Connecting Possibilities.
Driving Success.

From the CIO

The relationship between technology and higher education is one of constant growth and change. The exponential growth of technology means we've gotten better at adapting, but the COVID-19 pandemic pushed the rate of change into overdrive — resulting in 15 years of change in 15 months.

While challenging to navigate, change is often good for an organization. 2021 was certainly a year of change, with an enhanced focus on continuous improvement and innovation in teaching and research technology, increased collaboration across the campus and The Texas A&M University System, and improved strength and stability of our core services.

> **The driving force behind all our efforts is customer success .. .everything we do is focused on empowering the university's mission of teaching, research and service.**

As we look back at all the Division of Information Technology accomplished in 2021, we also look forward to the valuable initiatives and projects certain to make 2022 a year of connecting — connecting the university to high-value information services, connecting campus partners to proactive solutions, and connecting our employees to the training and resources they need to build a successful career in IT at Texas A&M.

Key to our future success will be a renewed commitment to collaboration and partnership with the System, state agencies, university colleges and departments. Plans are already underway to establish a highly flexible data network between the university and RELLIS campus.

We will create a design-build-run organizational model to drive IT infrastructure objectives and build a new team to facilitate the offering, provisioning and continual improvement of technology services in alignment with the needs of our campus partners. Additionally, work has begun on an integrated

We've established six high-level goals for the future of IT at Texas A&M:

1. Collaborative customer partnerships with a customer-centric support model.

2. Enable employees to build careers by offering training, innovative opportunities and advanced career ladders.

3. Proactive IT solutions that drive ROI and create value for Texas A&M.

security and identity management model. This strengthened partnership will improve all our services and benefit the campus community.

The focus of each of these initiatives is to deliver a clear return on investment in technology for the university and the System. Several collaborations have already shown increased efficiencies - saving time and money.

The driving force behind all of these efforts is customer success. The success of the students, faculty and staff of Texas A&M is our top priority and everything we do is oriented towards empowering the university's mission of teaching, research and service. I am very excited about the innovative work in our future and very grateful to be part of this amazing organization.

Sincerely,
ED PIERSON

4. New world-class data network, designed for the needs of the future.

5. Enhanced focus on cybersecurity, at both local and System-wide levels.

6. Cloud and hybrid solutions targeted for research and academic needs.

Ā|M Division of
Information Technology

Connecting Possibilities.
Driving Success.

Annual Report 2021

Table of Contents
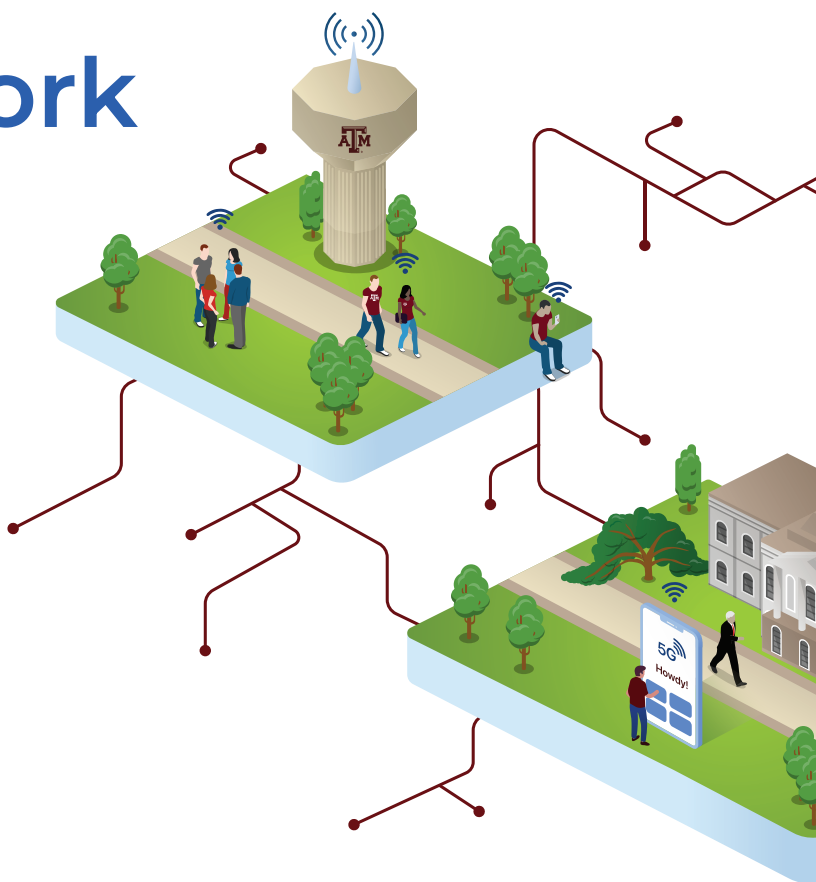
Campus Network

BACKBONE OF SUCCESS

It's indisputable — technology is essential to teaching, learning and research. Texas A&M's data network is the backbone of our campus IT infrastructure — connecting students and faculty to valuable information, tools and collaboration opportunities.

