systems which ensure maximum efficiency and effectiveness. | Implement PeopleSoft Financials project on time, within budget, and meet all success criteria | 98% | 100% |
| # of employee support calls to the Solution Center annually | 30,018 | N/A |
| Average customer satisfaction rating for the Solution Center (using results from employee survey for ratings of very satisfied and satisfied) | 93.5% | 95% |
| % of employee support calls handled by first tier Solution Center support | 92% | 85% |
| % of employees who rate all central ITS services on the annual survey as satisfactory or very satisfactory | 89% | 90% |

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| **Northern Arizona University**  **Information Technology Strategic Plan 2015-2019**  **Metrics** | | | | |
| IT Strategic Area | Goal | IT Metric | Current Progress | Target 2019 |
| Area #4 :  Risk Management | Goal: The primary focus of the Risk Management (RM) area is to support a robust information infrastructure which ensures quality and availability of needed data and services for faculty, staff, students and partners. Managing risk appropriately helps ensure that potential problems are proactively identified and corrected, minimizing adverse service impacts and other harm to the University. | % of laptops encrypted | 30% | 95% |
| % of technical services and software purchases with completed or waived IT checklists | 90% | 90% |
| % development and implementation of an IT disaster recovery plan | 95% | 100% |
| % of enterprise web applications scanned annually for vulnerabilities | 25% | 100% |
| % Campus converted to new telephone system (replacing PBX) | 5% | 100% |

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| IT Strategic Area | Goal | IT Metric | Current Progress | Target 2019 |
| Area #5:  Academic Technology | Goal: All academic technology endeavors should ensure well coordinated plans which account for all faculty and student uses of IT. | Upgrade to next Blackboard Learn release | 100% | 100% |
| % completion of a campus digital repository | 50% | 75% |

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| **Northern Arizona University**  **Information Technology Strategic Plan 2015-2019**  **Metrics** | | | | |
| IT Strategic Area | Goal | IT Metric | Current Progress | Target 2019 |
| Area #6:  Research Computing | Goal: Provide IT systems and services which enhance and expand NAU’s research and associated academic programs. | Implement PeopleSoft Financials project on time, within budget, and meet all success criteria. Increased scope to implement CayuseSP in Phase 2 of project. | 98% | 100% |

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| IT Strategic Area | Goal | IT Metric | Current Progress | Target 2019 |
| Area #7:  Strategic Alliances | Goal: Improve long-standing strategic alliances with other state universities and vendors to maximize cooperation and effectiveness. | Increase # of ATIF enabled tri-university collaboration projects | 1 | 4 |
| Increase # of non-ATIF enabled tri-university collaboration projects | 3 | 4 |
| # of tri-university IT staff meetings held annually | 21 | 25 |

## Strategic Areas, Goals, and Action Plans

* 1. **Area #1 Student Learning and Success**

Northern Arizona University graduates must be prepared to meet the challenges of a global economy fueled by information technology. Their experience at Northern Arizona University, both in and out of the classroom, should enable them to gain proficiency in using the most current IT systems. No matter how instruction is performed, be it in the traditional classroom or on the Web, Northern Arizona University’s IT infrastructure must be stable, easy to use, highly integrated, reliable, and secure in order to enhance student learning and promote the building of IT skills. This IT strategic area supports Northern Arizona University’s 2013 Strategic Plan goals # 1 & 6.

* + 1. **Goal #1.1 Provide high quality academic systems and services to meet the growing needs and expectations of all NAU students.** NAU’s commitment to student learning and success is evident; it is the only Arizona University with a 24x7 help desk support. The Student Technology Center has strong relationships with key NAU student learning and success partners from the faculty, the library, and the e-learning center; as well as Admissions, Extended Campuses, Registrar, Residence Life, and orientation programs offered to students and parents. These relationships, and subsequent support expectations, continue to evolve as new programs and new ways of helping students arise out of NAU’s strategic plan.
       1. **Action Plan #FY08-1.1.1 Enhance the services provided by the Student Technology Center to better handle student technical problems.** ITS proposed, and campus leadership favorably responded, to a request to expand the hours of faculty and staff support to 11 pm on weeknights and add significant weekend hours. Two positions were approved and now supplement the STC because a vast majority of previously after-hours calls regarded faculty interaction with the BlackBoard Learn system. This complements student support by resolving issues with classes in the online learning system.

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| Accomplished in FY2014 | In 2014, the team continued to improve support by refining issues with the upgraded wireless network and continuing to make improvements in security and access issues through Safe Connect. Lab improvements continued with chair replacement and improved thin client support in cooperation with the ITS SCAN Team. Student survey results for combined STC service areas continue around 90%, far above industry standards. | |
| Plan for FY2015 | Integrate extended hours support and evaluate resources and effectiveness. | |
| Performance Metric | Student Satisfaction survey rates STC services good or very good. | Surveys sent out after each support call made to the STC. |

* + - 1. **Action Plan #FY10-1.1.1 Conduct a Student Satisfaction Survey.** The spring 2014 Student Technology Survey was conducted prior to spring break.  The survey revealed how well our services are understood and utilized as well as where improvements might be made. Questions continued to establish trends in newer areas such as mobile learning, social networking and mobile devices.  Approximately 791 students took part in the survey, up from 700 in 2013; the results have been analyzed and a number of focus areas were identified for implementation of possible Improvements.

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| Accomplished in FY2013 | The survey was conducted in spring 2014. Results were analyzed and action items determined in summer of 2014. Survey results were promulgated to other areas of ITS, and where appropriate, NAU, for use in implementing improvements. | |
| Plan for FY2014 | Follow through on the past year’s survey action items and then design, communicate, and conduct the next annual survey. Analyze the results looking for actionable items. | |
| Performance Metric | Survey was conducted and results communicated and used to improve services. | Action items have been identified and improvements implemented. |

* + 1. **Goal #1.2 Improve student-related IT integrations with key university partners.** Student access to information technology goes well beyond a specific classroom or lab environment. Course-related materials are expected to be online and accessible from students’ personal computers 24 hours a day. Better access to specialized software from students’ personal computers improves time on task, course success, and student retention. Assuring students with special needs have ready access to assistive software, accessible websites, and just-in-time tutoring removes barriers and helps students succeed.
       1. **Action Plan #FY08-1.2.1 Continue to expand access to course-related materials using the tight integration with Blackboard’s Learning Management System (LMS).**  The President’s Blended Learning Initiative will rely heavily on Blackboard Learn as the tool that provides the platform for delivering these courses. Over the last year, ITS worked closely with the Special Assistant to the Provost to support her effort to expand adoption of the blended learning initiative. Additionally, ITS continued to partner with the Professional Education Program to implement the Outcomes Assessment functionality within Blackboard Learn. This functionality will provide better rubrics for accessing and reporting of student performance to learning objectives. NAU continues to see improvement in faculty adoption and student use of the Blackboard Learn application.

