Information Technology Services

Information Technology Services

2017-2018 Annual Report

November 30, 2018

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NORTHERN ARIZONA UNIVERSITY
Information Technology Services

November 30, 2018

To whom it may concern,

I'm pleased to provide this report summarizing the FY18 fiscal year for the Information Technology Services Division (ITS). The 2017-2018 academic year was my second year as the CIO at Northern Arizona University. This report highlights the status of IT and Data Governance, operational metrics and technological improvements made during the year. I'm very proud of the 200+ IT professionals who exhibited personal and team commitment to provide a high level of service and be a positive contributor to student success in learning, discovery, performance and community enhancement. It is this dedication and pioneering spirit that are our defining attributes as we pursue excellence in service to this great institution.

There were many accomplishments throughout the year that directly impacted student success among them are:

- Centralized printing services and reduced per-page costs to reduce barriers to student success relative to printed assignments.
- More than 250 additional wireless access points expanded coverage Increased wireless coverages now provide improved access in student housing, academic facilities, and student unions.
- Upgrades to more than 70 classrooms in collaboration with Facility Services. 65% of all classrooms at NAU are now based on our university standards making it easy for faculty and students to utilize all learning spaces.
- More than 800 computers, including all of the student computers in the library were upgraded. All computer labs throughout the university are now on the minimum standard 5 year equipment rotation cycle.
- Enhancements to Salesforce enable timely, accurate and high-quality advising services to students.
- Enhancements to *Internet connectivity provides additional bandwidth and reliable connections to network services.*

These and other projects highlighted in this report positively impact student success, and help forge an increasingly positive and sustaining future state for NAU.

There were also improvements made to research as Monsoon, NAU's high-performance computing cluster was expanded to include nearly 3,000 compute cores and additional terabytes of high performance data storage. A RedCap™ server was added to securely collect and store sensitive research data. New policies and procedures were also developed to ensure compliance with federal security standards.

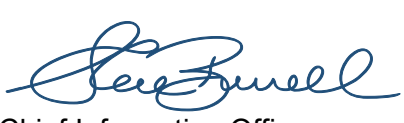
ITS also completed a reorganization and realigned services after the initial centralization of IT services in 2016. ITS now has seven departments of knowledge and services that are organized flatter, more matrixed approach to providing services to the university and aligns responsibilities more clearly while positioning ITS to become more agile in adopting and adapting to new technology.

FY18 marked the close of the prior IT strategic plan and the assessment in this report shows a high degree of success in meeting the stated objectives. Even with these accomplishments and successes, there are many opportunities for improvement. Internal studies continue to indicate that fostering more teamwork, collaboration and communication among ITS units is still needed. Moreover, we must become more disciplined in our approach and agile in our response to projects and campus needs in Flagstaff and throughout the state.

A new strategic plan will be written in FY19 and will draw input broadly from across the University to ensure connections to students, faculty and staff needs as well as the over-arching University and Arizona Board of Regents strategic intent. It is incredibly important that we contribute to innovation and sustainable operations as we support nearly every aspect of the institutions strategies and operations. IT Services must be about an emphasis on and agility for serving student success and less about driving the technology.

There are so many things the report does not discuss that represent the complexities of the services ITS provides and the good work performed by the staff and our collaborating partners throughout the University. If you have questions about ITS or this report, I welcome the opportunity to discuss them with you. Please direct your inquiry to me at steven.burrell@nau.edu.

Respectfully,



Chief Information Officer

Information Technology Services Annual Report 2017-2018

Overview of the IT Services Division

Mission

The mission of the Information Technology Services Division is to advance the Northern Arizona University mission by providing reliable technology solutions and excellent support for all University community members. Through our professional services, students, alumni, faculty, staff, administration, and the citizens of Arizona are afforded an IT environment which enhances instruction, learning, research, service, community relations, and business operations.

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

The vision of technology and information resources at Northern Arizona University is to utilize appropriate technologies and services to:

- Innovate with technology that is"
  - social,
  - mobile,
  - analytical,
  - cloud based,
  - and considers the evolving Internet of things.
- Beyond these technological guideposts ITS strives to:
  - Enthuse faculty to innovate in their teaching and scholarship;
  - Inspire students to learn and grow as 21st-century world citizens;
  - Enable excellence, effectiveness, and efficiency among staff and administrators serving our learning community;
  - Excite our alumni and benefactors by engaging them as stakeholders in the continued success of the University;
  - And seek new opportunities to facilitate the prosperity and well-being of the citizens of the State of Arizona.

IT and Data Governance

The IT and Data Governance Trustees report to the Executive Team and the President. The Trustees are responsible for oversight of Information Technology and data governance-related tasks that advance university data and reporting capabilities and enhance systems and processes in support of institutional strategic goals. The Trustees will 1) provide oversight and guidance to other NAU data governance committees and workgroups, 2) prioritize IT and data governance-related initiatives and tasks in to ensure alignment with institutional strategic goals, 3) address institutional policy and security practice-related issues, and 4) ensure appropriate allocation of resources to advance IT and data governance initiatives. Additionally, Trustees serve as liaisons to the university community to provide education and awareness on IT and data governance related issues.

Governance Membership

The Trustees are part of the University's IT and Data Governance structure and consists of selected Executive Team members who can effectively advise the President and lead various IT and Data Governance committees and workgroups at NAU.

- Steve Burrell, Chief Information Officer, Information Technology Services
- Bjorn Flugstad, Vice President, Finance, Institutional Planning and Analysis
- Laura Jones, Chief Institutional Data Officer, Institutional Research and Analysis
- Dan Kain, Provost, Office of the Provost
- Joanne Keene, Executive Vice President and Chief of Staff, Office of the President
- Jane Kuhn, Vice President, Enrollment Management and Student Affairs
- Dan Okoli, Vice President, Capital Planning and Campus Operations
- Dave Schultz, Vice President, Research

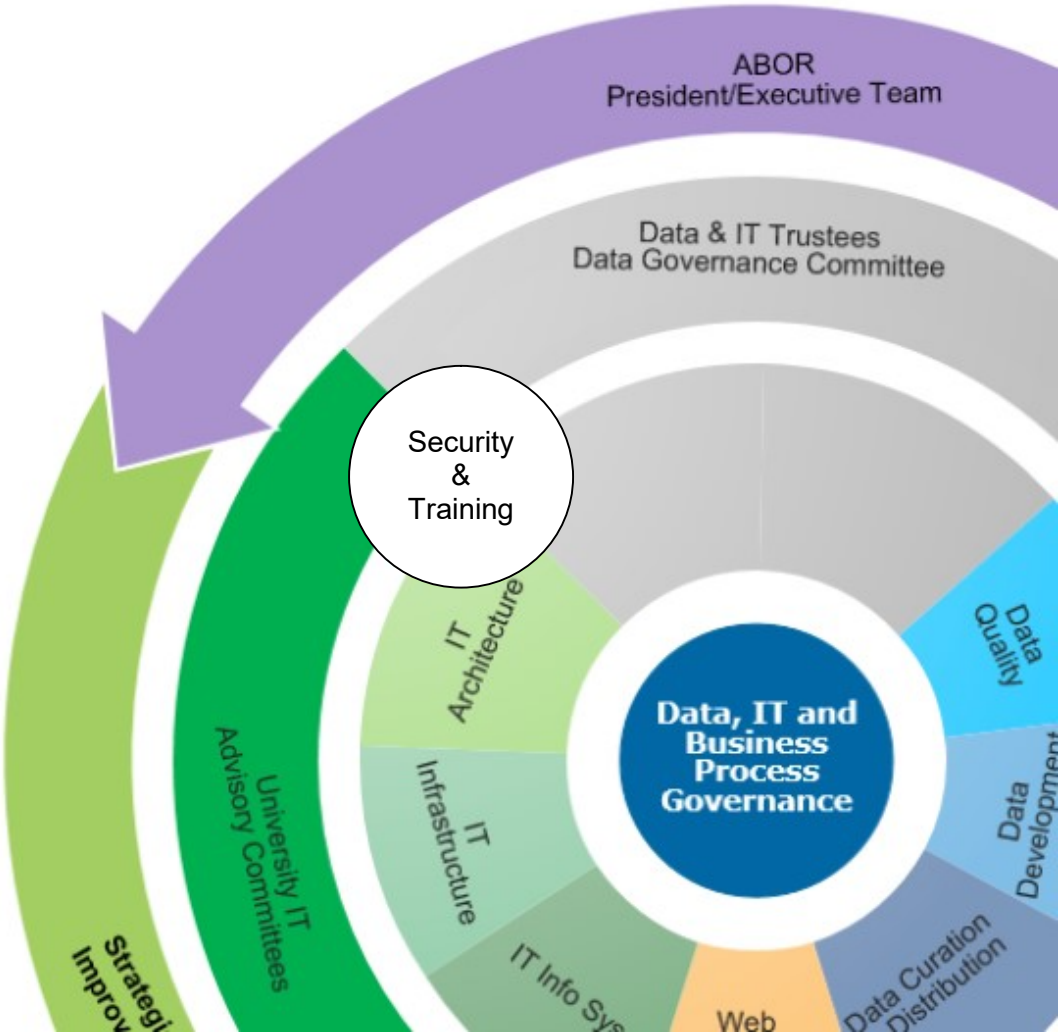
ITS Advisory Committees

There is a structure of advisory committees that inform the CIO about issues, needs, and assessment of technology and services. These committees and working groups provide an advisory and governance framework that guides the actions of the Vice President through transparent and open dialogue. The following councils and committees are part of the official NAU IT & Data Governance structure.

Academic Technology Advisory Council (ATAC)

The Academic Technology Advisory & Coordinating Council (ATACC) is an advisory body to the Chief Information Officer (CIO) and part of the formal IT and Data Governance structure of Northern Arizona University. Members are sought from across all divisions of the institution to represent diverse interests related to technology, policy, and services. Members of the Council are nominated by their Deans, the Provost, and the CIO and serve overlapping terms to help ensure continuity of conversation, tactics, and strategy. Participation from University community members based on their contributions to, or derived benefits from, topical discussions is encouraged. Meetings are open to members of the University community.

Figure 1: IT and Data Governance Diagram



The ATAC functions as an advisory body to the University IT & Data Governance Trustees and is created for the purpose of providing recommendations regarding strategic and technical direction for the NAU website and digital presence. The Council shall limit its activities to advising on matters that directly concern the digital presence of the university.

The key functions of the Council are:

- Recommend policies and procedures to ensure NAU web pages and electronic publications are consistent with NAU's web standards and reflect the University's brand and messaging to follow the University's strategic direction;
- Review and recommend information architecture;
- Review and recommend design and feature change and
- /or addition requests;
- Identify compliance issues and recommend resolutions;

More information is available at https://nau.edu/web/wac/ .

Computational Research Advisory Council (CRAC)

The Computational Research Advisory & Coordinating Council (CRAC) is an advisory body to the Chief Information Officer (CIO) and part of the formal IT and Data Governance structure of Northern Arizona University. Members are sought from across all divisions of the institution to represent diverse interests related to research technology, policy, and services. Members of the Council are nominated by the Vice President for Research, College Deans, the Provost, and the CIO and serve overlapping terms to help ensure continuity of conversation, tactics, and strategy. Participation from University community members based on their contributions to, or derived benefits from topical discussions is encouraged.

Student Technology Advisory Committee (STAC)

The Student Technology Advisory & Coordinating Council (STACC) is an advisory body made in partnership with the Associated Students of Northern Arizona University (ASNAU). The STAC provides guidance to the Chief Information Officer (CIO) and part of the formal IT and Data Governance structure of Northern Arizona University. Members of the Council are currently limited to members of the Associated Students of Northern Arizona University and student staff members of ITS. Meetings are issues driven and are often conducted in the context of ASNAU proceedings.

Information Security Committee

The information Security Committee reports to the Chief information Officer (CIO). The Committee is responsible for oversight of the Information Security Program. The Committee will 1) provide recommendations to the CIO regarding information security policies and standards, and 2) provide guidance and support to the Director of Information Security for the implementation and maintenance of the Information Security Program. Additionally, committee members serve as liaisons to the university community to provide education and awareness on information security issues.

The committee is part of the University's IT and Data Governance and is comprised of membership representative of the university community that can effectively advise the CIO, IT and Data Governance Trustees, and the university community on issues related to information security at NAU.

Strategic Project Review and Resourcing Committee

The Strategic Project Review and Resourcing Committee (SPRRC) is part of the University's Data Governance structure and is comprised of membership representative of the university community that can effectively advise the Data Governance Trustees, and the university community on effective and efficient project prioritization and resource allocation needs related to data governance at NAU.

The SPRRC is responsible for the review of project proposals to ensure alignment with strategic goals, to provide project coordination across divisions, and to make recommendations on university-level prioritization of projects based on available allocation of resources.

The SPRRC provides:

- Single entry point for all cross-divisional projects;
- Discussion of cross-divisional impacts, Institutional view of projects, strategic alignment;
- VP-level prioritization of all divisional projects;
- Resource allocation and project negotiation discussions;
- And critical project review.

CIO Advisory Council

The CIO advisory council consists of the ITS Directors, Associate Directors and other key ITS contributors. Meetings are held at least monthly and topics include review of issues, projects and other topics of concern relative to IT technology and services at NAU.

Additional committees, councils and steering groups under the umbrella of IT and Data Governance structure include:

- Data and Business Process Advisory Committee
- Research Data Use Committee.
- Professional Development and Learning Systems and Services.
- Salesforce Steering Committee.
- Student Experience Taskforce.
- NAU and Coconino Community College Coordinating Council.
- Space and Event Management Steering Committee.
- Student Retention Committee.
- Institutional Risk Management Committee.

The CIO also regularly participates in President's Cabinet meetings, Faculty Senate, and periodically participates in the Council of Deans and Department Chairs meetings and engages colleges through both formal leadership channels and informal relationships.