Texas A&M's network has grown organically for decades, and while the network initially met campus needs, it's time to design a new network to support an organization the size and complexity of Texas A&M. To meet the needs of the university well into the future, the Division of Information Technology is designing the Next-Generation Aggie Network.

Building YOUR Network

The needs of students, faculty researchers and campus stakeholders must drive the design of the new network. In late 2021, the Division of IT launched a survey and hosted a series of listening sessions to gather requirements for the new network. The message from campus was clear. The new network must address capacity, speed, manageability, modularity, agility and performance issues.

The network's robust backbone will power a pervasive and high-capacity wireless network to increase wireless coverage for mobile devices inside classrooms and across campus. 5G and IoT technologies should be enabled to support the explosion of smart devices and fuel cutting-edge research.

The new network will deliver more reliable and secure methods for transmitting data, which are essential for faculty research. A security model suitable for the collaboration needs of a Tier-1 research institution must be included, while also providing strong protection for projects with strict compliance requirements.
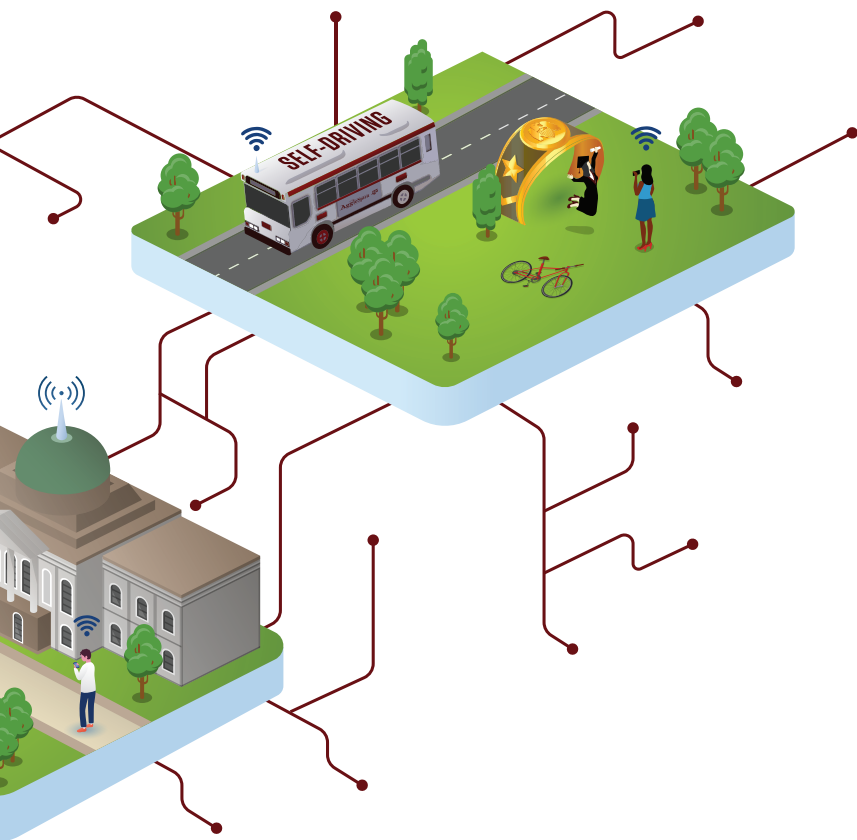
CAMPUS NETWORK ACHIEVEMENTS

Progress on the Next Generation Aggie Network

Designs for the Next Generation Aggie Network are underway. Presentations were made to university stakeholder groups and a user survey was conducted during the fall semester. Additional open sessions were held in late 2021 to solicit input from campus members. This feedback will help us design a network to better meet future demands of Texas A&M educators, researchers and students. An Executive Summary will be presented to the Board of Regents in early 2022.