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| Accomplished in FY2014 | * Implemented Blackboard Outcomes * Met with Follett bookstore representatives to decrease the time needed to enroll students in the Pearson My Lab initiatives * Transitioned NAU’s locally hosted Blackboard Learn platform to a hosted service by Blackboard to further stabilize and enhance performance * Surveyed the available lecture capture tools in collaboration with the e Learning Center and a decision was made by Vice Provost Office for Academic Affairs to not move forward with a solution at this time * Converted campus from individualized course evaluation tool to standardized survey in support of effort by Provost’s office to gain a more consistent view of teaching effectiveness | |
| Plan for FY2015 | * Provide upgrade assistance for on-going Blackboard Learn enhancements * Provide integration between Blackboard and the new campus-wide evaluation tool | |
| Performance Metric | Show continuous growth for enterprise LMS use each year. | Metrics have been identified and are in place in an earlier section of this report to track LMS usage each year. |

* + - 1. **Action Plan #FY08-1.2.2 Coordinate software licenses among departments to reduce costs, increase access, and provide additional educational software components to the license.** Students, faculty, and department chairs struggle to purchase the increasingly costly software necessary for their disciplines. Strategies in this initiative involve a) talking with more departments about their needs and searching for campus-wide consensus that can translate to central purchases and cost savings, b) evaluating requests for adding concurrent licenses to the virtual laboratory server, and c) consolidating existing licenses from disparate groups so the total campus cost is lowered. The responsible party for this action plan will be the ITS SCAN team. Note that these efforts also help with Area #6: Research Computing.

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| Accomplished in FY2013 | The SPSS license continues as a central resource with only modest media recovery costs for departments. Wolfram Mathematica products are now extended to cover students and NAU employees both at the office, as well as for home use. In additional, we license SAS and JMP for our labs and provide discounted purchases for faculty and staff. We pushed some time ago to obtain a campus-wide license for Red Hat Enterprise Linux that is leveraged by a number of departments, as well as ITS. | |
| Plan for FY2014 | A review of software needs based on input from the 2013 Student Technology Survey is underway and will continue into the next year. | |
| Performance Metric | Continue to explore opportunities to centralize software licenses. | Show continued effort to seek software license centralization opportunities. |

* 1. **Area #2 IT Infrastructure**

As Northern Arizona University’s “digital utility”, where all critical business and academic systems are operated, our core IT infrastructure must be engineered and maintained in the most highly reliable fashion to meet the needs of our campus users. Having services “always on” is a goal that is essential to a highly efficient and effective university. These activities require not only top-of-the-line hardware and software, but also, and more importantly, a highly skilled and motivated IT staff to keep these complex systems up and running smoothly. This IT strategic area supports Northern Arizona University’s 2013 Strategic Plan goals # 1 & 6.

* + 1. **Goal #2.1 Provide a highly reliable, secure, and robust data network.** NAU’s data network is critical to the operation of all IT services including both centralized and decentralized services. The term “digital utility” describes the data network better than any other service provided by the IT organization. When a new IT service is implemented it is often assumed that sufficient networking capability and capacity is already available in our data network. The level of service and capacity needed by those IT services is constantly increasing and the NAU network must be constantly improved to keep up with the demand.
       1. **Action Plan #FY12-2.1.1 Upgrade the network infrastructure for the Flagstaff Campus buildings.** A large number of network switches have reached their end of life. ITS must replace all older edge switches that have been declared end-of-life with newer switches. The responsible party for this action plan will be the ITS Network and Telecommunications Services group. This action plan will span the 2011-2012 and 2012-2013 academic years with funding coming from ITS local accounts for networking and communications. Additional staffing or possibly funding for contracting this work would be needed to complete this in a shorter timeframe. The performance measure is the number or percentage of the switches that have been replaced.

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| Accomplished in FY2014 | Reevaluated the number of switches that need to be replaced. Building upgrades and other projects have reduce the total number from 483 to 417. Replaced additional switches. Current count is 330 of 417 completed. We had anticipated completing the replacement of all switches this year. However other projects took higher priority. | |
| Plan for FY2015 | Replace all remaining switches as time allows between other projects. | |
| Performance Metric | All end-of-life switches replaced. | 79% complete. |

**2. Action Plan # FY14-2.1.2 Upgrade campus network throughput and architecture.** The campus network needs to be upgraded to meet several needs. First, the amount of network traffic within the campus network continues to increase steadily every year. Currently we have 10 gb/s connections between the two data centers on the Flagstaff Campus but the remaining network core and building network connections are still 1 gb/s. Without a bandwidth upgrade some of these connections will affect network performance in the near future. Second, two of our key network components, our datacenter firewalls and our network load balancers, have reached their end of life. We can only get limited support on these devices and they do not provide the network throughput or features needed to support the increasing demands of our enterprise applications. Third, our network architecture was designed not long after the university first connected to the internet. Since that time, network management complexity, security risks and regulatory compliance requirements have all increased. In order to assess our network security and architecture risks ITS contracted with a network consultant in FY 14. The recommendations from the consultant’s report included some major network architecture changes. These changes would have multiple benefits including; better segmentation of our network making our network more resilient to network problems and attacks, more flexibility in implementing new applications, and the ability to implement a more standard security model. The responsible party for this action plan will be the ITS Network and Telecommunications Services group. This action plan will span multiple fiscal years and require centralized funding. The performance measure is what percentage of the campus network subnets have been converted to the new architecture.

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| Accomplished in FY2014 | Network security and architecture assessment completed. | |
| Plan for FY2015 | * Develop an estimated budget for the upgrade project. * Secure centralized funding. * Begin implementation planning for the upgrade. | |
| Performance Metric | Percentage of campus subnets that have been converted to the new architecture. | Awaiting budget development and funding approval. |

**3. Action Plan # FY14-2.1.3 Implement IPV6 on the university network.**  The NAU network currently uses IP version 4 (IPV4). IP version 6 (IPV6) has been available for many years but the current world wide adoption rate is very low. There is no critical need to move to IPV6 soon but eventually there will be some reason that we will need to run IPV6. Therefore it is prudent to begin the planning and implementation of IPV6 now. The responsible party for this action plan will be the ITS Network and Telecommunications Services group. This action plan will likely span three to five fiscal years with funding coming from ITS local funding for networking and communications. The performance measure is that we have IPV6 implemented at our network border before the United States adoption rate is 50% and internally before it reaches 70%.