Human Resources

ITS Organization

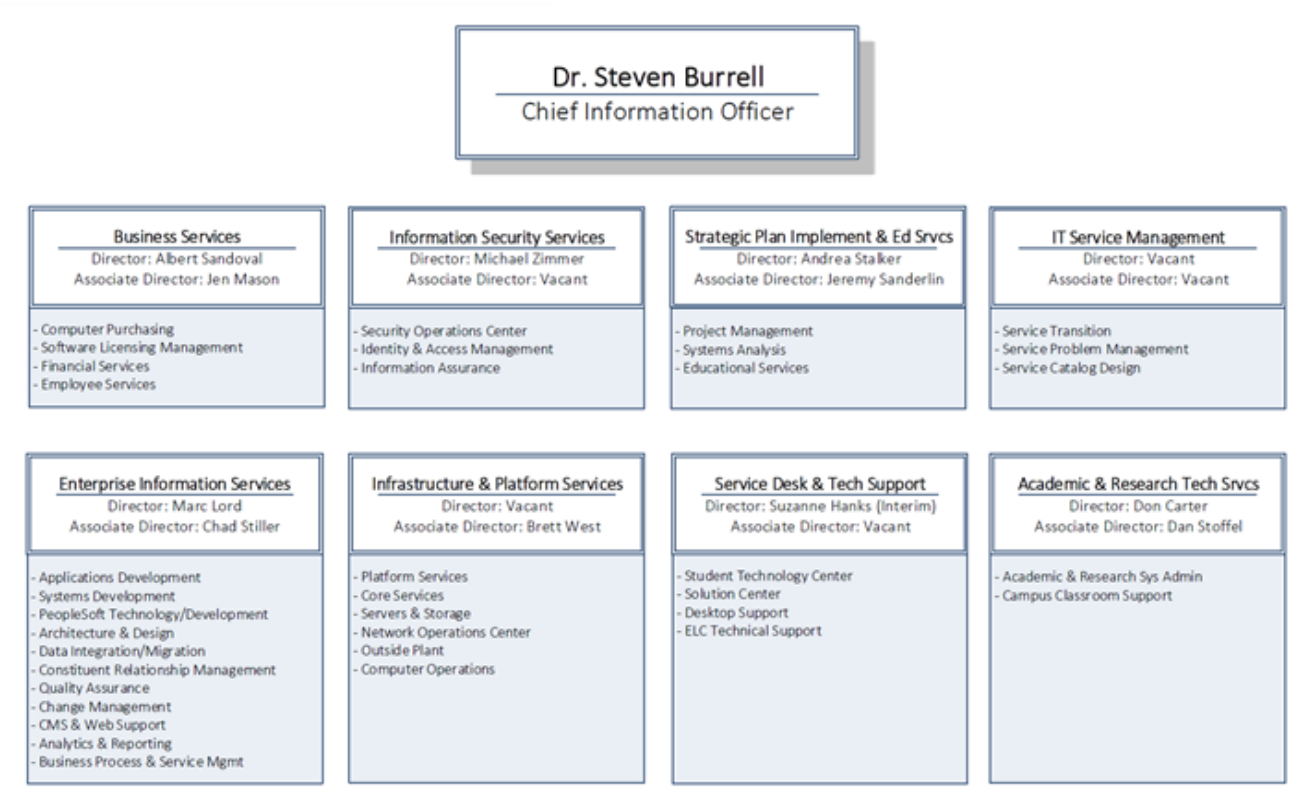
ITS was re-organized from four departments into nine departments that align closely with modern practice. A flatter, matrixed organization ensures that collaboration, decision making and accountability are pushed as far down into the organization as possible while creating agility. Each department of ITS is led by a Director. In the cases of larger departments, an Associate Director provides co-leadership responsibilities.

Department Descriptions

Information Security Services (ISS) - University information security services provides oversight of NAU's IT security program and provides a variety of services including proactive education on cyber best practices, security planning and monitoring, as well as investigation and mitigation services.

Strategic Planning, Implementation and Education Services (SPIES) – Provides systems analysis, business process optimization, technology consulting, project planning and implementation management, and technology training services university-wide.

ITS Organization Chart



Business Services - Fiscal and Human Resources and Administrative Support shared services for the entire division. This unit also houses University technology procurement services.

IT Service Management (ITSM) – Provides best practices development and oversight services around ITIL pillars of practice for IT Services.

Enterprise Information Services (EIS) – Provides application development, data integration, analytics and reporting, software as a service management, and other services in support of university-wide information systems like PeopleSoft, Salesforce, and OnBase among many others.

Infrastructure and Platform Services (Infrastructure) - Provides all services around IT infrastructure including compute, storage, archival, network, and communications systems. In addition, critical core platform services such as virtual servers, Domain Name Services, Active Directory, LDAP and other services are maintained by this group.

Service Desk & Tech Support Services (SD) - Provides help desk tier 1 and tier 2 services as well as field services state-wide for computer support. This group also operates the Student Technology Center providing computer repair, technical support, and operational assistances in collaboration with Housing and the Cline Library.

Academic and Research Technology Services (ARTS) - Oversees systems and provides a myriad of services in support of teaching, learning, performance and discovery.

Demographics

Demographics of the ITS staff show a growing number of millennials in the workplace. At time of census there were 203 FT employees who totaling 2,375 years of service and averaged 12 years of employment at NAU.

Generations	***Count***	***%***
Silent Generation (1925 - 1942)	0	0%
Baby Boomers (1943 - 1964)	58	29%
Generation X (1965 - 1985)	108	53%
Millennials (1986 - 2000)	37	18%
Generation Z (2001 - Current)	0	0%

Ethnicity	**Count**	**%**
American Indian/Alaska Native	18	9%
Asian	8	4%
Black/African American	3	1%
Hispanic/Latino	10	5%
Not Specified	3	1%
White	161	79%

Gender	**Count**	**%**
Women	56	28%
Men	147	72%

Note: There were 203 full time staff at time of this measure.

Student Staff

ITS employed 171 students in 26 different job roles for a total 65.8 full-time-equivalent (FTE) staff. This is significantly more than the median of 45 among our ABOR Peers (n=10). Students continue to provide technical and support services that are essential to the effective operations of technology throughout the institution.

	Positions	*Students*	
	# of Positions	# of Employees	FTE
FY16	15	100	38.46
FY17	25	173	66.54
FY18	26	171	65.77

Hiring students is a win-win proposition for NAU ITS and the student, providing rich job experiences in the student's field of study. ITS will continue to hire additional students into infrastructure support, service desk, software development, and administrative support roles as part of an overall strategy to become more efficient and effective in service delivery. It is also significant to note that no funds came to ITS to support the additional student hires during centralization of IT Services.

Staff Functional Roles

The following table summarizes the number of IT Staff performing general functional roles during FY17 according to EDUCAUSE categories and compared to NAU ABOR Peer institutions.

	Professional Staff FTE	*%*	*Student Staff FTE*	*ABOR Peers AVG FTE**	*%*
Total Central FTE	204		66	174	
1. Administration and management of IT	12	6%	5	18	10%
2. IT support services	43	21%	25	35	20%
3. Educational technology services	19	9%	10	19	11%
4. Research computing services	2	1%	1	1	1%
5. Communications infrastructure services	16	8%	2	20	11%
6. Enterprise infrastructure and services	48	24%	10	28	16%
7. Information security	8	4%	2	6	3%
8. Information systems and applications	53	26%	9	25	14%
9. Other IT domain(s) [describe other IT domain(s)	6	3%	2	22	13%

** Source: EduCAUSE Core Data 2017-2018*

The ABOR peers used in this comparison are a mix of central and decentralized IT institutions. The numbers reported are self-reported by the institutions and are for IT staff that report to a central IT authority such as the CIO.

Fiscal Performance

Expenses from State and Local Accounts Summary

Expense Class	*State*	*Local*	*Total*	*%*
Salary	$10,183,568	$5,887,265	$16,070,833	44%
Other Wages	$95,174	$86,925	$182,099	0%
Student Wages	$107,982	$820,284	$928,266	3%
Work Study	$464	$8,039	$8,504	0%
ERE	$3,544,689	$2,106,001	$5,650,690	15%
Operations	$1,417,883	$7,339,422	$8,757,306	24%
Interdepartmental	$19,006	$50,789	$69,795	0%
Utilities/Other Ops/Ins	$159,469	$571,875	$731,343	2%
University Charges	$0	$171,786	$171,786	0%
Professional & Outside Services	$1,208,021	$2,415,824	$3,623,844	10%
Travel In-State	$7,333	$13,223	$20,557	0%
Travel Out-of-State	$37,151	$18,726	$55,877	0%
Equipment	$90,282	$395,207	$485,489	1%
Total	**$16,871,023**	**$19,885,366**	**$36,756,389**	**100.00%**

Technology Fee Expense Summary

Expense Class	*Total*
Salary	$ 3,541,527
Other Wages	$ 44,096
Student Wages	$ 652,859
Work Study	$5,289
ERE	$ 1,251,239
Total Personnel	$ 5,495,010
Operations	$ 3,605,114
Interdepartmental	$ 43,078
Utilities/Other Ops/Insurance	$ 75,672
University Charges	$ 84,317
Licensing and Services	$ 1,328,865
Travel In-State	$ 16,891
Equipment	$ 54,363
Total Non-Personnel	$ 5,208,300
Total Expenses	$ 10,703,310

Technology Fee Classroom Small Equipment Expense Summary

Most of the equipment purchases for Audio Visual (A/V), computers and peripherals quality as non-capital assets. The following table breaks out the operational costs and amounts spent to improve equipment in laboratories and classrooms.

Classroom/Lab A/V Computer	A/V	A/V Non Capital	Computers	Computers Parts & Supplies	Total
Total	$54,363	$892,348	$279,172	$56,761	$1,282,644

Revenue Summary

Revenue ITS Local (2500+4700+4800)	
Transfers In	$11,830,382
Transfers Out	$8,164,499
Net Transfers	**$3,665,883**
Mandatory Fee	$11,527,449
Other Fee	($3,875)
Foundation	$2,360
Department Revenue	$4,237,106
Auxiliary Revenue	$318,898
Total	**$16,081,938**
Balance Forward July 1, 2018	$1,668,285
Ending Balance June 30, 2018	$1,530,741

ITS began the practice of budgeting on 85% of expected revenue as a philosophical approach in FY17. This approach allows for emergency funds in the event of loss, and gaurds against impact of downturns in revenue (enrollment) which could dissrupt critical operations that depned on fee and revenue sources.

Performance Metrics

The following metrics compare NAU to that of other institutions as compiled by the EDUCAUSE Core Data survey (FY17). NAU ITS salaries are notably higher and level of professional development very low compared to the reporting ABOR peers. However, NAU compares very similarly to peer institutions on central IT per-student FTE spending. NAU reports a higher emphasis on transformational IT projects.

EDUCAUSE Core Data Service ABOR Peer Metrics[1]

Metric	***NAU ITS FY18***			***ABOR PEER AVERAGE FY17****			***PEER RANGE****
Central IT FTEs per 1,000 institutional headcounts (Faculty, Staff, Students)	9.24			9.22			5.66- 12.92
Total IT spending per Institutional FTE (Students, faculty and staff)	1,179			1,140			$700-$1330
Total IT spending per student FTE	1,145			1,178			$753 -$1,532
Percentage of central IT spending on running (R), growing (G), and transforming (T) the institution	Run	Grow	T	Run	Grow	T	
	70	20	10	80	10	10	
Central IT compensation as a percentage of total central IT operating expenses.	64%			61%			26%- 83%
Central IT spending on professional development as a percentage of total central IT spending.	0.63%			0.72%			0.35 - 1.09%
Total central IT expenditures as percentage of institutional expenses	6.3%			5.6%			3.3% - 6.7%
Average IT Staff Expense	$98,751			$79,447			$35k – $107k

[1] Total central IT funding is from 2017 Core Data Survey, Total central IT staff is from 2017 Core Data Survey
Total employees is from 2017 IPEDS data via EDUCAUSE.
Student FTE is based on IPEDS Fall 2017 enrollment data