Embracing the Internet of Things

In early 2021, the division **launched a pilot program for an Internet of Things (IoT) network.** The network allows campus members to connect smart devices that will not connect to TAMU_WiFi and links each device to the user's account, ensuring network safety. Global access to IoT will change the game in education and research. IoT is the future of technology and the division is working hard to build a campus network where all the devices we rely on work seamlessly and securely.

Engineering Smarter Classrooms with IoT

Students in the College of Engineering's Department of Engineering Technology and Industrial Distribution used the pilot IoT network to raise capstone projects to a new level. By harnessing the functionality of IoT, students can expand their knowledge and usage of technologies such as autonomous vehicles. Without IoT, vehicles can drive around with a routine path, but with IoT, they interact in real-time with users' voice commands, just like a Google Home or an Echo Dot on wheels. The more students and professors have access to tech tools like IoT, the more they can tackle complex issues and challenges. Collaboration and partnerships with faculty, researchers and colleges make work like this possible.

Network of the Future

The Next-Generation Aggie Network will be faster, stronger and more secure. Coupled with long-term, sustainable funding and service delivery strategies — the new network will provide a modern, resilient and secure research and education network to better meet the future demands of Texas A&M educators, researchers and students. The Next Generation Aggie Network is Texas A&M's network — the backbone of our success.

Building a Stronger, Faster Network Today

Texas A&M added 475 wireless access points over the year and the network capacity from campus data centers to the campus border was **increased from 40GB to 100GB**. Fiber was upgraded from older multi-mode to new single-mode in 36 buildings and added to six new locations. VPN bandwidth and geographical redundancy were also improved.
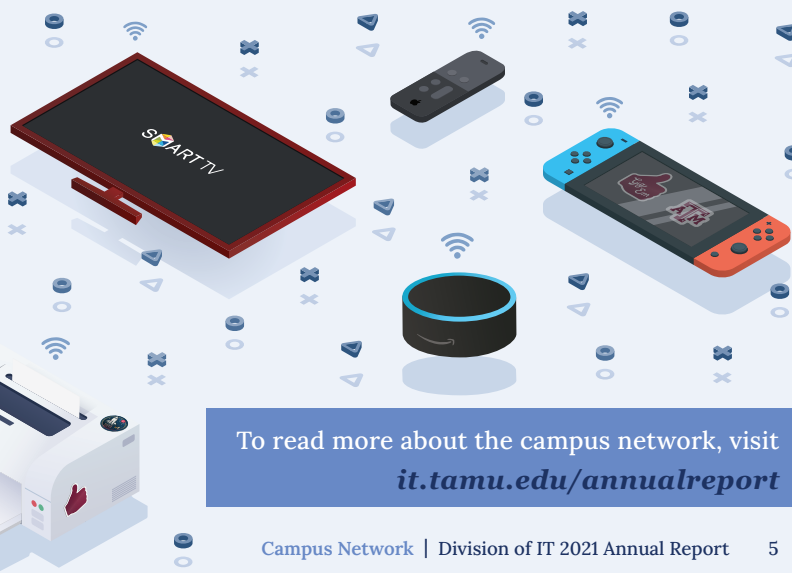
To read more about the campus network, visit
it.tamu.edu/annualreport

Cybersecurity

SECURING THE UNIVERSITY

Cybersecurity incidents occur every 11 seconds in the United States, costing consumers more than $1 trillion annually and threatening higher education, government and industry. Texas A&M University must stay vigilant, with over 8,200 wireless access points across campus and over 62,000 devices on the network at any point in time.

Currently, the Division of IT inspects and blocks hundreds of millions of attacks including sophisticated nation-state led attacks. This provides us with the data and experience to enhance the university's security posture while discovering solutions to current and future challenges to cyber safety.

Leading the Way

Texas A&M University is poised to become a national leader in cybersecurity and identity and the first choice for security research. We will partner with Texas A&M researchers and research organizations in the realms of security and identity, improve and increase the data- and security-related capabilities for our researchers and scientists, and develop government and higher education partnerships focused on solving security, identity, data and risk management problems.

CYBERSECURITY ACHIEVEMENTS

Tags Help Campus Members Detect Suspicious Emails

To help fight phishing attempts, the division activated **"external sender tags"** in October. The tags clearly identify messages received from external or suspicious sources.

Duo Updates Strengthen Security

Alert notifications are now sent to campus members when a new device is added to their Duo NetID Two-Factor Authentication account. Duo's "remember me" function was also reduced to five days. The **changes were in response to detected phishing attempts** aimed at compromising Duo accounts.