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| Accomplished in FY2014 | Discussed combining at least some of the IPv6 implementation as part of the network upgrade plan that is listed above. | |
| Plan for FY2015 | Determine how IPV6 can be implemented at our network border and how it will interact with the Sun Corridor. Create an estimated timeline for implementation at the network border and on the internal NAU network. | |
| Performance Metric | Current US IPV6 adoption rate (according to Google IPV6 statistics) | 8.5% |
| IPV6 implemented at border before 50% |  |
| IPV6 implemented internally before 70% |  |

* + 1. **Goal #2.2 Fully implement and operate a highly reliable, secure, and robust wireless network on the Flagstaff Campus and at selected Extended Campuses locations**
       1. **Action Plan # FY12-2.2.1 Upgrade and expand wireless networking deployments.**To keep up with current technology, wireless speeds and student expectations the wireless network needs to be upgraded to 802.11n which is the latest WiFi standard. The last wireless deployment did not cover all administrative buildings and left the Flagstaff campus at 85% of the buildings covered by wireless. The contract with our current wireless vendor is due to expire in May of 2012. In order to assure the best pricing and the selection of the best wireless technology fit an RFP process will be conducted during FY 2012. Following that the Residence Hall Network (RESNET) will be upgraded to 802.11n to provide faster coverage. The equipment removed from RESNET will be used in the remaining buildings that do not currently have wireless or have even older wireless technology. The current wireless deployment was funded out of the IT student fee. It is anticipated that the 802.11n upgrade will also be funded from the IT student fee although alternate funding and partnerships with Residence Life will be considered. It is anticipated that the 802.11n upgrade will begin in the summer of 2012. Installation of the replaced equipment on the rest of the campus will follow. A performance measure would be the percentage or number of residence halls covered by 802.11n WiFi. A second performance measure would be the percentage or number of building and sites covered by any WiFi network. The responsible party for this action plan is the ITS Network and Telecommunications Services group. Funding is provided by the IT Student Fee with other options to be considered.

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| Accomplished in FY2014 | * Completed Administrative buildings. | |
| Plan for FY2015 | Project completed. | |
| Performance Metric | All Residence Halls have 802.11n coverage. | 100% Completed. |
| All appropriate campus buildings have some kind of wireless capability. | 100% complete. |

* + 1. **Goal #2.3 Provide a highly reliable, secure and robust server environment for ITS and key university systems.** During the summer 2007 a very strong rain storm caused a flood of a network and computing room on south campus destroying many pieces of equipment including the primary data backup system for IT systems. This left NAU extremely susceptible to a loss of critical data. About a month later construction of the new dining facility on north campus interrupted power to the main ITS building and several other buildings housing critical IT services including the dining card system. These service interruptions brought attention to the need to provide highly reliable secure and robust environments to house critical IT systems. ITS has since purchased a replacement tape backup system and implemented other measures to protect critical systems but more work needs to be done protect our key systems and provide maximum availability.
       1. **Action Plan #FY08-2.3.2 Centralize Campus Administrative Servers: Move servers for key university systems to ITS computer room co-location room or hosted offsite.** This Action Plan has been adjusted for FY 2011-2012 to accommodate increased use of hosted services and focus more on applications instead of individual servers. Decentralizing critical IT systems in multiple locations across campus decreases reliability, security and cost effectiveness. Therefore, ITS has begun an effort to identify where critical IT systems are housed and ensure that they are in a secure, reliable and cost effective location. ITS will work with the administrators of those systems to provide space, power and networking access in the main ITS computer room or co-location room. ITS will also work with administrators of systems to have those systems hosted offsite when appropriate. The responsible parties for this plan are the ITS Computing and Communication Systems group and the Enterprise Information Solutions group. No additional funding is required for this plan.

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| Accomplished in FY2014 | Three additional racks of research computing servers and storage have been moved into the co-location room. The Library, College of Education, CEFNS, and the Center for International Education all moved equipment into the co-location room. | |
| Plan for FY2015 | Continue to advertise our co-location services. Work with campus departments and administrators to determine their needs and accommodate them in the co-location room when feasible. The current budget climate will continue to limit the number of areas willing to move into the co-location room. Identify the critical administrative systems used at the university and create an inventory of those systems including where the system is hosted. | |
| Performance Metric | Counts of the hosting locations for administrative systems. The number of departmental systems should go to zero. Will also count number of non-critical systems hosted in the departments. | Awaiting inventory results. |

* + 1. **Goal #2.4 Provide highly reliable, secure and robust centralized IT services.**
       1. **Action Plan # FY12-2.4.1 Consolidate and improve voicemail service by providing only one voicemail system.** When the Microsoft Office Communication Server and Microsoft Exchange Unified Messaging (Exchange UM) servers were implemented in 2009 they provided a second voicemail system in addition to our traditional voicemail system. At the time, Exchange UM was considered too much of a risk to be used as the primary voicemail system. Since that time ITS experience with Exchange UM has increased and the product has matured. Recent surveys of faculty and staff have shown some dissatisfaction with the traditional voicemail system. In order to improve efficiency and service, ITS should consider migrating to just one voicemail system which would be Exchange UM. No additional funding is required to implement this plan. A performance metric would be the percentage of mail boxes and voicemail applications hosted on Exchange UM.

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| Accomplished in FY2014 | Completed the migration of all user mailboxes. Decided to make migration of voicemail application part of the PBX replacement project. We will migrate department voicemail applications at the same time that we migrate them from PBX to Lync phones. Staff received some training on how to configure voicemail applications. | |
| Plan for FY2015 | Migrate voicemail application as we migrate departments to Lync. | |
| Performance Metric | Percentage of voicemail boxes and applications that are hosted on Exchange UM. | 100% of user mailboxes converted  0% of department applications converted. |

1. **Action Plan # FY13-2.4.2 Implement disaster recovery and redundancy of key systems at the newly constructed north data center.** The upgrade of the north telecom node and completion of the adjacent computer room provides a disaster recovery site that the University previously did not have. Faster recovery in the event of a disaster and loss of the main data center can be accomplished by installing equipment in the north data center now. With proper planning and design this equipment can also provide additional redundancy for our critical production systems. This action plan will identify the University’s critical systems and networks and implement a way to have them running within 48 hours of loss of the main data center. When possible equipment installed in the north data center will be used as part of our production environment to provide additional redundancy and capacity. Periodic testing and rehearsals of the disaster recovery plans will be performed. This action plan will span multiple fiscal years. Funding will come for ITS reserve and operating accounts. Performance metrics will be the number of production systems implemented and that some disaster recovery rehearsal is performed at least once per year.