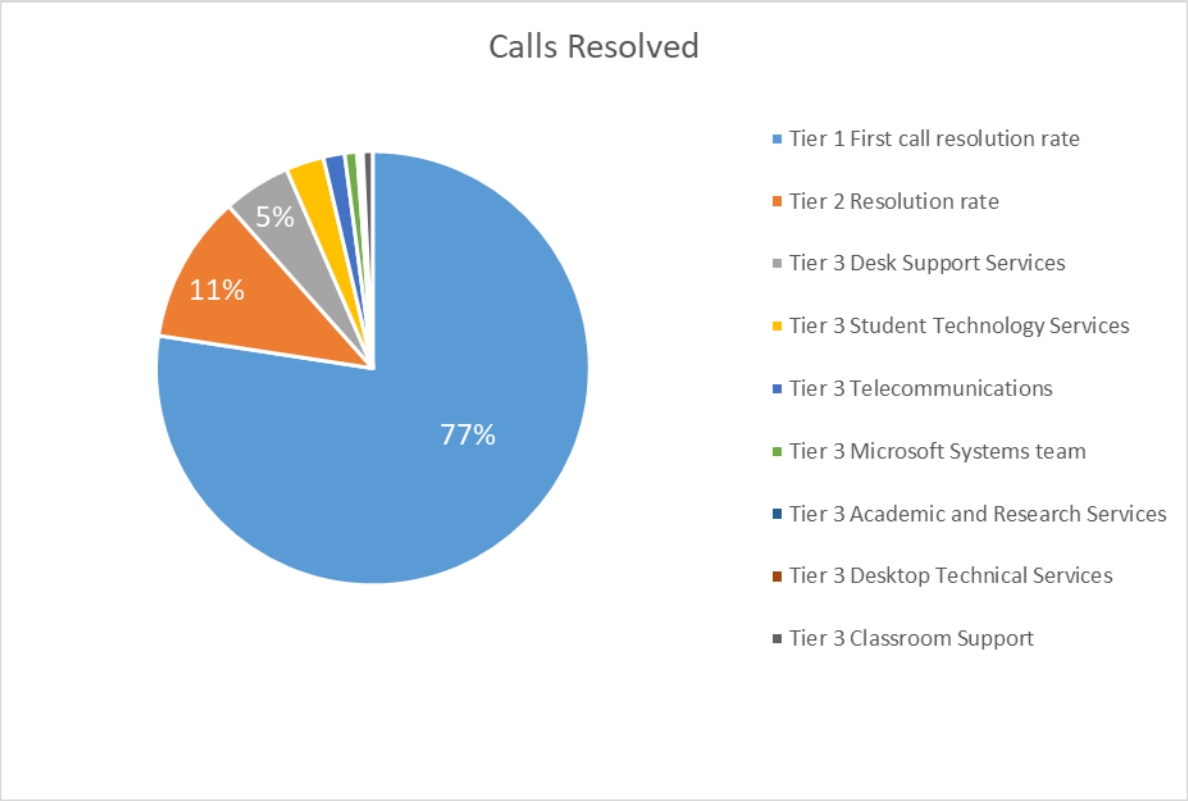
Metric	***NAU ITS FY18***	***ABOR PEER AVERAGE FY17****	***PEER RANGE****
Central IT spending on professional development per central IT staff FTE	1,039	1,279	$298 - $2,500
Student Worker FTEs per 1,000 institutional headcounts (Faculty, Staff, Students)	22	26	11 - 47
Central IT Spending on ongoing compensation as a percentage of total central IT spending.	58.2%	57.7%	48.7 - 61.7

FY18 Service Desk Performance Metrics

The following service desk metrics reflect

Student Technology Support	**Requests**	**% of Total**
Phone calls	53,908	86.6%
Emails	3,755	6.0%
In-person (STC Window and SLRC)	3,418	5.5%
Self-service	130	0.2%
Computers serviced	769	1.2%
Student Residence Hall appointments	270	0.4%
Satisfaction rating (4, or 5 overall rating)	4632	94.3%
Tier 1 First call resolution rate	40,539	75.2%
Tier 2 Resolution rate	5,773	10.7%
Tier 3 Desk Support Services	2,645	4.9%
Tier 3 Student Technology Services	1,486	2.8%
Tier 3 Telecommunications	834	1.6%
Tier 3 Microsoft Systems team	482	0.9%
Tier 3 Academic and Research Services	110	0.2%
Tier 3 Desktop Technical Services	112	0.2%
Tier 3 Classroom Support	387	0.7%

Note: Reports generated from ServiceNow™, Touchpoint, and RAASI.



Tier 1 and Tier 2 Help Desk Call Center Metrics

	Student Technology Center Tier 1 Student	Solution Center Tier 1 Faculty and Staff	Solution Center Tier 2 (faculty/staff/student)
Avg Wait Time	0:25	0:25	0:43
AVG Service Level*	94.6 %	96.6 %	79.2 %
Avg Handle Time	5:51	5:54	6:42

* This is a formula based on # of abandons, average handle time and average call wait time.

Satisfied or Very Satisfied Responses to Service Follow-Up

University Community Group/Service	*FY17*	*FY18*	*Target*
Faculty	95% (n=685)	94% (n=2,185)	99%
Staff	96% (n=1,298)	95% (n=1,608)	99%
Students	86% (n=188)	92% (n=839)	99%
Classroom Support	93%(N=2,538)	94%(N=3,844)	99%

Classroom Support

Metric	FY17	FY18
Classroom Support Incidents	2,538	3,844
Service Requests	590	1,318
Service Restorations	1,948	2,526
Overall Satisfaction (4,5)	93%	94%

Common Restoration Categories (based on qualitative evaluation)

- Failure of aging equipment
- Cabling Failure
    - Unapproved changes made to cabling or physical failure
- Failure or poor performance of aging computers
- Projector Lamp/Filter Replacement
- Network or network-based communication errors in automated AV systems
- User Error

Common Service Request Categories (based on qualitative evaluation)

- Classroom Technology Training
- Video Conference Support
    - Both in conference rooms and for academic guest speakers
- Special Event Requests
- Software Packaging and Installation Requests
- Preventative Maintenance Checks
    - E.G. faculty member wants a classroom AV system checked out before an important class/event
- New AV Consultations
- Connections to college-specific resources in general use classrooms

Summary of Technology and Service Improvements

Jacks Print

ITS centralized all student printing access points into the Papercut™ system, provided 100 free pages of printing, and reduced price per page to .05 cents. Students are now billed through Jacks Express rather than receiving a bill for printing at the end of the term.

Wi-Fi

Prior surveys indicated that students were dissatisfied with Wi-Fi. The Student Technology Center conducted interviews and surveys with students to identify those areas that were underserved. As a result more than 250 additional Wi-Fi access points were installed in Housing, Academic buildings, Student unions and other places students identified needs. ITS will begin installing Wi-Fi in those areas outdoors where students identified needs (common areas, bus stops, and pedway).

TouchNet Transactions

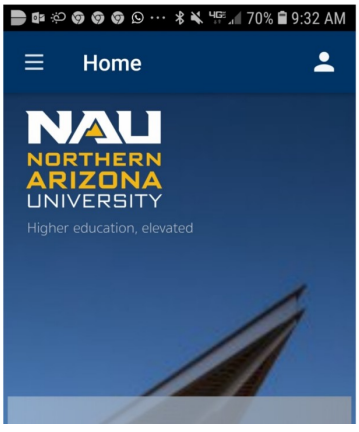
EMSA IT upgraded the transactional system from BlackBoard Transact to Touchnet™. This system is responsible for more than $30m in transactions in the auxiliary enterprises annually. The system provided improved PCI compliance and introduced more modern features and capabilities.

BlackBoard Learn

BlackBoard Learn (BbL) is NAU's primary learning management system (LMS). BbL was upgraded to the Software-as-a-Service version to take advantage of the latest feature sets and position the university for future enhancements in a continuous upgrade environment.

NAUgo Smart App

ITS introduced NAUgo, on the Modo™ mobile application platform. This new smart app platform provides advanced mobile technology capability for students. ITS views NAUgo as a student success platform capable of delivering "just in time" information to students and actionable prompts. Additional development is expected quarter over quarter.



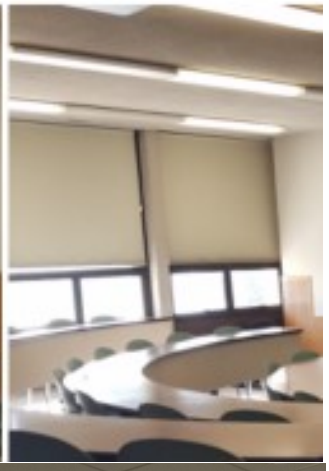
Charging Stations

Students are mobile technology dependent. ITS has been working with student affairs to identify locations where mobile charging stations can provide convenience to students and keep them connected. ITS designed and built charging stations that are relocatable based on events and seasonal needs

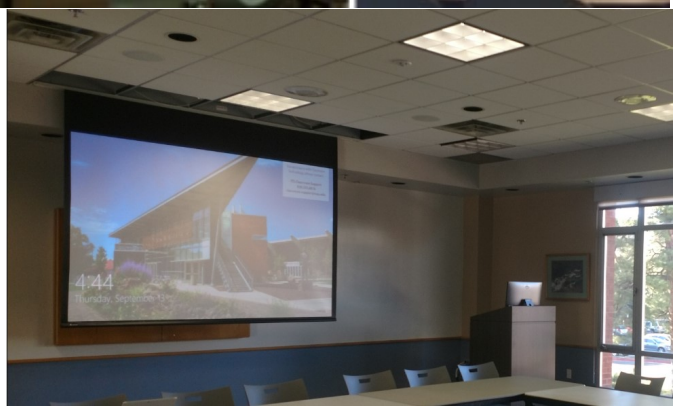
Learning Space Improvements

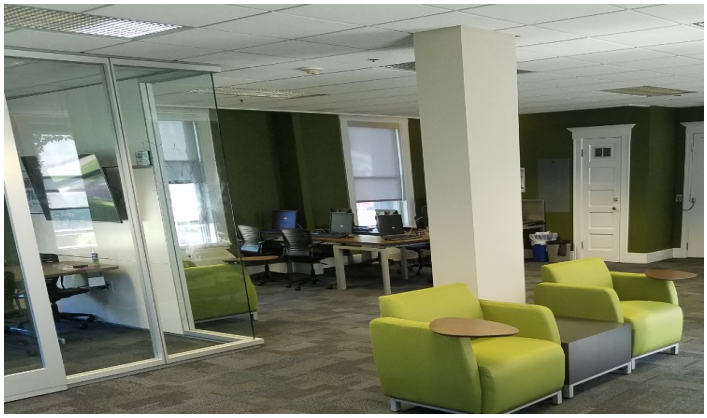
ITS upgraded and addition 70 classrooms to current A/V standards brining 65% of all classrooms state-wide into compliance. This is accomplished in collaboration with Facilities Services to also improve furniture, carpeting, window treatments, lighting and other facility factors to improve the overall learning environment.

Looking Back…



In addition, the heavily used meeting rooms in the north Student Union were also upgraded to NAU standards like the Havasupai room pictured here.





In addition to traditinal classrooms, ITS has partnered with Housing to transform computer labs and other spaces into technology-enabled learning spaces such as the one in Morton Hall.

Many conference rooms and seminar rooms have also benefited from the implementation of A/V and technology standards. Many of these rooms now have the ability to Skype™ and Zoom™ with remote participants increasing staff productivity.

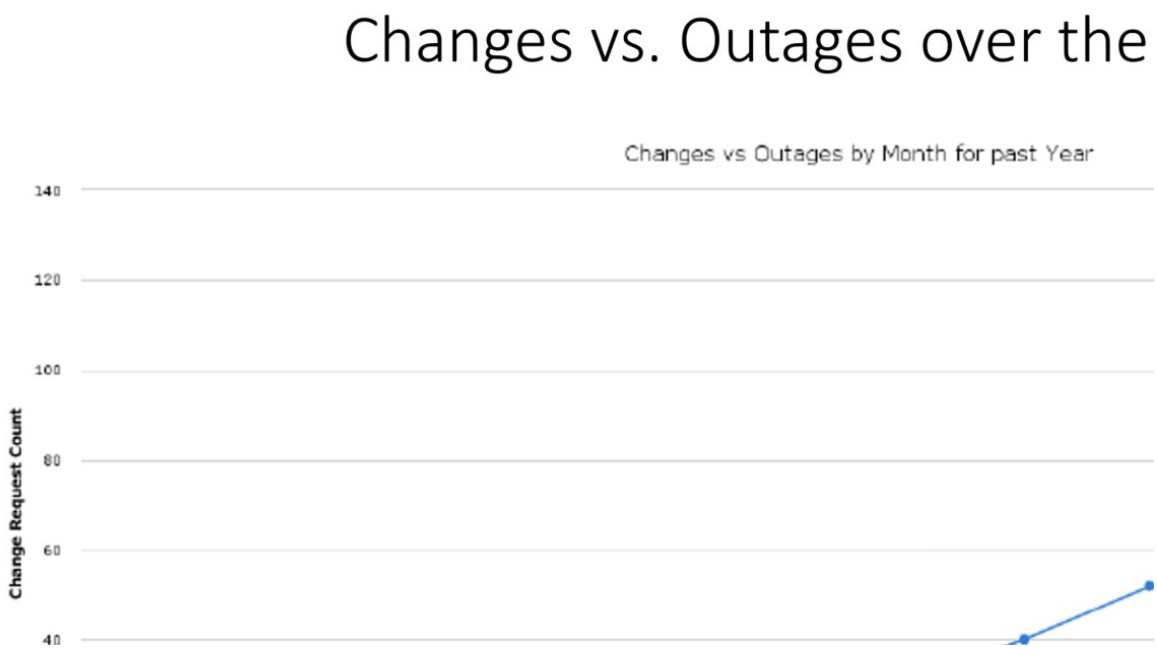
The implementation of Fusion™ software allows ITS staff to proactively monitor and remotely control classroom AV. This contributes significantly to the increased availability of facilities and efficiencies of staff in supporting classrooms.

<u>Computer Laboratories</u>

ITS upgraded more than 800 computers, throughout campus including all of the student use computers in the Cline Library. NAU computer labs are now all compliant with our technical currency goal of a 5 year rotation.

IT Service Management

ITS has adopted the ITIL framework for IT Services Management (ITSM). ITSM provides standards and guidance on best practices for IT management. There are many aspects to ITSM, but among the first implemented is change management. Change management has forced a cultural change from undisciplined update/IT infrastructure changes to one of planned, coordinated and communicated change that manages risks. The results are less unplanned downtime, smoother transitions to new technology and fewer disruptions to university teaching, research and business operations. ITS will continue to implement ITSM standards and deploy them with the ServiceNow™ platform.



ExLibris Library System

NAU was the first among the tri-universities to deploy the exLibris library system. The new system is cloud based and provides advanced functionality and mobile services to students, faculty and staff.