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| Accomplished in FY2014 | 1. Purchased additional server equipment. 2. Installed all additional server equipment. 3. Implement all remaining core infrastructure systems DNS, and DHCP. 4. Purchased remaining dedicated failover database servers. 5. Finalized recovery plans for each system. 6. Finalized major system dependencies as part of the higher level disaster recovery plan. 7. Moved Sun Tera Pop internet connection point of presence to Flagstaff and purchased new redundant border routers. 8. Tested firewall configuration and timing between the data centers. Proved we can put redundant firewalls in the separate data centers. 9. Performed a walkthrough of each team’s recovery plan. 10. Performed a very high level rehearsal of the order of systems to bring up. | |
| Plan for FY2015 | 1. Complete implementation of critical production applications 2. Perform a more thorough disaster recovery rehearsal on the core infrastructure. 3. Schedule a time for our first test of disaster recovery procedures where we actually take down some or all of the main data center. 4. Create a recovery plan for campus-wide networking. 5. Implement Lync redundancy in north data center. | |
| Performance Metric | Number of systems implemented at north data center. | 28 |
| Number of disaster recovery rehearsals | 2 |

1. **Action Plan # FY14-2.4.3 Replace Aastra Phone PBX.** During the summer of 2013 our Aastra PBX sales person informed us that although our phone system is still supported it is very difficult to find replacement equipment and that it must come from the used market. She also told us that Aastra no longer has the staff and expertise to support integrating the phone system with other systems. In order to ensure availability and reliability of our phone services and to be able to integrate new applications with the phone system the Aastra PBX must be replaced. NAU has a limited deployment of two other phone systems. One is the Cisco Call Manager system used to provide phone service to Extended Campus locations. The other phone system is Microsoft Lync (formerly called Microsoft Office Communication Server) that was installed as part of the Unified Communications pilot project in 2009. Both of these are candidates to replace the Aastra PBX. One of these systems will be selected as the replacement and all phones will be migrated to that system. It is estimated that this action plan will span at least calendar years 2013 and 2014. It may take longer depending on the funding available. Central funding will need to be secured for this project. The performance metric will be the percentage of phones converted to the new system.

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| Accomplished in FY2014 | * Researched the features available with both Cisco Call Manager and Microsoft Lync to determine if one or both these will meet the needs of the University. * Selected Microsoft Lync as the PBX replacement. * Designed Lync 2013 server and network environment. * Upgraded Lync servers to Lync 2013. * Secured centralized funding for the project. * Created project charter and implementation plan. * Assigned full time project manager to project. * Migrated all Phoenix area PBX supported sites to Lync as part of the North Valley campus relocation. * Started analysis of telecom budget and expenses in preparation for changing telecom funding and chargeback model. | |
| Plan for FY2015 | * Complete the implementation preparation and procurement phases of the project. * Complete proposal for funding and chargeback change. This includes converting ITS and one other department as pilot departments. * Create conversion schedule and start converting departments. | |
| Performance Metric | Percentage of phones that are hosted on the new phone system. | Awaiting start of implementation phase. Currently have about 200 users on Lync before campus conversion starts |

* 1. **Area #3 Administrative Effectiveness**

The primary focus of this strategic plan area is to provide continued, stable and predictable administrative computing support at minimum cost. NAU has utilized acquired vendor products, rather than open-source or locally developed core administrative applications, since the mid-1990s. The experience with Oracle-PeopleSoft HCM and SIS corroborates the promise that acquired vendor products can provide “as-delivered” solutions meeting the basic functional needs of university administration and has now been extended to the Financials system. This IT strategic area supports Northern Arizona University’s 2013 Strategic Plan goals #1 & 6.

* + 1. **Goal #3.1 Operate and Maintain Highly Effective and Efficient University HR and Student Admin Systems: Currently Oracle/PeopleSoft HRMS, Student and Campus Community Systems.** NAU has moderately tailored the base applications to meet locally identified and justified business needs. A committee review, acceptance and prioritization process is in-place and required before changes are applied. In the balance, the acquisition and use of vendor packages to support these essential administrative areas has resulted in lower total costs than would have been experienced by other strategies.
       1. **Action Plan #FY11-3.1.1 Upgrade Oracle/PeopleSoft HCM system.** Upgrade of the Oracle/PeopleSoft HR/Payroll application; moving from version 9.0 to 9.2. This project received approval in November 2012 along with the HCM/CS database split. The database split was completed in June 2013 and the upgrade started in April 2014 with a scheduled completion of April 2015.

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| Accomplished in FY2014 | 1. Project team was formed and project planning completed 2. Completed phase one of the project to include hardware purchase, installation and the first implementation of the new application environment 3. The interaction hub was reviewed and determined to be a separate project to follow closely at the end of the HCM project 4. Four forms were identified to be completed by the HR office. They are in progress and will be completed in fall 2014 | |
| Plan for FY2015 | 1. Complete functional fit-gap assessment in Fall 2014 2. Complete technical upgrade in Spring 2015 | |
| Performance Metric | Complete upgrade to version 9.2 by April 2015. | 15% complete. |
| FY2014 Complete ROA automation | 90% complete |

* + 1. **Goal #3.2** **Replace the University Financial System with PeopleSoft Financials**
       1. **Action Plan #FY11-3.2.1 Replace the CGI/Advantage financial system with version 9.1 of PeopleSoft Financials.** The implementation of the PeopleSoft Financials System was approved by the ABOR IT Council in March of 2011. Phase One of the project, which was the replacement of existing Advantage functionality, was completed as scheduled in July 2012. Additional functionality being implemented through December of 2012 as planned. Phase Two functionality has been developed and implemented with the exception of the two items mentioned as planned for FY14.

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| Accomplished in FY2014 | 1. Completed the remaining tasks required to complete the Financial implementation 2. Implemented distributed purchasing card processing functionality along with the new capability of attaching electronic files through Hyland OnBase to further advance the President’s process improvement initiatives 3. Worked with Purchasing and Facility Services to implement the inventory management functionality within PeopleSoft. The last part of this project is Facility Services upgrade of their third party project tracking system. 4. Archived the Advantage Financials database 5. Successfully reviewed issues from previous year-end close and resolved all known issues in collaboration with the Comptroller’s office | |
| Plan for FY2015 | 1. Move system to ongoing support, The Financials Systems replacement completed. | |
| Performance Metric | Complete the implementation of the O/PS 9.1 Financials. | 100% complete for phase one.  100% complete for phase two. |

* + 1. **Goal #3.4 Operate and Maintain a Highly Effective and Efficient University Data Warehouse and Reporting Service: Currently Informatica and SAP/Business Objects Systems.** The NAU Data Warehouse is a mission-critical system for the reporting needs of the campus. Routinely over a thousand reports a day are generated by business and central administrative users. A drive for continued innovation in data analytics resulted in the purchase of the Blackboard Analytics platform. This platform and first dashboard was implemented during FY14 and will continue to be expanded during FY15 to provide improved analytics and dashboard tools for University Administration.

**1. Action Plan # FY14-3.4.1 Implement Blackboard Analytics.** ITS should evaluate realigning IRM resources to assure that effective database and change management support is provided the data warehouse applications. This support includes physical management, performance tuning, access control management, change management processes and verification. This plan is to minimize total costs, maximize system performance, address emerging audit concerns, and assure as much end-user data integrity and security as practical. The cost of this evaluation is a part of routine business processing and no additional central funding is required.

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| Accomplished in FY2014 | 1. The Blackboard Analytics environment has been implemented at NAU and internal staff have been trained to enhance and support the application. 2. The first dashboard for Daily Enrollment analysis will be fully implemented in August 2014 | |
| Plan for FY2015 | 1. Complete the implementation of Blackboard Analytics for Student Information to include Financial Aid and Census dashboards 2. Reevaluate Blackboard Analytics for Learn and Financials to see if it can complement the base Blackboard Analytics module. If not, determine a solution that can integrate the Blackboard Learn data with our existing analytics solutions. | |
| Performance Metric | Implement Blackboard Analytics | 75% complete |

* + 1. **Goal #3.5 Conduct a bi-annual formal system review of all administrative systems**
       1. **Action Plan #FY08-3.5.1 Conduct periodic reviews of all administrative systems.**

Establish a formal bi-annual review process to provide a continual and cyclic evaluation of installed administrative computing systems. This review should include:

1. Changes in system functionality and technology
2. Direction and goals of ABOR and NAU
3. Goals and technical abilities of NAU business units and Information Technology Services
4. Ancillary systems developed and acquired by NAU business units
5. Direction software vendors are moving their product lines
6. Changes and trends in the acquired software marketplace
7. Economics of the State of Arizona and NAU

The goal of this formal review is to routinely identify the ongoing operational costs, the opportunities and the requirements to fundamentally change those systems in reaction to changes in the business, marketplace and economic factors facing NAU.

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| Accomplished in FY2014 | 1. Reviewed Blackboard Analytics for Learn and the decision was made to review it again following the Analytics for Student Information and Financial Aid modules 2. Participated in a test of the Educational Advisory Board’s offering for longitudinal data analysis and it was determined by the Provost’s office that the product would not meet NAU’s needs 3. NAU decided to become a member of the Predictive Analytics Reporting Framework and began the data identification process 4. Defined the need for a Constituent Relationship Management application to enhance enrollment, student success initiatives, and future advancement efforts | |
| Plan for FY2015 | 1. Complete Constituent Relationship Management RFP in fall 2014. 2. Complete review and scheduling of PeopleSoft Financials upgrade process. | |
| Performance Metric | Perform annual review of all major administrative systems. | On-going effort. |

* 1. **Area #4 Risk Management Plan**

The primary focus of this area is to support Strategy 1 under Goal 6 of the NAU 2013 Strategic plan which calls for support of a robust information infrastructure to ensure quality and availability of needed data and services for faculty, staff, students and partners. The core mandate for information security is to ensure confidentiality, integrity and availability of data.

* + 1. **Goal #4.1 Reduce risk of data loss from lost or stolen laptops.**
       1. **Action Plan # FY14-4.1.1.** Lost or stolen laptops are a major source of risk for loss of sensitive data. To reduce this risk, ITS launched a project to encrypt laptops, focusing on departments working with sensitive data, and newly acquired laptops.

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| Accomplished in FY 2014 | The Information Security Committee approved laptop encryption as a standard recommended practice.   * All new Windows laptops set up by the ITS PC Support team have Bitlocker encryption enabled as the default. * Acquired Microsoft Bitlocker Administration and Monitoring (MBAM) console for administration and tracking of encryption. * Solutions for centrally managing Mac laptop encryption were investigated, no good solutions found. | |
| Plan for FY2015 | * The IS team will continue to investigate centrally controlled solutions for Mac laptop encryption. * MENSA and PC Support to implement MBAM for managing Windows laptop encryption. | |
| Performance Metric | During this FY, will implement the MBAM central management tool that will provide better metrics and easier administration. | # laptops encrypted as reported through MBAM. |

* + 1. **Goal #4.2 Protect data in cloud/external services**

With the dramatic increase in the use of cloud/external services at NAU, including many services that require the export and storage of student data, there is a need to address risk to the university by ensuring that service providers follow *NAU CMP 110: Information Security Plan* policies and are committed to robust information security practices.

* + - 1. **Action Plan #FY11-4.2.1** Through the use of the Information Technology check list, review contracts with software and service providers entrusted with NAU data. The checklist includes a section targeting information security providing a mechanism for risk assessment.

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| Accomplished in FY2014 | Purchasing Department sends all contracts for software and services to ITS for checklist approval, including information security risk assessment. | |
| Plan for FY2015 | Continue to use the ITS checklist to review cloud/external vendors. | |
| Performance Metric | Continue to use the ITS Checklist to review vendors. | Ongoing |

* + 1. **Goal #4.3 Address aging campus telephone system PBX**

The current campus telephone system needs to be replaced with a more modern, voice over IP (VIOP) enabled system so that NAU can take advantage of cost savings and added business features.

* + - 1. **Action Plan #FY14-4.3.1 Research and recommend a replacement system, then initiate the replacement project.** ITS will review existing products and make a recommendation to campus leadership for a VIOP system to replace the PBX. Once approved, ITS will move forward to begin the implementation project.

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| Accomplished in FY2014 | 1. Selected a product to replace the PBX (Microsoft Lync). 2. Initial project plan completed, decision to proceed with formal project management, including moving project management to the project management team. | |
| Plan for FY2015 | 1. Project Implementation started | |
| Performance Metric | Make measurable progress by moving staff off PBX. | 25% complete (by end of FY15) |

* + 1. **Goal #4.4 Plan for disaster recovery “warm” site.**

An important component of IT risk management is a robust disaster recovery plan. A critical aspect of this plan is the provisioning of a disaster recovery site.

* + - 1. **Action Plan #FY14-4.4.1 Complete setup of the “warm” disaster recovery site**.

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| Accomplished in FY2014 | 1. Setup of the “North Node” DR site complete with the exception of a redundant internet connection. 2. First 48 hour response flow chart with critical services completed. | |
| Plan for FY2015 | Conduct a fail-over test to the North Node DR site. | |
| Performance Metric | Fail-over test is successful | Ongoing |

* + 1. **Goal #4.5 Mitigate risk of data loss by improving the security of web applications and servers.**

Attacks against web applications are an active source of security breaches and a robust scanning and patching program is necessary.

**Action Plan #FY14-4.5.1 Utilize appropriate measures to scan for and then remediate vulnerabilities in web applications.** Utilize the QualysGuard web application scanning tool to find vulnerabilities, and then work with appropriate developers to remediate problems.

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| Accomplished in FY2014 | 1. Purchased additional Qualys web application licenses and began scanning enterprise level web applications.  2. Assisted web developers with secure coding challenges. | |
| Plan for FY2015 | 1. Continue to increase scanning of enterprise level applications.  2. Establish a regular scanning schedule for newly scanned enterprise applications. | |
| Performance Metric | Inventory is completed and Qualys web application licenses are being used for the most critical enterprise web applications. | Ongoing |

* 1. **Area #5 Academic Technology**

Academic technologies are a relatively new aspect of university business and represent new risks as well as rewards for Northern Arizona University. The Blackboard Learn Learning Management System (LMS), for example, is now the most highly used web service on campus and is increasingly viewed as a mission critical campus resource. The Impulse SafeConnect system protects the campus network when thousands of students’ personal computers join the network. Library services are increasingly online and accessed 24 hours a day from locations all over the world. As fitting our mission, technology-rich statewide facilities support students needing academic technologies away from the Flagstaff campus. Podcasting is growing naturally out of initiatives started by the E-Learning Center. All of these endeavors indicate a need for coordination and support for faculty and student uses of academic technologies. This IT strategic area supports Northern Arizona University’s 2013 Strategic Plan goal # 1.