OnBase

ITS has made investments in Hyland OnBase as an enterprise platform for automating business workflows and forms. ITS staff automated over 70 business processes during the past year among them:

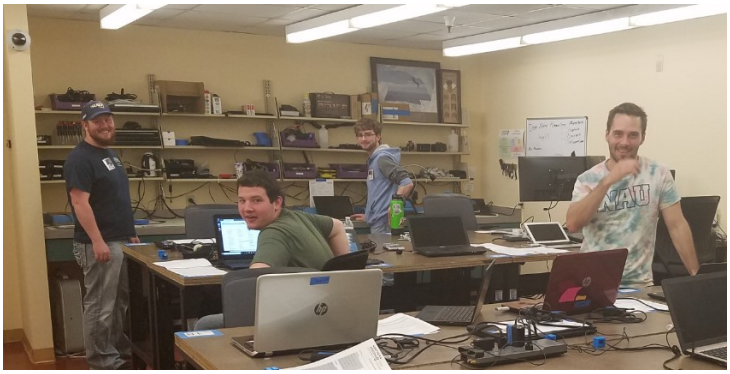
- ITS Software Checklist
- Affiliation Agreement
- VPAA Course Fee Form
- ResLife Lenel Access Request Form
- ITS Travel Approval and Worksheet

Reporting & Dashboards

ITS tool several big steps towards improving our data reporting and dash-boarding capabilities. Business Objects was upgrade allowed us to do a major cleanup of old reports as well as improved functionality. More than 10,000 reports were reduced to 2,318. Additionally, the CIO in cooperation with the Chief Data Officer, Laura Jones established NAU's Tableau server with the Board of Regents and worked together to standardize the availability of Tableau at NAU. Data CookBook was also implemented as a data dictionary and integrated with Business Objects and Tableau to provide ready access to data definitions and meta-data as a tool for both report readers and writers.

Student Technology Center

The Student Technology Center (STC) was relocated to the Cline Library as part of a collaborative effort to consolidate and improve services to students. Students now have one-stop shopping for all IT services they may need in the library. This collaboration paves the way for FY19 projects to introduce virtual reality theaters and one-button video studios among other technology innovations to enrich student learning, exploration and performance.



Consolidated Service Desk

The ITS service desks and telephone operators were consolidated. Plans for consolidating eLearning helpdesk into the ITS service desk are also underway. This consolidation creates additional efficiencies and more closely couples tier 1 and tier2 services.

Lenel Door Management and Surveillance.

ITS made substantial investments and improvements to the Lenel door locking and surveillance capabilities and in partnership with Facility Services has standardized equipment and operational support. The university presently operates 777 Door/card readers and 646 Surveillance Cameras.

In FY17, ITS inherited a system that was in disrepair and out of date and produced more than 20,000 false alarms every week.

In partnership with Facilities Services, ITS repaired:

- More than 250 doors
- More than 400 cameras
- 62 video recording devices

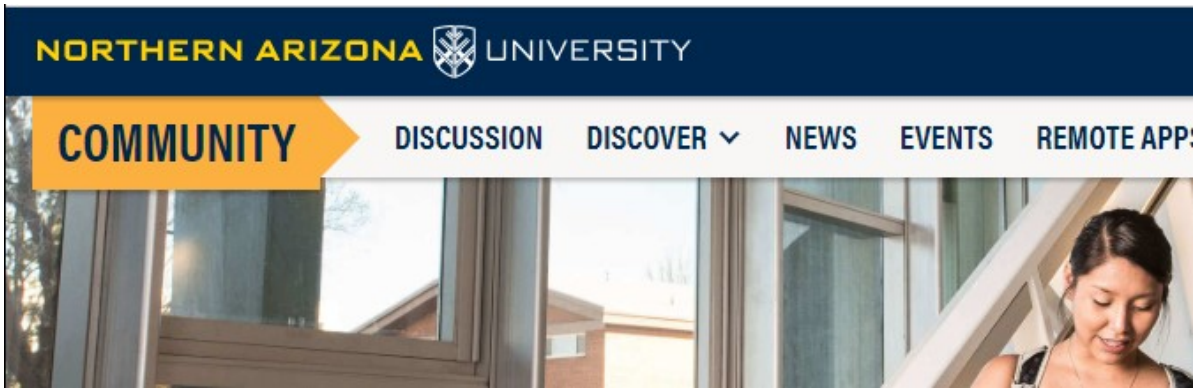
And has nearly eliminated false alarms in the system.

In addition, ITS and Facilities obtained certified training that allows for self-installation and management, greatly reducing operational costs. With training, repairs, and standards in place, ITS and Facilities also installed 80 new door readers and 150 cameras to improve safety and security on the Flagstaff and North Valley campuses.

Michael Dashovy is seen using the new Intelishure™ system which monitors numerous controller boards and reports errors and failures proactively to ITS technicians. This software has increased the productivity and effectiveness of managing door locking, surveillance and other IoT devices and serve to ensure these institutional assets are in working order to provide the greatest possible levels of security and safety controls.

My.NAU.edu Portal

ITS introduced a new portal based on Salesforce technology. The new portal provides a responsive design making it useable by mobile devices. Critical communications and actionable prompts are integral to the platform. It conveniently brings together many services and touchpoints for students, faculty and staff and provides easy access popular software titles that students can access anywhere on the Internet.

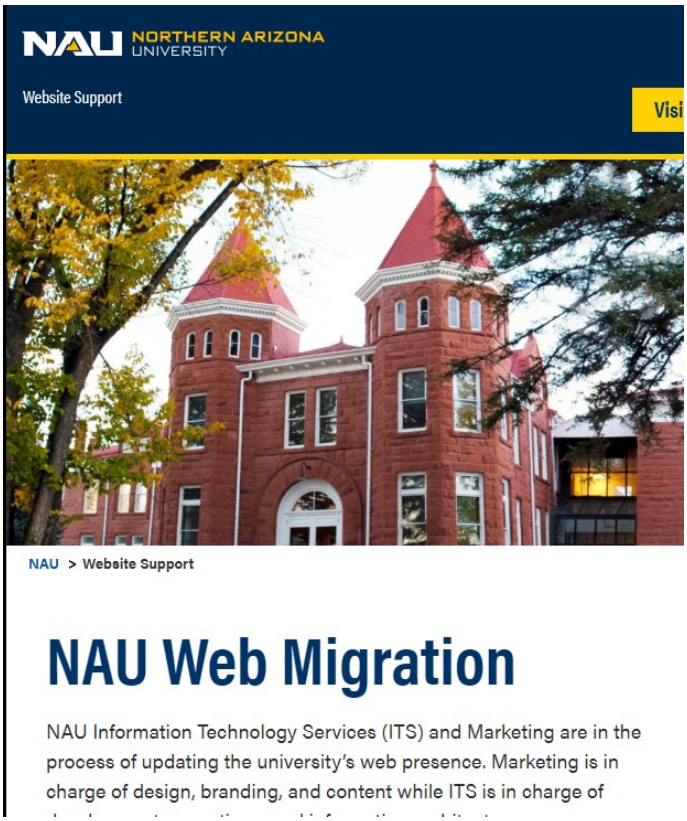


Cayuse

Cayuse is a research proposal and award management system that interfaces with PeopleSoft. The reimplementation standardized business processes and an interface built to PeopleSoft streamlined the management of post-award funds

NAU Web Migration

ITS partnered with University Marketing and Lipman Hearne to deliver more than 100 new websites in www.nau.edu. Additionally, the groundwork was laid to move several hundred more sites onto an internal web service, in.nau.edu. This separation of websites on WordPress technology allows NAUs public message to be more succinct and focused experience for the public and prospective students. In.nau.edu will provide the "inside" services for current students, faculty and staff. Both sites will be hosted in the cloud to provide maximum availability and elasticity during high-peak use periods. WordPress™ technology and various plug-ins provide users and website editors with easy to tools and robust capabilities for maintaining the site.



Salesforce & Student Success Initiatives

Salesforce is the universities customer relationship management system. ITS and partners in Enrollment Management and Academic Affairs successfully leveraged Salesforce to answer the fundamental question, "How do we engage with our prospects and students?" In the past year NAU increased the central visibility of new engagement data by tracking in Salesforce advising appointments, mentor interactions, numerous other student success activities (student comments), and "walk-in" prospects (quick contact form). Furthermore ITS improved student engagement by leveraging Marketing Cloud for automated and ad-hoc communications to both prospects and current students. Finally NAU has improved usability of students, faculty, and staff by developing helper apps (appointments.nau.edu, faculty2student outreach) and turning on the new Salesforce Lightning user interface for our advising community.

Other improvements and expansions to Salesforce include:

- IPASS enhancements
- PEP enhancements
- Grad College Integrations
- Outbound Calling
- IPASS enhancements
- Direct Mail Export
- Undergrad opportunities restructure
- Higher Ed (HEDA) field labeling
- NAU Community (my.nau.edu)
- Lightning UI/UX for Advisors

Custom Application Development

ITS performs custom development of software where needed capabilities are not available, and where it is not prudent to change business practices or policy that drives software functionality. The ongoing cost versus return are carefully scrutinized before custom applications are developed. Some of the major custom applications developed this past year include:

- Scheduling helper app – Appointments.nau.edu
  - Used by 350 staff across 17 units
  - 28,000 appointments have been made by 15,000 students
- Automated Advisor Assignment Tool
- Critical Messaging Application
- Jacks Path, Phases II & III functional enhancements
- Tutor Track
- Graduate College Accept My Offer
- Personalized Learning middleware modifications
  - Non-Standard Term
  - Pearson Learning Studio™ lessons conversion to Moodlerooms™
  - Weekly starts
  - MCIT degree launch support
- Math Placement
- Scholarship Estimator
- Peak Performance for Tutoring Programs
- Transfer Credit Rules (Transfer Articulation Project) - Phase II
- Customized one portal Id.nau.edu for IAM team(Part of MFA project)

- Reskinned many custom application to match the new NAU marketing theme
- Math Conference Registration sub site
- Faculty2Student user interface rework.

Security Program

ITS renewed the IT Security Program to reflect policy revisions and align with industry best practices. The Northern Arizona University Information Security Program serves as the core of the University's information security activities, information security resources impact nearly every aspect of the NAU mission, vision, and values and as such, protection of those resources is critical to ensure NAU's continued success in meeting its mission and strategic objectives. The Arizona Board of (ABOR) policy states that NAU's Information Security Services is responsible for establishing and maintaining a University Information Security Program. This program provides university-wide guidance to ensure the confidentiality, integrity and availability of the University IT resources.

Improvements to Security Program

ITS has undergone several audits to gauge the policy, practices and effectiveness of the NAU security program. The following outline documents twelve areas of emphasized improvement and progress to date.

1. **IT Risk Assessment 80% complete.**
    a. Enterprise risk management interviews and executive rating/scoring complete;
    b. IT Risk Assessments complete; policy/standards complete;
    c. Phase 1 of data inventory complete with deeper phase 2 to be done as the remaining item.

2. **Access Controls – "50% complete with remaining items in progress.**
    a. Highest risk users have been enrolled to two-step verification;
    b. Consulting engagement completed with report being reviewed for our roadmap to modernizing our entire Identity and Access program.

3. **Configuration Management – "60% complete with remaining items in progress.**
    a. Change Management elements of this finding are fully complete and implemented, policy and standard documented.
    b. Management of baseline images and systems is a project that is underway.
    c. Cisco ISE product implementation and other central management tools are being upgraded and teams organized around these duties.
    d. Change Management falls under this area and is completed.

4. **Logging, Monitoring – 75% complete.**
    a. Policy and standard documentation completed and published.
    b. In progress items include further implementation of systems into our Splunk™ environment for more automated log review and alerting. Financials Audit implies we have more systems to include with completion during FY19.

5. **Incident Response –90% complete.**

a. All items except for a new table top exercise are implemented, documented, published."
b. Policy and procedures completed.

6. **Security Awareness Training - 100% complete.**
    a. ITS is implementing a new learning management system for more automation of communications are implemented, documented, published but the training is active and ongoing.
    b. Completed the policy/standard, communications have gone out since June and we have been monitoring and communicating for non-completion since June.

7. **Vulnerability Scanning Program - 100% complete.**
    a. All items are implemented, documented, published – we simply need additional time to show true evidence of following all elements."
    b. Completed policy and standard published, we continue to execute and improve our process to fully match those files.

8. **Patch Management Program - 100% complete.**
    a. All items are implemented, documented, published – we simply need additional time to show true evidence of following all elements."
    b. Completed policy and standard published, and we continue to execute and improve our process to fully match those files.

9. **Contingency Planning, Backup & Recovery – 100% complete.**
    a. *More time needed to exercise* more testing, including table-top exercise *for audit to recognize.*
    b. Incident Management policy and standard approved, published.
    c. Previously completed our Backup and Recovery policy/standard and some testing of recoverability of backups tested within the newly implemented hyper-converged system.

10. **Penetration Testing, Web Application Development and Training – 25%**
    a. We have conducted web application scanning with our arrangement with University of Texas for all public facing web applications.
    b. First drafts of official web application policy, standard, protocols in progress.

11. **IT Security Strategic Plan, InfoSec Policy and Program, and Noncompliance – 100% complete.**
    a. IT Security Strategic Plan with goals-mission-measures-objectives;
    b. Information Security Policy and Standards, InfoSec Program;
    c. InfoSec Committee and Charter;
    d. Non-compliance with policies is included in all published policies/standards.

12. **Third Party Assessment & Monitoring –100% complete**
    a. Completed with the overarching InfoSec Policy now including sections for the assessment and monitoring of third parties, vendors.
    b. Also performing the Software Checklist with Higher Ed Vendor Cloud Assessment Tool, and HECVAT survey for 2 years now.
    c. Difficulties lie in monitoring purchasing card transactions (post transaction).

Completed Portfolio Projects

ITS maintains a portfolio of projects that comes from the SPRRC committee and is vetted through the university IT and Data governance structure. Each project has a sponsoring entity and a classification of run, grow or transforming outcomes. The following table lists the projects in the portfolio that were completed. Of course, there was other work completed that is not in the portfolio. This include routine maintenance, break-fix, and other projects not registered in the portfolio. ITS' discipline and maturity in using the portfolio is increasing quarter over quarter.