* + 1. **Goal #5.1 Continue to encourage growth and improvement of existing Academic Technologies.** Major investments have been made by NAU in order to secure and provide the academic technologies expected of any university. To achieve above average service levels, these investments need to be leveraged into effective resources that are widely adopted.
       1. **Action Plan #FY08-5.1.1 Maintain an effective, reliable, nearly always-on LMS.**  The Blackboard Learn LMS is the most usedacademic service on campus and involves core instructional activities such as accessing course content, participating in discussion groups, communicating with professors, checking grades, or even taking online quizzes and exams. The LMS must be available and perform adequately to meet student and faculty expectations. This is a highly integrated system involving many administrative as well as academic areas of the campus. The action plan for the LMS includes the continual need to professionally manage the performance, availability, and proper function of this resource. It also encourages the relevant teams to explore improved efficiencies or develop new services in areas such as the Blackboard LMS/PeopleSoft interfaces, integrating with a digital repository, and making the fullest use of the available architecture and options in the LMS. The responsible party for this action plan will be the ITS Enterprise Web Team.

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| Accomplished in FY2014 | 1. Converted our locally hosted Blackboard Learn system to one externally hosted by Blackboard Corporation. 2. Implemented a feedback mechanism on all pages of the LMS to provide students and faculty with and easy mechanism for reporting issues and suggestions for improving the service | |
| Plan for FY2015 | 1. Ongoing support for enhancements and upgrades to the BB Learn environment. 2. Continued support for critical integrations with third party systems that expand the use of the BB Learn system | |
| Performance Metric | System is available 99.99 % of the time | Improved from 98.99% |
| Feedback mechanism established and used | Improved ratings on the annual student survey |

* + 1. **Goal #5.2 Support important new technology directions.** There are often new opportunities that naturally arise out of existing services or in response to new strategic thinking and revisions to the overall university strategic plan. Occasionally early adopters find solutions and opportunities that the campus needs to consider for wide adoption. When this happens at NAU, multiple stakeholders are able to come together and create action plans around these new directions.

1. **Action Plan # #FY11-5.2.2 Evaluate and propose appropriate desktop virtualization strategies.** Virtualization is a growing but complicated strategy in the desktop arena. Early promises of savings have not necessarily been realized due to vendor capitalization on the trends in the areas of licensing and costs. However, the spectrum of solutions have been thoroughly explored and those that reasonably held promise for savings or green benefits were pursued via the GreenPC terminal services model and replacement of the central ITS lab with an upgraded system. On-going analysis confirms 2011 findings that the more complicated and expensive full desktop virtualization is problematic to implement in the complicated NAU computing environment and does not at present provide promising ROI. However, a simpler remote desktop model for basic computing uses such as kiosks, counter systems, labs, and basic administrative positions is workable.

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| Accomplished in FY2014 | * Refined support issues of implemented Citrix server infrastructure and 317 Wyse thin clients for kiosks, print release stations and labs.       ITS continues to support GreenPC thin clients and watch for ways to broaden their applicability. This year we leveraged our existing investment in KeyServer license management  to enrich the functionality of GreenPC by providing customers with access to  licensed applications such as Visio, MS Project and Adobe Acrobat on their virtualized desktops.   * Worked with other departments running Sunray thin clients to develop a plan and timeline for replacing them before January 2014. Examples include CEFNS and the Gateway Center. | |
| Plan for FY2015 | * Continue to monitor industry directions to insure that NAU’s desktop virtualization is optimized within cost and resource considerations. | |
| Performance Metric | Number of successfully deployed systems. | Approximately 120 thin client systems deployed in the GreenPC environment. |
| Percentage of kiosks, print release stations and lab stations deployed | 100% |

1. **Action Plan #FY11-5.2.3 Collaborate with the Marketing Department on selection and implementation of a web content management system (CMS).** NAU is in need of a modern, user-friendly and capable web CMS. This capability will allow campus departments to leverage existing content managers to provide web content without the need for web developers.

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| Accomplished in FY2013 | * ITS continues to collaborate with Marketing in the nearly-complete conversion of the campus web-sites, administration of the system, and planning and implementation of upgrades. The Eden project converted 225 sites and WebTech converted 18. * The ITS web site is continuously being evaluated for improvements. A slightly revised home page has been implemented, and a more significant improvement is in work through the ITS Web Steering Committee. | |
| Plan for FY2014 | • Support Ektron upgrades; suggest flexibility improvements such as expanded template library; and coordinate with possible new NAU site design.  • Improve ability of users to find information on the ITS site, including enhancing exposure of student services, security issues, and better use of home page real estate based on site use metrics.  • Conduct focus group evaluations to inform ITS of site redesign acceptance. | |
| Performance Metric | ITS web site converted and progressively improved. | 100% Complete. |
| Number of campus web sites converted. | 100% Completed. |

* 1. **Area #6 Research Computing**

Northern Arizona University is widely recognized for strong research programs that enhance classroom instruction and provide valuable services to the state of Arizona. Today nearly all phases of research involve using computers and networks: from the investigation phase to sharing results, researchers need appropriate research computing resources and support to remain competitive and function efficiently. This IT strategic area supports Northern Arizona University’s 2013 Strategic Plan goals # 1, 2, 3, 4, & 6.

1. **Goal #6.1 Identify Research Computing Needs**
   * + 1. **Action Plan #FY08-6.1.1 Work with the Vice President for Research to identify research computing and networking needs.** Very likely there are small, or perhaps not so small, problems with existing research computing and networking needs that have not risen beyond a single department or research group level. This initiative is simply to ask researchers what, if any, research computing and networking barriers or needs they currently have or can anticipate in the near future.

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| Accomplished in FY2013 | * Collaborated with AVP of Research to create training and tracking mechanism for compliance with Responsible Conduct of Training requirements | |
| Plan for FY2014 | * Informal assessments and feedback of research needs will continue, but at a fairly low priority. | |
| Performance Metric | Conduct analysis of research IT needs. | On-going |

* + - 1. **Action Plan #FY08-6.1.2 Keep the Vice President for Research and other researchers informed of emerging Tri-University research computing opportunities.** As part of a recent Arizona Board of Regents recommendation, the Tri-University technical teams are expected to work jointly on different projects. One such project is a new super-computer facility. While NAU is not an integral part of the development or funding of this facility, there is an expectation that some of these resources will be made available to NAU researchers. This action plan is to keep the Vice President for Research updated on this opportunity as well as other research computing opportunities that may arise due to similar Tri-University initiatives. The responsible party for this action plan is the Chief Information Technology Officer. The initial timeline for this was the 2008-2009 academic year; no additional funding will be required for this action plan.