Project Name	Category	Primary VP Sponsor
1. Advancement Gift Documents - Kwiktag to OnBase	Grow	Academic Affairs
2. Graduate College Transfer Credit Petition	Grow	Academic Affairs
3. iPASS Salesforce Course, Advisor, and Student Success Indicator Integration	Grow	Academic Affairs
4. Military Excuse - OnBase	Grow	Academic Affairs
5. Upgrade Forestry Research Species from Feces app	Grow	Academic Affairs
6. Automatic Advisor Assignment - Phase I	Grow	Academic Affairs
7. Course Fee Form - Review Date added as keyword - OnBase	Grow	Academic Affairs
8. FCB Scholarship Application Feature Additions	Grow	Academic Affairs
9. iPASS Business Process Alignment	Grow	Academic Affairs
10. iPASS Salesforce- Dropped and Deleted Courses	Grow	Academic Affairs
11. Military Residency in OnBase	Grow	Academic Affairs
12. Salesforce FCB implementation	Grow	Academic Affairs
13. exLibris integration with NAU systems	Run	Academic Affairs
14. CollegeNET 25Live Schedule Optimization	Transform	Academic Affairs
15. Jacks Planner	Transform	Academic Affairs
16. County Water Application	Transform	Academic Affairs
17. iPASS Course Feedback Tool_POC	Transform	Academic Affairs
18. BBLearn and Class Lists	Transform	Academic Affairs
19. BBLearn Reporting- General usage stats	Transform	Academic Affairs
20. Advancement LOU Documents - Kwiktag to OnBase	Grow	Advancement and Alumni Services
21. Advancement Entity Documents - Kwiktag to OnBase	Grow	Advancement and Alumni Services
22. Fac Services Scan Queue Revamp in OnBase	Grow	Capital Planning and Campus Operations
23. Facility Services - OnBase - Asbestos and Hazardous Material Inspection Request	Grow	Capital Planning and Campus Operations
24. EMSA Justification for Staff Hiring - OnBase	Grow	Enrollment Management
25. Salesforce Marketing Cloud Expansion Phase 1	Grow	Enrollment Management
26. Release 1 NAU Community	Transform	Enrollment

		Management
27. Civitas Security and Prediction Values Salesforce Integration	Transform	Enrollment Management
28. Salesforce for Office of the President	Grow	Executive Services: Other
29. ITS Consolidation Phase 2	Transform	Executive Services: Other
30. Diversity Strategic Plan plus Online feedback form	Transform	Executive Services: Other
31. Jacks Path - Phase I (aka Transfer Unification Project)	Transform	Executive Services: Other
32. NAU Website Phase 1 - Top level site conversion	Run	Executive Services: University Marketing
33. FCB Expression Engine URL Inventory	Transform	Executive Services: University Marketing
34. PeopleSoft JPMC SUA Processing	Grow	Finance and Administration (deprecated)
35. Research Metrics Workgroup	Run	Finance and Administration (deprecated)
36. Implement Data Cookbook	Transform	Finance Institutional Planning and Analysis
37. HR-Qualified Life Event in OnBase	Grow	Human Resources
38. eCERT Rewrite Move out of Select Survey	Grow	Human Resources
39. HR - eCert - Refactor and Create front end	Grow	Human Resources
40. HR OnBase EARP Form and Workflow	Grow	Human Resources
41. EARP BizTalk Integration	Transform	Human Resources
42. Enterprise website architecture conversion	Grow	ITS
43. Google support model	Grow	ITS
44. Release 2 NAU Community	Grow	ITS
45. Salesforce for International	Grow	ITS
46. Unified Communications Implementation 2014 - 2016	Grow	ITS
47. DNS Re-architecture	Grow	ITS
48. Firepower network security edge install	Grow	ITS
49. ITS Software Checklist	Grow	ITS
50. OnBase automatic user provisioning	Grow	ITS
51. Post Office Building Rewire	Grow	ITS
52. Printing Services Building Rewire	Grow	ITS
53. Rolle Building Rewire	Grow	ITS
54. ROTC Building Rewire	Grow	ITS
55. BBLearn - PeopleSoft Integration	Grow	ITS
56. Campus IT Survey tool upgrade	Grow	ITS
57. Centralized File Storage	Grow	ITS

58. ITS Alfresco Documents into OnBase Phase 1	Grow	ITS
59. NAU Website Conversion Phase II	Grow	ITS
60. OnBase Migration Form Enhancements	Grow	ITS
61. OnBase Security Form enhancements - Affiliates and exited employees	Grow	ITS
62. Phishing awareness campus rollout	Grow	ITS
63. PS Dept Security - OnBase	Grow	ITS
64. Unified Communications Phone Conversions Q2 2017	Grow	ITS
65. AntiVirus Campuswide Replacement	Run	ITS
66. CSOracle12c	Run	ITS
67. PeopleSoft CS Tools and CS UF	Run	ITS
68. PeopleSoft FYQ2 Updates Campus Solutions and Human Resources	Run	ITS
69. PeopleSoft UF CS Bundle 36	Run	ITS
70. PeopleSoft UF CS Bundle 37	Run	ITS
71. PeopleSoft UF CS Bundle 38 and 39	Run	ITS
72. PeopleSoft UF HCM PUM 11 and 12	Run	ITS
73. PeopleSoft UF HCM PUM 13	Run	ITS
74. PeopleSoft UF HCM PUM 14	Run	ITS
75. PeopleSoft UF HCM Tax F	Run	ITS
76. PeopleSoft Updates and Fixes December 2014	Run	ITS
77. Fiber upgrade between main and north data centers	Run	ITS
78. OnBase v16 Upgrade	Run	ITS
79. PeopleSoft Q1 Updates Fixes	Run	ITS
80. PeopleSoft Tools 855 Upgrade	Run	ITS
81. Replace PS CS Oracle DB Servers	Run	ITS
82. PeopleSoft HCM Tools Upgrade TAX B	Run	ITS
83. PeopleSoft Q2 Updates Fixes	Run	ITS
84. Re-architect centralized Linux authentication	Run	ITS
85. IPASS Implementation	Transform	ITS
86. Central IT Purchase Model	Transform	ITS
87. IT Centralized Classroom Support	Transform	ITS
88. IT Change Management	Transform	ITS
89. Delegates and Proxies in OnBase	Transform	ITS
90. Enterprise Security - Data Stewards	Transform	ITS
91. Enterprise Security - OnBase	Transform	ITS
92. IPS Implementation	Transform	ITS
93. OnBase 16 Web Client and Unity Client on GreenPC	Transform	ITS
94. Qualtrics service for campus	Transform	ITS
95. WordPress Security - OnBase	Transform	ITS

2017 Actions and Outcomes of TechQual + Study

The TechQual+ instrument was used to identify perceptions of participants across 13 common measures and additional questions relevant to specific issues of interest to the Chief Information Officer. TechQual+ primarily measures the difference between minimum acceptable expectations of service and perceived level of service delivery.

The following short-term actions were taken to address areas of low expectation. Some of these actions are associated with current projects that are funded and underway. Others may require additional funding and time to develop.

Connectivity and Access

1. Improve Wi-Fi coverage in underserved and hi-density areas identified by students including outside coverage along the Pedway and outdoor spaces frequented by students. *Status: In progress. Quad, bus stops, and high-traffic Pedway areas were identified as priorities for students. ITS will expand Wi-Fi coverage to these locations as resources are available.*

2. Upgrade wiring and network equipment in residence halls to alleviate constraints. *Status: Canceled. Wiring would not improve coverage. Rather ITS is requesting that housing invest in wireless access points and other network equipment to improve services.*

3. Identify Wi-Fi dead zones in residence halls and find a way of extending coverage to those locations. *Status: Completed. Extensive work was done to interview students and collect data on specific dead zones in housing locations. ITS deployed more than 200 additional Wi-Fi access points in locations where students identified they were under-served.*

4. Add 2nd Internet connections to campus. Status: *Completed. Result is no major outages of Internet during past year.*

5. Map coverage in academic and administrative buildings to identify “dead zones” to evaluate if additional coverage may be needed. *Status: Completed. Wireless heat maps created for Mountain campus to show expressed needs by students. Courtyards and bus stops among the underserved and favored locations*.

6. ITS will also engage with a CISCO consultant to review our practices and configuration and to offer insights into how we might modify configuration or practices of the existing infrastructure as well as future plans and enhancements. *Status: Completed. CISCO engaged and recommendations implemented*.

Support Services

1. Review Tier 1 and Tier 2 procedures/systems to see if there are any ways of streamlining current service requests. *Status: Ongoing. Units were physically merged as first step.*

2. Consider additional after-hours or peak-hours staff schedules. Status: Hours of student support now match Cline Library.
3. Continue to invest in staff training and knowledge-base development to improve on first-call service success. Status: Ongoing.

Blackboard Learn

1. The results of this study were shared with Don Carter, Director of eLearning. *Status: Blackboard Learn was upgraded to latest SaaS continuous update model.*

Classrooms

1. ITS will review the comments about classroom inadequacies and work with Facilities and Registrar to keep information regarding the technology updated. *Status: Ongoing. 65% of classrooms meet current standards.*

2. ITS will identify classroom priorities in each college and work to upgrade as many classrooms as possible to the new NAU standard or otherwise mitigate problems in existing classrooms. *Status: Ongoing. 65% of classrooms meet current standards.*

3. ITS will deploy management software that will provide proactive information on non-functioning or marginal equipment (e.g. aging projector bulbs). *Status: Completed. ITS deployed software "Fusion" to allow staff to proactive monitor and respond to AV issues.*

Results of the survey are available online for a limited time at the TechQual+ site:

Students
https://www.techqual.org/login/a.aspx?k=fa8a8cc0-5681-4317-ad27-e33f08236e44_ce827e34-2235-41d6-a0cc-579d3de6e875

Faculty and Staff
https://www.techqual.org/login/a.aspx?k=fa8a8cc0-5681-4317-ad27-e33f08236e44_06571690-1551-421b-957b-7644b7a3fcd8

The CIO will conduct another TechQual™ Plus Survey in the spring of 2019.

Strengths Weaknesses Opportunities and Threats

ITS conducted a SWOT (Strength- Weakness –Opportunity –Threats) analysis as part of a strategic planning engagement with *Dinocrates Consulting*. Dinocrates consultants interviewed over 40 university stakeholders to identify the following analysis. The results help inform ITS strategic planning and operational effectiveness initiatives.

Strengths

- NAU has a strong commitment for improving instructional technologies.
- New ITS infrastructure for storage/compute capabilities allows for consolidation and growth of on premise resources.
- Monsoon, NAU's High Performance Computing (HPC) infrastructure, is a valued asset.
- ITS staff has deep institutional knowledge of University operations.
- ITS has successfully reorganized and continued to provide quality services post-centralization.
- ITS is positioned well with stakeholders as a trusted partner and advocate
- ITS staff are the division's most valuable asset. Staff are competent and actively engaged in skill development. Some possess industry recognized certificates of competency.

Weaknesses

- Academic and instructional technology and support has taken a back-seat to other initiatives in recent years and as a result may lack training, adoption, and adaptation to a rapidly changing instructional initiatives for student success. (*Informed and supported decision to incorporate eLearning into ITS*).
- Communication among ITS teams and with the University is inconsistent and as a result teamwork, collaboration and adoption of new technologies are not optimized. (*Informed ITS management to adopt team communication standards and create a position to coordinate key communications within and external to ITS*.)
- ITS operates numerous aged and home-grown constructs that require additional staff resources when more modern tools are available. (*Supports decision to implement new identity management capabilities and virtualize individual servers on a central largescale and state-of-the-art virtual server platform).*
- Documentation of processes, people and technology are often dated or inaccurate.
- Time to closure of service tickets is too long or there is not sufficient commitment to closing tickets in a timely manner.
- NAU has highly modified systems which require additional staffing resources to maintain (e.g. PeopleSoft). (*Supported decision to move PeopleSoft support to Rimini Street and to back-out changes made to Salesforce*).
- ITS policies are outdated and do not provide the framework upon which standards and practices can be audited. Nor do they provide modern guidance for the

university community to be responsible digital citizens. (*Supported the initiative to update all ITS policies, beginning with Appropriate Use and security policies.)*

- NAU and commercial networking infrastructures are incomplete and bandwidth limited subsequently inhibit ubiquitous and continuous access to information and technology resources on all campuses. (*Supports initiative to improve wireless services and alleviate campus network traffic congestion choke points.)*

Opportunities

- Engage qualified consulting services to accelerate technology deployment, bridge staff skill gaps and conduct knowledge transfer for sustaining technology and services. (*ITS is engaging Microsoft™ and Dell IT partners to identify services to help us advance knowledge of cloud services and modern toolsets*).
- Engaging academic departments in discussions about instructional technology while collaborating with Academic Affairs to leverage improved pedagogical methods. (*ARTS department will be primarily responsible for this beginning in FY19)*.
- Publicizing ITS services, projects and capabilities. Promote the available technology tools (e.g. O365), applications and best practices through shared communications and exemplars. (*Supported with the addition of a communications coordinator in ITS*).
- Create opportunities for more teamwork and sharing of knowledge & resources within ITS and with our stakeholders. (*Considering the adoption of Microsoft Teams™ as a collaboration and information sharing tool. Also re-invigorating the Service Now™ knowledge base.*)
- Strategically expand ITS staff knowledge, competencies, and skills and create avenues for professional growth/mobility for ITS staff within the organization. (*ITS is developing a talent recruitment and retention plan*).
- Identify, consolidate, and adopt software tools to improve accuracy, security, efficiency and effectiveness of technology and services managed by ITS.
- Increase the utilization of student employees to conduct important and essential ITS work. (*ITS is expanding its use of students in support of operational effectiveness and efficiencies e.g. telecom and networking services*).
- Expand Services to non-Flagstaff campuses. (*ITS has shifted staffing positions to support campuses throughout Arizona, rethinking strategies, and engaging with partners to identify the best service delivery options*).

Threats

- Decreases in enrollment may further reduce ITS funding, limit strategic activities or cause staff reductions.
- Over-emphasis on online may reduce investments in traditional classroom technology.
- Staff changes, losses, re-shuffling and entrenched teams interrupts communication, teamwork and collaboration.

- Staff reductions, turnover or future gaps in expertise may cause disruption to the effective management of IT systems and confusion as to expert sources for problem resolution.
- Entrenchment in established culture creates barriers to organizational development and the establishment of leadership at all levels.
- Inability to foster strong communication limits impact of technology, inhibits teamwork and collaboration, and fails to recognize the work and accomplishments leading to positive impact of technology on the university's strategic intent.
- Student expectations for modern robust technology and effective systems does not contribute to student recruitment, admissions, retention, progression and completion.

2015-2018 Strategic Information Technology Plan

This is the last year of the current plan. A new strategic plan will be written in 2018-2019.

The current plan has been in place since 2015 and pre-dates the current CIO and consolidation of IT resources and personnel. The plan identifies 7 Goals. By the end of the FY18 fiscal year, many of the objectives under the following goals were completed and advanced the strategic intent of ITS and the University. Among the many accomplishments achieved as set forth in the plan are include:

Goal 1: Student Learning and Success

Provide high quality academic systems and services to meet the growing needs and expectations of all NAU students:

- Blackboard was upgraded to the latest SaaS version. Improvements in classrooms and computer labs were also substantial
- 70 additional classrooms were updated to bring the total number of classrooms meeting NAU A/V standards to 66%.
- More than 800 computers were updated in laboratories, classrooms and the Cline Library to bring all computer labs on campus up to a 5 year life-cycle standard.
- The Student Experience Taskforce was created to identify ways of improving the student experience through updated technology, business practices and services.

Goal 2: 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:

- The Sun Corridor Internet service was upgraded to dual 10gb connections providing additional capacity, throughput and reliability.
- A Dell Isolan™ hyper-converged compute and storage platform was implemented to consolidate and virtualize hundreds of centralized servers.
- More than 250 additional wireless access points were added to underserved areas of campus including academic, housing, and student activity spaces.

Goal 3: Administrative Effectiveness

Business operations must be supported by dependable, secure, flexible and scalable services and systems which ensure maximum efficiency and effectiveness.

- Oracle PeopleSoft support was outsourced to Rimini Street and saved over $450,000 annually on maintenance and support contracts.
- A self-funded PC maintenance program saved nearly $200,000 in acquisition costs of PCs and Macs.
- Software and service charge-backs were standardized based on market competitive rates.
- The WWW website and IN.nau.edu websites were created to distinctly serve external and internal audiences. More than 100 sites were migrated to WWW during the year.

Goal 4: IT Risk Management

The core RM mandate is to ensure IT operations are properly managed with respect to risk acceptance.

- ITS participated in institutional risk assessment exercises of which IT related risks were identified and rated.
- ITS also created a new IT risk management framework compatible with NIST standards, conducted training with ITS staff, and collected data about risks as a preliminary step to identifying more specific threats, and possible threat mitigations.

Goal 5: Academic Technology

All academic technology endeavors must coordinate and support faculty and student uses to enhance student success.

- Standardized printing services were introduced that provided students with 100 pages of free printing.
- Various software titles were site-licensed to provide ubiquitous access to
- Virtual Desk services were introduced to provide

Goal 6: Research Computing

Provide IT systems and services which enhance and expand NAU's research and associated academic programs.

- A RedCap™ server was introduced for the secure collection and storage of sensitive research data.
- Policies on research data security were written and accepted by Data Governance Trustees.

Goal 7: IT Strategic Alliances

Improve long-standing strategic alliances with other state universities and vendors to maximize cooperation and effectiveness.

- Flagstaff Interent2 gigapop. The I-40 Corridor network project was created and is a tri-university project involving many interests among governments, private interests, and education stakeholders.
- Dell, Microsoft and Cisco are major IT partners. ITS established standing monthly meetings with each to ensure current knowledge exchanges and to identify priority areas for services, training and products.

2015-2019 Strategic Plan Metrics

The Vice President of Information Technology maintains a long-term strategic plan with goals and objectives that guide the development of technology and services in support of the University's comprehensive strategic plan. The current IT plan was established in 2015. Many of the stated objectives have been accomplished.

The following metrics were set out in the 2015-2019 strategic plan. The final status of the metrics are reported here, through FY18.

IT Strategic Area	Goal	IT Metric	2014 Measure	2018 Final Measure	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%	96%	90%
		% of course sections active in LMS	68.20%	68.45%	80%
		% of faculty actively using Blackboard Learning Management System (LMS)	89.10%	86.89%	85%
		% of students actively using the LMS	96.70%	93.97%	95%
		% online course sections using LMS	96.10%	90.19%	95%
		% in-person course sections using LMS	57.20%	59.90%	75%
		# of university courses taught in hybrid mode (part online & part face-to-face)	275	379 (6%)	400
		% of support calls handled by first tier at Student Help Desk	94%	75%	98%
		# of support calls to the Student Help Desk	54,623	53,908	53,000
		# of students served by the STC walk-in service	3,600	3,418	2,500
		# of ResNet students served by in-room service call	364	270	550
		% of students visiting the MyNAU portal at least once a month	27,901 (99.3)%	30,060 (99%)	23,943 (95%)

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%	100%
		% of time core campus network is operational*	99.99%	99.9%	99.90%
		% of time major systems available:*			
		Oracle/PeopleSoft CS	99.88%	> 99.6%	99.90%
		Oracle/PeopleSoft HCM	99.88%	> 99.6%	99.90%
		Blackboard Learn	99.89%	> 99.6%	99.90%
		O/PS Financials	99.99%	> 99.6%	99.90%
		Data Warehouse	99.99%	> 99.6%	99.90%
		Faculty and Staff Email (Microsoft Exchange)	99.60%	> 99.6%	99.90%

**Note: system availability includes consideration for 3 hours of planned maintenance per month = 99.6% available*

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%	100%
		# of employee support calls to the Solution Center annually	30,018	5,773	N/A
		Average customer satisfaction rating for the Solution Center (using results from employee survey for ratings of very satisfied and satisfied)	93.50%	95%	95%
		% of employee support calls handled by first tier Solution Center support	92%	75%	85%
		% of employees who rate all central ITS services on the annual survey as satisfactory or very satisfactory	89%	97%	90%

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%	30%	95%
		% of technical services and software purchases with completed or waived IT checklists	90%	100%	90%
		% development and implementation of an IT disaster recovery plan	95%	100%	100%
		% of enterprise web applications scanned annually for vulnerabilities	25%	40%	100%
		% Campus converted to new telephone system (replacing PBX)	5%	100%	100%
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%	100%
		% completion of a campus digital repository	50%	100%	75%
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%	99%	100%
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

** *Note: NAU is engaged in various partnerships with UA and ASU around procurement of systems, co-development of RFPs, shared contracts, Sun Corridor networking as examples to collaboration. The tri-university CIOs meet monthly to discuss issues and opportunities. CISOs meeting monthly to discuss security programs. Other groups are engaged in issue discussion and site visits.*

Assessment of Centralization of IT Services

IT Services at NAU were centralized in FY16 in response to a $17 million budget cut. Prior to centralization, Information Technology Services was at approximately 135 staff members. 50 positions were identified as initial candidates for centralization. The CIO was charged to elicit a sustainable operational budget and derive savings through efficiencies while maintaining high levels of effective service to the University community.

Since the initial centralization act, additional elements have been centralized and ITS has assumed responsibility for additional services including: Extended Campus IT services, elements of library technology support, elements of student affairs classroom/meeting room support. 25 positions from Extended Campus were identified centralized under ITS in FY17.

FY19 Pending Centralization

At the end of FY18, there were 7 positions in eLearning identified for centralization in ITS effective for FY19. There were also 3 ITS positions who's primary responsibilities were associated with content development (formerly in Extended Campus) identified to be moved out of ITS to the Provost along with the remainder of the eLearning staff, effective for FY19. .

Non Centralized IT Professionals

Sans the eLearning staff described above, there are approximately 30 known technology professionals that remain decentralized under the control of non -TS division management:

FTE	*Supervising Department*
21	College of Education ETC
4	Cline Library
2	EMSA Health Services
2	EMSA Services and Auxiliary support
1	University Foundation support

Fiscal Savings

Through the elimination of overlapping responsibilities, realignment of staff responsibilities, and the deployment of new technological capabilities, ITS has reduced overall staffing from 230 FTE to 205 FTE. Staff reductions have been accomplished through natural attrition, retraining, and promotions. No IT professionals lost their job as result of centralization. This represents a saving of approximately $2.5m in salary savings, including ERE costs.

Through some fiscal efficiencies and cost-cutting, ITS has been able to establish an operational budget that returns funds to NAU central budget. In addition, ITS established an emergency equipment fund (~$350,000) to be used to sustain university IT operations in the event of loss or disaster.

Reinvestments

Increased efficiencies also extend to reinvestments of central savings. The following are some of the areas and approximated amounts of centralized savings and resource reinvestments made by ITS:

- Invested over $300,000 in salary equity adjustments from under-compensated IT professionals acquired from colleges.
- Student staff salaries did not transfer with centralization to ITS budgets. ITS has re-invested over $350,000 in student staff salaries (~27 FTE).
- Significant re-investments in classroom improvements of more than $1m annually.
- More than $750,000 invested in classroom/laboratory computer upgrades
- More than $250,000 annual increase in Internet bandwidth and wireless networking capabilities
- Expanded software licensing for university titles at approximately $300,000 annually.

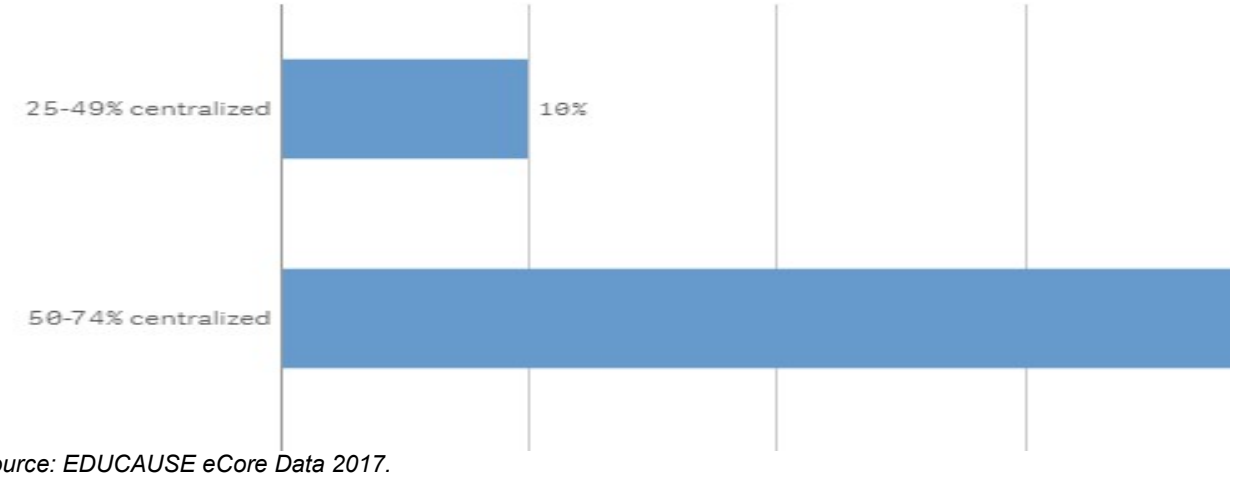
Increased Efficiencies

Centralization of IT services warrants increased efficiencies in operations for all university departments and colleges. An example of increased efficiencies is illustrated in the new partnership between ITS and the Cline Library. During the past year, ITS collaborated with the Cline Library to integrate the Student Technology Center in the library to create a one-stop IT service opportunity for students. Students are able to obtain hand-on support and computer repair as well as access to loaner laptops through the library circulation desk.

During FY18 ITS Classroom Support staff also took responsibility for managing library computers and library classrooms from the Cline Library. They also took responsibility for the Union meeting rooms from Enrollment Management and Student Affairs without the transition of any staff from those areas. No staffing moved to ITS in this change. The positions were left with the Cline Library and EMSA to support other strategic initiatives. ITS continues to look for opportunities to offload IT responsibilities from other organizations that align with existing services.

NAU Peers % Centralized IT Staff

At least half of our ABOR peer institutions have already moved to a centralized IT management model with others moving parts or all of their IT resources to central authority. CIOs at these peer institutions exchange models and ideas around maximizing the efficiency and effectiveness of centrally managed technology services.



Source: EDUCAUSE eCore Data 2017.

Centralization of IT Services: Before and After

The following assessment of centralization identifies generalized realized benefits and opportunities for improvements. Before and after centralization conditions are obtained from interviews with IT staff and key stakeholders.

Before IT Centralization	After IT Centralization
Before centralization there was approximately 135 staff in ITS and an estimated 134 identified decentralized IT workers.	205 IT staff and approximately 33 decentralized technology support staff: 21 ETC, 4 library, 2 health center, 3 Auxiliaries, 1 Astronomy/Physics, 1 Foundation) Net reduction of 33 FTE = ~$2.5m savings
Some departments have very limited or no IT support at all. There is little practice of sharing these staff resources with other areas of need.	ITS managed resources can be redirected to institutional needs as necessary.