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| Accomplished in FY2013 | The CITO and VP for Research meet monthly. During these meetings information is shared regarding Tri-University and other research computing opportunities. | |
| Plan for FY2014 | The monthly meetings will continue and opportunities for collaboration identified and explored. | |
| Performance Metric | Continually communicate to research community of emerging Tri-U opportunities. | Ongoing |

* + - 1. **Action Plan #FY09-6.1.1 Explore general tools for research collaboration.** An ongoing effort is needed to research various collaboration tools, both software and network, which will aid researchers with their efforts. Such collaboration software tools, such as Confluence and Microsoft SharePoint, are in this category. Video conferencing would be another tool to aid in collaboration activities with remote colleagues. Wide video conferencing use can help reduce travel costs for researchers and others across the campus.

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| Accomplished in FY2014 | 1. The requirements for the Live Data research portal were developed by a collaborative team of system administrators from ASU, UA, and NAU and approved. 2. A vendor was selected and design work has started | |
| Plan for FY2015 | 1. Provide support as needed to phase one of the project 2. Provide support to the development of the previously approved phase 2 work | |
| Performance Metric | Continually explore new tools for research collaboration. | Ongoing |

1. **Goal #6.2 Assist with new IT related security and compliance research mandates.**

Concerns about information security increasingly impact all aspects of university business. Many research areas involve confidentiality and a mandate to protect certain types of information. Some granting agencies are becoming very explicit in their requirements for managing sensitive data. Often this is not the area of expertise or interest for the principle investigator; hence, it makes sense to have guidelines, best practices, and even consultative services to help with these research-related obligations.

* 1. **Action Plan #FY11-6.2.1 Review the evolving security guidelines to identify and communicate best practices for securing restricted research data.** Continue to review changing security guidelines to include the changes to the Federal Information Security Management Act which is now being included in federal research grant requirements. Be a resource for investigators needing compliance assistance. The responsible party for this action plan will be the Director of Information Security. This action plan will not require additional funding.

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| Accomplished in FY2014 | 1. Worked with VP Research area to draft NAU research data security policy based on a variety of data protection regulations including HIPAA and FERPA as well as NAU-specific needs.  2. Assisted Cline Library with data security aspects of guidelines for researchers. | |
| Plan for FY2015 | Continue to work with VP Research area and other campus constituents to promote research data security. | |
| Performance Metric | Research data security policy is completed and approved by campus leadership. Researchers are informed regarding data security policy and guidelines. | Ongoing |

1. **Area #7 IT Strategic Alliances**

NAU has a long-standing strategic alliance with Oracle/PeopleSoft that should be supported. This agreement calls for NAU to provide early feedback on releases of Student System and Campus Community systems in exchange for decreases in annual vendor support costs. Additionally it leads to NAU being classified by Oracle/PeopleSoft as a “critical account’ when installing vendor-supplied upgrades. This, in turn, leads to increased support and attention to institutional needs during this critical period. Collaboration initiatives will help the universities to better leverage the resources of each campus to ensure high availability systems. This IT strategic area supports Northern Arizona University’s 2013 Strategic Plan goal # 6.

**Strategic Goal #7.1 Maintain Strong Strategic Alliances with Other Arizona Universities**

1. **Action Plan #FY08-7.1.1** **Continue to maintain strong cooperation with ASU and now UofA on their Oracle/PS systems.**

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| Accomplished in FY2014 | 1. The enterprise applications leadership at all three universities continue to share information related to on-going and upcoming projects with ASU hosting an all-day on-site meeting. 2. Collaboration with ASU helped NAU to quickly establish the baseline requirements for a CRM, but unfortunately NAU was unable to leverage the same contract. 3. Collaboration with ASU and UA enabled NAU to investigate and use auxiliary development resources to quickly complete overflow work that would have previously taken several more months to finish | |
| Plan for FY2015 | 1. Continue to collaborate with ASU and UA enterprise development teams. 2. Reinstitute effort to build collaboration on Project Management functions now that NAU is building a Project Management Team | |
| Performance Metric | Continue to work with other universities to find ways to collaborate on our Oracle/PS installation and upgrade plans. | Ongoing |

1. **Action Plan #FY08-7.1.2** **Watch for other opportunities to build strategic alliances with our fellow Arizona universities on other administrative systems.** Begin talks about a future direction for universities financial systems.

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| Accomplished in FY2013 | 1. Information sharing regarding the implementation of key new mobile application implementation and their adoption rates. | |
| Plan for FY2014 | Continue to seek opportunities to collaborate. | |
| Performance Metric | Work together as opportunities present themselves. | Ongoing |

1. **Action Plan #FY08-7.1.3** **The NAU Information Security Office is working together with the security offices at ASU and UofA to determine a vulnerability scanning and penetration testing tools set to be deployed at all three universities.**

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| Accomplished in FY2014 | Continued to hold monthly conference calls between the three information security officers.  1. Shared information regarding incidents for faster response and resolution.  2. Shared information regarding compliance efforts.  3. Shared information regarding audit response to promote consistent approach and response to audit processes.  4. Agreed to utilize new NIST cybersecurity framework rather than ISO 27001 as a basis for tri-U information security programs. | |
| Plan for FY2015 | 1. Continue to seek opportunities to cooperate in the security area. | |
| Performance Metric | Work together as opportunities present themselves. | Ongoing |

## Information Security Office Program and Plan

Northern Arizona University (NAU) is committed to preserving the availability, confidentiality, and integrity of its information resources while also preserving and nurturing the open, information-sharing requirements of its academic culture. NAU must protect its information assets, provide for the integrity of institutional processes and records, and comply with state and federal regulations.

NAU is dedicated to a proactive approach to Information Security (IS). In the past year continued steps were taken to ensure the security of the most critical campus information systems through efforts supported by compliance with the Arizona Board of Regents (ABOR) Information Security Guidelines.

Key among these efforts for FY2014:

* Improvements to tools and processes for phishing email response, including an in-house developed web application for tracking response.
* Security reviews conducted by outside consultants for network, enterprise databases, and PeopleSoft Enterprise systems. As a result of these reviews, several major projects including the expansion of two-factor authentication, Oracle database encryption, and moving to an MPLS network design have been initiated.
* Acquired and deployed Splunk Enterprise to improve the reach and efficiency of incident response.
* Acquired and installed Identity Finder to scan NAU equipment for sensitive data.
* Draft of research data security policy and guidelines completed.
* Developed new policy and guidelines for server hardening.
* Continued efforts to encrypt Windows laptops.
* Disaster recovery site in the North Node completed.
* Awareness activities including revised mandatory information security training, October Cybersecurity awareness month activities, “phishing” booth at employee mixer, and various presentations at student clubs.