Before IT Centralization	After IT Centralization
Many software are multiple versions behind current and posed security risks.	Software is maintained for technical currency and security risks are mitigated through a variety of university security programs. (Examples – TDA 17 versions, Stanley-Lenel, Adobe, Solid Works)
Learning spaces have a variety of technical components and controls making it hard for faculty and students to travel among classrooms. Quality of classrooms varies widely, presenting inconsistencies in the qualitative experiences of students.	A consistent standard for equipment and interfaces provides easier shared uses among learning spaces. Students have a more consistent experience among learning spaces. Learning facilities are holistically managed to achieve a quality learning environment – including flooring, furniture, paint, lighting, etc. (Examples – Castro, Forestry)
Not all learning spaces eligible for program/class fees resulting in aged hand-me-downs from other areas and unreliable/unsuitable for intended uses.	All learning spaces are eligible for technology fee funding. Equipment is managed to provide consistency within and among classrooms and laboratories. (Examples – Communication Arts Commons, Science labs, Library)
Departments propagated equipment acquired with course/program fees from learning spaces to faculty offices.	A planned obsolescence of hardware meets ABOR policy and institutional guidelines for technical currency in all learning spaces.
Software not implemented correctly, lacking sufficient training, coordinated support, or integration of business process improvement.	Software implementation plans follow a best practice project management methodology which includes support and training plans, as well as needed consulting services to ensure maximum benefits of investment. (Examples – Resource 25, Qualtrics, Salesforce)

Before IT Centralization	After IT Centralization
Many "IT" staff asked to do a variety of roles, stretching skill levels beyond reasonable limits, no coordinated security approach, and limited depth of staffing or planned backup of individual resources.	Teams of IT service professionals provide in-depth coverage of all NAU areas. (Examples: Classroom support meets or exceeds 10 minute response SLA. Help desks support 24x7 support with high satisfaction ratings).
Inconsistencies in job responsibilities and pay rates created inequities in employment.	All IT support roles leveled based on revised job descriptions and pay scales. (ITS invested ~ $365,000 to correct)
No reliable empirical data on support satisfaction	FY17 FY18 Faculty 95% (n=685) 94% (n=2,185) Staff 96% (n=1,298) 95% (n=1,608) Students 86% (n=188) 92% (n=839) Classrm 93%(N=2,538) 94%(N=3,844)
A variety of ways of implementing software, computer security, credentials and capabilities cause students to have vastly different experiences in different colleges and buildings.	Standards of technology implementation create consistency for student experience. (Examples: consolidation of Microsoft Domains simplify security and access credentials to resources,).
Limited to no inter-college planning or sharing of IT services / assets among colleges.	Collaborations among colleges, ITS and the library present opportunities for collaboration and innovation. (Examples: Library + ITS STC, ITS + STC + School of Comm, virtual reality theater Reallocation of technology to areas of need)
Colleges struggle to identify for adequately licensing software or keeping it technically current. Versions of software different between classrooms, buildings, and colleges.	Coordinated licensing ensures version controls and upgrades are coordinated. In some cases, there are centrally funded site licensing for shared titles. (Examples: Adobe, SPSS, Qualtrics, Kaltura, Apps.nau.edu)

Before IT Centralization	After IT Centralization
In some colleges there is a practice of taking lab/classroom computers and giving them to faculty to use, creating "churn" of equipment in labs and aged equipment in hands of faculty.	Classrooms are all on minimum 5 year computer replacement cycles. Consistency and improved reliability in computer labs used by students. Some colleges still do not adequately fund technical resources for their faculty and staff.
Illegal use of unlicensed/copyrighted software.	Compliance with federal copyright law.
Limited contingency funds to replace equipment failures and loss.	A central fund has sufficient balance to repair or replace equipment quickly and without impacting other institutional budgets or operations.
Provost allocated (if available) funds to support instructional technology initiatives.	Provost continues to maintain and control funds to stimulate instruction and research technology capabilities. Technology Fee and ITS funds also support technology initiatives in instructional, research and administrative areas.
Limited governance and coordination of institutional technology needs.	A comprehensive IT and Data Governance program that comprehensively addresses institutional needs.

Realized Benefits of Centralizing IT Services

The benefits of centralization of IT assets may not be evident from a before and after comparison in the previous section. This section provides stated realized benefits categorically.

The benefits were derived from interviews of key stakeholders and ITS staff. Dinocrates Consulting provided additional evidence to support these conclusion. It is recognized that individual's experiences vary as do their opinions as to the benefits of centralization. The information is provided here to promote more discussion about areas of improvement and further benefits, efficiencies, and effectiveness for NAU IT Services.

Technology Staff

- Shared IT resources among all university departments.
- Increased depth of staff skill sets.
- Increased gender, ethnic, and generational diversity in IT staff.

- Greater emphasis on student-centric needs vs. department-centric needs.
- Integrated geographic alignment of state-wide staff to support regions.

Technology Infrastructure

- Shared resources (converged platform).
- Service does not depend on who you know
- Improved management of deprecating/obsolescing hardware/software
- Ability to dedicate resources to innovation activities.
- Consolidation allows greater leverage with key vendors

Security Program

- Improved visibility and management over critical assets (servers, web applications)
- Standardization of configurations, patches and updates, changes, access controls
- Better auditability and logging, monitoring, alerting for problems and incidents
- Enhanced ability to perform vulnerability scanning to learn risks and remediate them
    - Reduction of risks associated with threats, vulnerabilities, attacks
- Improved continuity of operations for servers relocated to ITS Data Center
    - Includes backups, recovery, resilience
    - Governance

Enterprise Applications

- Pooled resources able to apply services across the portfolio (i.e., design/UI, QA)
- Greater ability to standardize on technologies and support central functions
- Provide enterprise focus to core apps in order to leverage across the institution (i.e. OnBase™).
- Increased communication between groups and rest of ITS for core services
- Ability to be more innovative in building helper applications to improve the UI's that are integrated with the enterprise systems
- Decreasing duplication of software packages
- Implemented change management processes for improved stability across the enterprise
- Single platform for capturing and understanding user needs.
- Centralized/standardized vendor management.

Service Desk

- Better communication between support groups and internal ITS services.
- Consolidated service (1st and 2nd tiers + campus operators).
- Improved knowledge base (known unknowns)
- Improved, useable Service Portal and Catalog
- Reduction in unplanned outages and improvements in service management
- Improved service outage notification.
- Coordinate with Library in providing central services for learning support.

IT Governance

- Governance is integrated into strategic initiatives.
- Clearer decision making channels related to projects and IT acquisition.
- Single, transparent view of all enterprise projects

- Direct, collaborative input by NAU leadership and stakeholders into project prioritization
- Governance provides improved IT focus on highest-priority campus initiatives
- Core applications identified and consolidated uses/investments in those applications.
- Single platform for student engagement. Improved ability for consistent communications and collaboration with students.

Business Services

- Reduced pricing for software & hardware.
- Operational versus Capital budget capabilities and increased stewardship of resources.
- Centralized computer purchasing
- Eliminated single point of failure (business services)
- Software management
- Communications - WIP - consolidated authority/ SME(all areas)
- Expanded use of ServiceNow™ as system of record for billing/charge backs
- Consolidated training budget has broader/deeper impact
- Created common business practices
- Salary and position/title equity among IT professionals created.
- Service oriented focus forced traditional IT organization to engage institution.
- Creation of career paths, starting with junior level positions

Research Technology

- Increasing communication and visibility of research technology & resources
- Collaboration of HPC support with other central IT services
- Extend HPC to undergraduates
- Extended HPC to affiliates (more loosely defined)

Learning Technology

- Better access to web development & usability resources & expertise
- Consistency of technology across classrooms (faculty can move from classroom to classroom without re-learning technologies)
- All Labs on a standard refresh cycle
- Awareness of the multitude of similar app packages across academics. Future consolidation possible
- Help desks integrated for collaborating on academic needs solutions
- Central support for faculty Courseware adoption.
- Kaltura funded as a digital educational content repository site license for all colleges, faculty and students.

Staffing Effectiveness

- More efficient resource management/allocation of IT resources supporting campus initiatives
- Duplicate work and re-work reduced.

Unrealized Potential of Centralized IT Services

It is important to recognize the areas of unrealized potential and shortcomings of IT centralization. The following list was also derived from interviews with stakeholders and IT staff and are presented here to stimulate plans to overcome shortcomings and improve IT service for NAU. These findings are substantiated by ITS staff and stakeholders engaged by the consulting firm, *Dinocrates* who conducted a strategic assessment of ITS in June and July of 2017.

1. Leverage E-Learning reorganization to emphasize support for teaching and learning.
2. Improve communication and coordination efforts regarding planned changes in IT capabilities, software needs, hardware upgrades.
3. Improve communication with the university community regarding known problems, resolutions, work-around, or non-resolvable status.
4. Increase training, discovery and social sharing through user-groups opportunities for the entire university community.
5. Improve management and services for centralized software purchasing, relicensing, and deployment coordination. ITS needs to mature processes associated with software distribution and configuration management. The benefits of adoption of modern tools has not yet been fully realized.
6. Help all colleges find resources to upgrade faculty/staff computers from their operational budgets.
7. Analyze incident data to identify if campus positioning and balancing of IT support assets is optimal to timeliness, efficiency and effectiveness for incident management.
8. Reduction of technical debt. Consolidate or decommission duplicate custom software developed applications. Find more opportunities for consolidation/reduction of academic, enterprise, and custom developed applications with similar “off-the-shelf” solutions.
9. Increased operational efficiencies and reduction of legacy manual processes.
10. Further consolidation of support desks and operator resources to provide comprehensive and fully integrated service desk Tiers 1-3.
11. Expand use of enterprise licensure (e.g. Microsoft, AWS, and Google) through outreach and awareness campaigns similar to planned “Coffee with Coffey” Monsoon utilization campaign.
12. Opportunity to further standardize and integrate among enterprise tools (MS Teams with ServiceNow, MS Project -> ServiceNow)
13. Simplify and bring consistency to configuration standards, baselines, user permissions/access and services (e.g. file sharing services, domains, authentication and Identity Management.)
14. Increased use of cloud services for faculty and student projects (Azure, AWS), reduce risk, increase agility and provide prudent product migration services.
15. Improve and streamline methods for internal chargebacks for IT asset acquisition.

16. Extend use of ServiceNow™ service desk to other ITS partner service areas.
17. Further consolidation and standardization of shared software tools (e.g., MS Teams vs Slack vs Skype) to improve teamwork and communication.
18. Participate in grants and facilitate opportunities for living laboratories around shared ITS/academic interests such as wireless networks, encryption, identity management, IoT, machine learning, data analytics and other shared interest areas with faculty researchers.

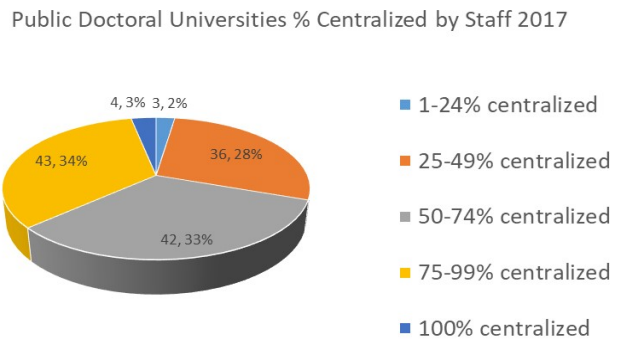
There is always opportunity for improvement and optimization of human, time, policy and money assets. Questions, ideas, concerns and opportunities should be communicated to the NAU Chief Information Officer.

Comparison Metrics to Centralized IT in Large Public Doctoral and Masters Institutions

EDUCAUSE identifies 690 colleges and universities that employ a centralized model for IT Services. Among the public doctoral and masters level institutions in the United States, 37% are at least 75% centralized as measured by the number of staff FTE allocated to "central IT".

Organizational Model in 2017		
1-24% centralized	3	2.34%
25-49% centralized	36	28.13%
50-74% centralized	42	32.81%
75-99% centralized	43	33.59%
100% centralized	4	3.13%

U.S. Public Doctoral Institutions



This group of centralized, public doctoral research and masters level institutions provides a basis for comparison to NAU's efficiency and effectiveness as a central IT services organization. Following a methodology of metrics developed by Gartner Research, ITS identified 28 public master and doctoral level institutions of at least 5,000 students to compare basic efficiency/effectiveness measures.

The following sections compare NAU to a group of peer group consisting of large public masters and doctoral universities who have indicated they operate on a centralized model. These institutions are listed in the Appendices. Institutions self-identified as at least 75% centralized by staff FTE on the annual EDUCAUSE Core Data survey.

Staffing Distributions

The distribution of ITS staff resources to specific functional areas represents a transition to new IT standards and capabilities. For example, the increased use of cloud based services reduces the number enterprise infrastructure staff required to manage servers and storage and reducing the number of customizations made to software versus configuration and adaptation of business processes reduces the number of Information Systems programmers. Given these two legacy dispositions at NAU, ITS compares relatively similarly across other functional categories. The number of staff among centralized peers varies with the size and complexity of the institution.

Staff Distributions Comparison

Organizational Areas	*NAU FY16*	*NAU FY17*	*% Dist*	*FY17 Centralization Peers Median*	*% Dist*
Other	0	5	2%	-	0%
Res. Computing	1	2	1%	1	1%
Info. Security	6	6	3%	4	4%
Support services	47	43	21%	23	20%
Ed-tech services	19	19	9%	10	9%
Admin./mgmt. of IT	12	12	6%	11	10%
Info. systems/apps.	57	53	26%	21	19%
Enterprise infrastructure	51	48	24%	14	12%
Communication services	18	16	8%	9	8%
Total	209	204		112	

Another metric of value is to compare the number of central IT FTE to the total FTE of the institution. The range among NAU centralization peers is 3.3 to 10.6 IT FTE per 1000 FTE of faculty staff and students.

Number of Central IT Staff FTE per 1,000 Institutional FTE

	NAU FY17	*NAU FY18*	*Centralization Peers Average*
Number of Central IT Staff FTE per 1,000 Institutional FTE (Faculty, Staff, Students)	9.0	9.3	6.6

Operational Excellence and Delivery Management

Gartner identifies three investment states for IT services: running the operations of the institution, growing capacity, and transforming operations. Gartner posits that an institution should be investing significant resources in transforming higher education institutions while creating growth capacity and maintaining excellent operations. The following table show that NAU is investing in growing the institution at a slightly greater rate than our centralization peers. This metric is heavily influenced by the projects brought forth through IT governance and aligns with the university's strategic intent.

% Budget Directed to Run, Grow, and Transform Initiatives

Percentage of budget spent on:	*FY17*	*FY18*	*Central IT Peers*
Run	75	70	80
Grow	20	20	10
Transform	5	10	10

Cost Management and Optimization

A comparative metric is to analyze the total cost of IT services as a percentage of all institutional expenditures and the overall IT costs for supporting all students, faculty and students (FTE). The figures are influenced by the overall size of the institution and the total budget, including research.

	NAU FY17	*NAU FY18*	*Centralized IT Peer Average FY17*
Overall annual IT services costs as a percentage of institutional budget	5.60%	5.40%	3.9%
Overall annual IT services costs per institutional FTE (faculty, staff, students)	$1,179	$1,145	$832

The data for this table is from the EDUCAUSE Core Data and appears in Appendix A. Among these peers NAU ranks 4th in the amount of dollars spent per institutional FTE and is similar to Central Michigan University, University of Nebraska – Lincoln, SUNY Buffalo State, Norfolk State University, and the University of Colorado Boulder.

It is not the objective to be the “cheapest” in this context, nor is it prudent to be the most “expensive”. Rather it provides a comparative gauge in the context of the University’s strategic plan and the investment in technology, academic programs, research, student services, and student success initiatives.

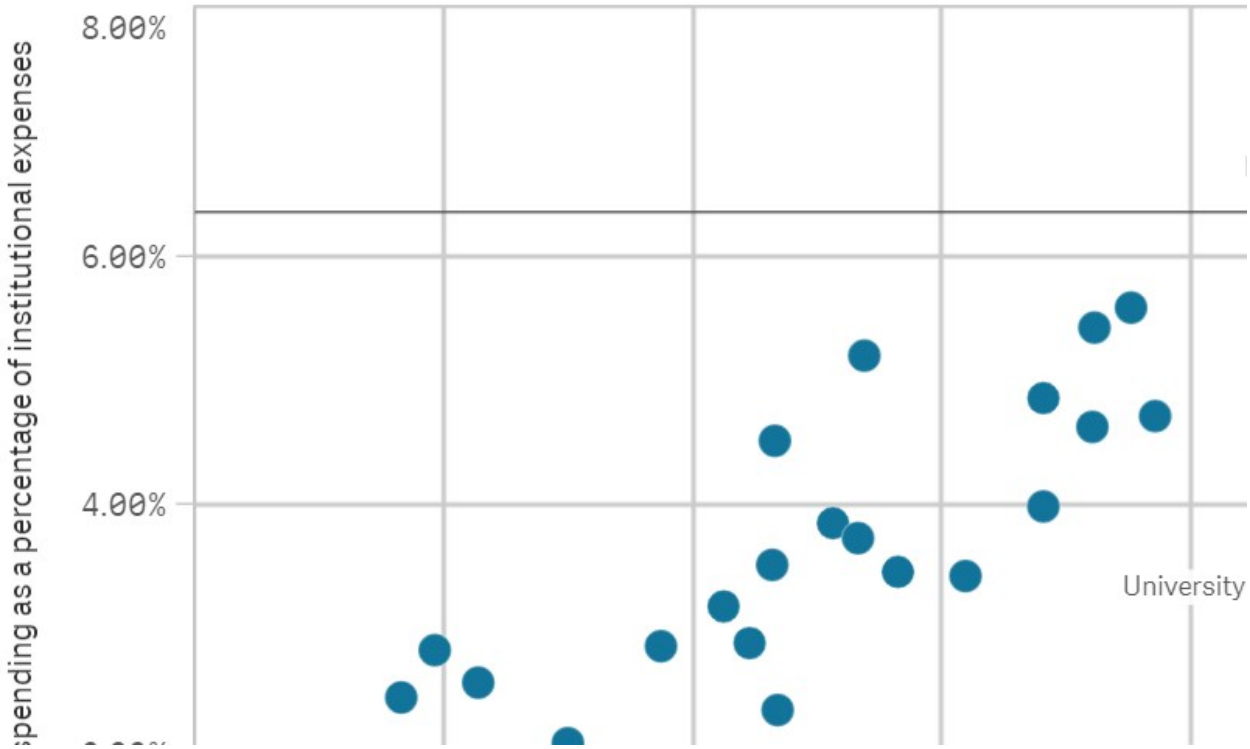


Figure: Comparison of IT Service Cost as % Institutional Budget and FTEs

Other Centralization Metrics

The following metrics are based on guidance from The Gartner Group and provide some additional institutional insights into the effectiveness and efficiencies of centralizing IT services.

Standardization and Consolidation

The University is improving on the standardization of classroom A/V and computers. Standardizations results in cost savings and more effective support and utilization of classrooms. The consolidation of servers and data centers reduces risk and allows the institution to focus resources on establishing resilient and reliable services. Optimized administrative processes allow for more efficient use of resources and contribute to university effectiveness.

	FY16	*FY17*	*FY18*	*Target*
Classroom AV Meeting Standard	38%	52%	64%	100%
Computer Labs Meeting Standard	n/avail	88%	100%	100%
Computer Purchase Exceptions to Standard	47%	15%	14%	10%
Number of Physical Servers	325	550	475	~
Number of data centers/server rooms	10	6	4	3
Number of optimized enterprise processes	n/avail	34	70	~

Financial and Budget Management

The ITS budget is decreasing as a percentage of overall budget. Increases in budget are due to several factors: Increased number of students, annual contract escalators, salary increases, meeting State of AZ security program demands, and capital investments in infrastructure and capabilities all drive IT expenses up. Reductions in the number of IT staff result in savings and increased efficiencies.

Metric	***F17***	***FY18***
Total IT Expense	34,148,072	$36,756,389
Variance of IT budget from Expenditures	$ (1,668,286)	$ (783,345)
Central IT Personnel Costs (% of expenses)	21,696,525 (64%)	22,840,391 (62%)

Human Resources

Efficiencies are gained through consolidation of human resources and removal of overlapping responsibilities, the implementation of modern technologies, and standardization of systems. While it is occasionally argued there is convenience of having someone “down the hall who does it all”, there is more scalability, consistency, security, and efficiency in building teams who service any and all hallways fairly and equitably throughout the entire institution. NAU has achieved significant economies of scale and efficiency with regard to staffing. This has been achieved through restructuring, technical training, modernization of tools, geographical positioning, and customer service success training.

IT Staff Centralized vs Decentralized by Fiscal Year.

	FY15	*FY16*	*FY17*	*FY18*
Centralized IT Staff FTE	135	185	209	204
Distributed IT Staff FTE	122	72	47	30
Total IT Staff FTE	257	257	256	234

The reduction of 23 FTE represents a budget savings of more than $2m in annual operational costs.

Satisfaction of Users and Stakeholders

Customer satisfaction is a key measure in gauging the effectiveness of IT services. ITS issues feedback questionnaires on ServiceNow™ tickets to provide immediate feedback on satisfaction. The following results show relatively high levels of satisfaction.

Satisfied or Very Satisfied Responses to Service Follow-Up

University Community Group/Service	*FY17*	*FY18*	*Target*
Faculty	95% (n=685)	94% (n=2,185)	99%
Staff	96% (n=1,298)	95% (n=1,608)	99%
Students	86% (n=188)	92% (n=839)	99%
Classroom Support	93%(N=2,538)	94%(N=3,844)	99%

The increased number of participants in FY18 over FY17 is explained to be an increased emphasis and active program for obtaining feedback at service points for customers. Also it is posited that there is increasing familiarity with the help desk as a single point of contact for service, and an increased use of Service Now™ by the university on whole.

Future Satisfaction Studies
ITS will continue a practice of following up on low-scoring satisfaction service with personal calls from management. ITS will also issue the TechQual+ survey of IT service expectations and satisfaction again in the spring of 2019. The results will provide additional insights into faculty, staff and student satisfaction, experiences, and expectations for IT services.

Appendix A
Centralization Peer Institutions

Peer Centralized IT Institutions for comparative study for centralization efficiency.

Institution Name	Carnegie Classification	State	Student FTE	Cost of IT service per institutional FTE (Faculty, Staff, Students)	% IT Expenditures of total Institutional expenditures	Central IT FTE per 1000 Institutional FTE
Binghamton University	RU/H	NY	14,947	$667.71	2.36%	6.4
Boise State University	Masters-L	ID	16,169	$663.36	3.52%	8.2
California State Polytechnic University, Pomona	Masters-L	CA	20,163	$737.38	5.21%	5.7
California State University, Fresno	Masters-L	CA	20,694	$665.46	4.52%	4.5
California State University, Los Angeles	Masters-L	CA	19,822	$392.04	2.84%	3.3
Central Michigan University	DRU	MI	22,049	$1,373.50	7.42%	6.2
Eastern Michigan University	Masters-L	MI	17,477	$732.30	3.74%	3.4
Georgia State University	RU/VH	GA	26,506	No Data	No Data	No Data
Idaho State University	RU/H	ID	9,929	$881.33	3.99%	No Data
Indiana University of Pennsylvania	DRU	PA	13,618	$573.88	2.87%	3.5
Kennesaw State University	Masters-L	GA	20,003	$365.11	2.46%	10.6
Norfolk State University	Masters-L	VA	5,861	$1,172.58	4.58%	7.7
Northern Arizona University	RU/H	AZ	22,553	$1,178.52	6.34%	9.3
Old Dominion University	RU/H	VA	19,580	$920.73	4.63%	7.6
Portland State University	RU/H	OR	20,958	$818.72	3.44%	5.4
Sam Houston State University	DRU	TX	15,824	$922.39	5.43%	6.7

South Dakota State University	RU/H	SD	10,272	$499.05	2.09%	4.3
SUNY Buffalo State	Masters-L	NY	9,563	$1,231.96	4.82%	8.6
Temple University	RU/H	PA	33,380	$1,088.05	1.57%	7.4
Texas State University	Masters-L	TX	30,638	$951.79	5.59%	6.8
The University of Memphis	RU/H	TN	16,750	$971.19	4.72%	7.0
University of Colorado Boulder	RU/VH	CO	28,167	$1,094.63	2.98%	10.3
University of Nebraska - Lincoln	RU/VH	NE	22,068	$1,348.21	3.89%	9.3
University of Northern Colorado	DRU	CO	10,726	$881.34	4.86%	6.2
University of Southern Mississippi	RU/H	MS	13,294	$645.14	2.90%	6.7
University of Texas at El Paso	RU/H	TX	17,161	$764.35	3.47%	6.5
University of Texas at San Antonio	RU/H	TX	24,169	$624.31	3.19%	6.1
University of Wisconsin-Oshkosh	Masters-L	WI	10,883	$426.96	2.58%	4.7
Western Kentucky University	Masters-L	KY	16,359	$712.20	3.86%	No Data

Source: EDUCAUSE Core Data 2017

Appendix B
Centralized IT Positions

Centralized IT Positions through FY18

Prior to centralization, Information Technology Services was at approximately 135 staff members.

50 positions were identified for centralization, effective 3/14/16. Below is a broken out list of position counts that were centralized per department.

2 x Assoc. VP for Student Affairs
5 x College of Engineering, Forestry and Natural Sciences
1 x Center for International Education
3 x Cline Library
4 x College of Arts & Letters
4 x College of Education
2 x College of Health & Human Services
5 x College of Social & Behavioral Services
1 x Comptroller's Office
2 x Campus Services & Activities
3 x Enrollment Services
1 x Extended Campuses
1 x Personalized Learning
4 x Facility Services
3 x Housing & Resident Life
1 x Human Resources
1 x School of Forestry
2 x University College
1 x University Development
4 x WA Franke College of Business

25 positions were identified for centralization, effective 8/29/16.

- All 25 staff members came from Extended Campuses.

Centralized IT Positions for FY19

7 positions are identified for centralization, effective 7/1/18.

- All 7 staff members from eLearning Center.

3 positions are identified for centralization out of ITS to the Online Dean, effective 7/1/18.

- All 3 staff members are current ITS employees, but had been centralized in from EC on 8/29/16.

Appendix C
ABOR NAU Peers Degree of Centralization

NAU ABOR Peer Institution -	***Answer***	***Year***	*2017*
Northern Arizona University-60008255	Centralized by expenditures		75-99% centralized
	Centralized by staff		75-99% centralized
Old Dominion University-60009338	Centralized by expenditures		75-99% centralized
	Centralized by staff		75-99% centralized
University of North Carolina at Greensboro-60009929	Centralized by expenditures		50-74% centralized
	Centralized by staff		50-74% centralized
Northern Illinois University-60011138	Centralized by expenditures		50-74% centralized
	Centralized by staff		50-74% centralized
Kent State University-60009107	Centralized by expenditures		50-74% centralized
	Centralized by staff		50-74% centralized
Georgia State University-60009812	Centralized by expenditures		75-99% centralized
	Centralized by staff		75-99% centralized
University of Nevada, Las Vegas-60008819	Centralized by expenditures		50-74% centralized
	Centralized by staff		50-74% centralized
Southern Illinois University at Carbondale-60008528	Centralized by expenditures		75-99% centralized
	Centralized by staff		75-99% centralized
George Mason University-60009344	Centralized by expenditures		50-74% centralized
	Centralized by staff		25-49% centralized