The IS Program continues to experience campus-wide support. Its implementation is an on-going process, and high-level executive support will continue to be critical for its long-term success. The IS Program addresses the substantial risks the university faces and outlines the roles, responsibilities, policies, procedures and standards designed to address the risks. This report highlights the progress of the ISO Office, Information Technology Services, distributed IT personnel, and the university community toward meeting the Program goals in each of 5 core areas of the IS Program plan for FY 2014 and establishes goals for FY 2015.

For many years the IS programs of NAU, ASU, and U of A were based on ISO 27000 series of standards. With the release earlier this year of the National Institute of Standards and Technology (NIST) Framework for Improving Critical Infrastructure Cybersecurity the decision was made by the three Arizona University IS Offices to adopt this framework as a more approachable method for IS program and plan development and improvement. The new framework is business and risk driven and intended to support a continuous improvement cycle. It is also designed to fit with existing standards (such as the ISO 27000 series) so that current program goals and activities can be easily integrated into the new framework.

The NIST Framework comprises three parts: the Framework Core, the Framework Implementation Tier, and the Framework Profile. As a first step toward using the new framework the current activities of the IS program are mapped below into the core framework. For future work, the implementation tier will be identified and a target profile developed. Following are the five Core Functions with a report on current activities and goals for this next year for each of the functions.

**Identify**

**2013-14 Activities**

* Acquired and installed Identity Finder.
* Scanned additional enterprise web applications
* Scan University enterprise servers using Qualys to identify and remediate vulnerabilities
* Utilized nmap and Nessus to automate search for XP machines on campus network, machines were then upgraded or placed on internal network.
* Participated in University level risk management assessment.
* Completed security reviews for network, enterprise databases, and PeopleSoft web applications.
* Met with the Information Security Committee once per semester as well as communication via email to ensure the Committee is informed and security activities are approved.

**2014-15 Goals**

* New Enterprise web application scans placed on regular schedule
* Scan University enterprise servers using Qualys to identify and remediate vulnerabilities
* Use Identity Finder to scan desktops in critical campus units (such as Comptroller and Registrar)
* As part of the multifactor authentication project, classify the level of assurance appropriate for all enterprise level applications
* Explore the use of penetration testing to identify potential security gaps
* Continue to participate in the University level risk management assessment
* Complete Oracle database encryption project
* Continue to meet and communicate regularly with the Information Security Committee.

**Protect**

**2013-14 Activities**

* Oracle database encryption project under way
* Established policy and guidelines for server configuration and management
* Draft completed for research data security policy, guidelines for researchers completed and published.
* Enhanced existing email filtering capabilities for faculty and staff email. Began using custom filters through the administrative console for student gmail.
* In-house development of phish tracking web application to streamline phishing response. .
* Equipment for new, more secure VPN purchased.
* Developed new end user training, held cybersecurity awareness activities during October awareness month
* Closed SSH activity from open internet to prevent attackers scanning for vulnerable servers.
* Laptop encryption program continuing. Acquired the Microsoft Bitlocker Administration and Monitoring (MBAM) application to help future efforts.
* Serve on the Institutional Review Board to ensure attention to research data security needs
* PCI compliance project underway
* Review University contracts for software and technology services to ensure compliance with security standards

**2014-15 Goals**

* Complete Oracle database encryption project
* Launch MPLS project
* .Install new VPN equipment
* Assist VP Research area to finalize research data security policy.
* Evaluate results of PeopleSoft security review and recommend any necessary refinements to access controls or other PeopleSoft security issues.
* Deploy new awareness training
* Hold cybersecurity awareness month activities in October
* Continue to serve on the Institutional Review Board to ensure attention to research data security needs
* Install and begin using the MBAM application to monitor progress of laptop encryption
* PCI compliance project continuing
* Review University contracts for software and technology services to ensure compliance with security standards

**Detect**

**2013-14 Activities**

* Acquired and installed Splunk to begin building SIEM capabilities and utilized to correlate known bad IP addresses with account logins, discovering compromised accounts.
* Increased the use of open source black lists and alert services

**2014-15 Goals**

* Evaluate and potentially acquire a commercial threat list service
* Install OSSEC to pre-filter logs for Splunk analysis
* Evaluate and potentially acquire an IDS/IPS solution for PCI network segment (this may be combined with the MPLS network architecture redesign).

**Respond**

**2013-14 Activities**

* Created an in-house web application for tracking phishing activity to streamline response.
* Finalized DR plan including first 48 hour critical services flow chart
* Detected and stopped brute force attack on password change tool.
* Detected and stopped direct deposit attack.
* Participated in the University Emergency Advisory Group to ensure campus incident response appropriately addresses IT needs, and ITS is prepared to assist overall campus responses
* Responded to numerous subpoenas, assisted Public Affairs Office with FOIA requests

**2014-15 Goals**

* Participate in the Emergency Management Group to ensure campus incident response appropriately addresses IT needs, and ITS is prepared to assist overall campus responses
* Ongoing coordination of information security incident response for the University
* Investigate the use of Splunk for scripted response to known malicious activity

**Recover**

**2013-14 Activities**

* Finalized DR plan including first 48 hour critical services flow chart
* Conducted forensics on Direct Deposit and password change tool to understand the attacks and improve security posture
* Checked with ASU, U of A and State of AZ risk management regarding current recommendation for cybersecurity insurance. Not recommended at this time due to high cost and difficulty meeting qualifications for reasonable protections.

**2014-15 Goals**

* Investigate ID protection contract to prepare for possible breach response.
* Check in with risk management regarding current recommendation for cybersecurity insurance.
* Conduct DR review on site at recovery facility; if successful schedule a live fail-over test.

**Incident Response Reporting**

In the past year NAU did not have any incidents that required notification under AZ 44-7501 “Notification of Breach of security system”, or Section 10 of the ABOR Information Security Program Guidelines. However, NAU did have security incidents which required action from ITS and the IS group.

Incidents included a targeted phishing attack which resulted in compromised user accounts and direct deposit account changes, and a brute force attack against the password change tool which also resulted in compromised accounts, with no evidence of subsequent account access. There was one incident of a compromised email account being used to send fake purchase orders. None of the fake POs resulted in loss to the University.

## Conclusion

After years of reduced budgets, Northern Arizona University must comprehensively scrutinize all spending across the entire University. IT spending is an area that must be linked to a common purpose and plan which is represented by this document. The University-wide strategic planning and budgeting process is a key element in establishing University priorities. This IT Strategic Plan and Information Security update must be an integral part of this process to ensure that IT initiatives are supportive of the overall University mission, plans, and goals, and are considered for appropriate ranking in the list of Northern Arizona University’s budget priorities.