Steps Taken to Protect University's Reputation and Accounts

The Sender Policy Framework (SPF) authentication method now helps prevent @tamu.edu email addresses from being spoofed. The division also enabled DKIM signing

To this end, several audacious goals have been set for the next five years:

- Set the bar for effective enterprise security in higher education.

- Educate and train the future leaders of cybersecurity.

- Create innovative security data management research programs that benefit the university, state and nation.

- Work with our faculty and agencies to become a national leader in academic research in cybersecurity and identity, addressing major unsolved technical and policy challenges.

Securing Tomorrow

The current cybersecurity skills gap across the country is a challenge. Educating and training future leaders of cybersecurity is a core component of our mission. The division currently offers an innovative Cybersecurity Apprenticeship Program (CAP), which allows selected students to have hands-on experience in identifying and stopping attacks. Designed to add an additional layer of security monitoring to campus, the long-term goal of CAP is to help position Texas A&M University as the leader in cybersecurity education while also preparing students for the booming cybersecurity industry.

PARTNER SUCCESS

System and Division Work Together to Strengthen Security

In 2021, the Texas A&M University System and the Division of IT worked together to streamline the process for sharing cyber threat intelligence data. Streamlining the process gets critical information about compromised accounts in the hands of those who can turn off the account faster, reducing negative impacts from cyber criminals.

and enforcement on the campus mail relays and deployed DMARC reporting for @tamu.edu domains in 2021. When used together and fully enforced, these technologies protect recipients and the university's reputation by preventing the @tamu.edu email domain from being spoofed. **Texas A&M leads the nation as one of the first universities to implement these security protocols.**

To read more about cybersecurity, visit
it.tamu.edu/annualreport

Cloud Technologies

CONNECTING TO THE CLOUD

In the era of "big data," innovation has accelerated with the expanded use of cloud technology. While cloud computing has been on the rise for over a decade, there are still many barriers to moving from traditional, on-premise infrastructure to the cloud. Projects are often avoided or abandoned due to procurement and contracting difficulties, as well as the effort required to learn new technology platforms and meet security requirements.

The Division of IT partnered with the top public cloud platforms to provide a flexible, secure and compliant cloud computing experience for the Texas A&M community. The Aggie Innovation Platform (AIP) provides access to Amazon Web Services (AWS), Microsoft Azure and Google Cloud at no added overhead costs, and with the added benefit of a master contract, customized networking configuration, and campus identity management services. The AIP now provides Texas A&M with access to a simple-to-start, flexible, scalable, secure, and compliant place to create and innovate with minimal barriers or long-term financial investment risk.

Removing Barriers to Innovation

AIP's mission is to remove or reduce as many barriers as possible to make it easy for Texas A&M researchers and campus IT professionals to take full advantage of what the cloud has to offer. Instead of managing servers and IT-related tasks, researchers can spend more time on their research. As the AIP service expands, it will continue to facilitate faster innovation and enable less risky experimentation.

Within the next several years, AIP will expand access to most of the services offered by Amazon Web Services, Microsoft Azure, Google Cloud and Cloudflare. Service access will be complemented with a complete set of commonly deployed resources (Infrastructure as Code, or IaC) available to the Texas A&M community — all geared toward saving time, reducing errors and increasing security.

Measuring Success

Moving forward, AIP will become a launching point for the Texas A&M community to innovate. Success will not only be measured by cost savings and time reduction, but with a greater number of high-value projects completed. Security of data and resources will also improve with baseline security defaults and more efficient compliance supervision. Thanks to AIP, Texas A&M will be able to reach new heights with the cloud.

PARTNER SUCCESS

Training Mental Health Professionals in the Midst of a Pandemic

The Texas A&M Telebehavioral Care Program (TBC) used Microsoft 365 to train mental health professionals during the pandemic. As one of the only telemental health training programs in the world, the TBC was challenged with balancing a dramatically increased caseload and maintaining support for their trainees who had to work from home. With Microsoft Teams, they were able to provide remote supervision to trainees, create a file-sharing hub for critical documentation and data, and quickly communicate with the entire team without fear of leaving anyone out. The TBC continues to use Microsoft Teams to provide group therapy appointments and support their hybrid working environment.

CLOUD TECHNOLOGIES ACHIEVEMENTS

University Moves Email To Microsoft 365

The Division of IT, working closely with technology partners across campus, successfully **migrated almost 40,000 mailboxes to Microsoft 365.** This move away from on-premise Microsoft Exchange reduced on-campus hardware costs and the time required to administer servers and storage systems. **The move to the cloud will save the university $700,000 each year!**

The move also gave campus members access to new integrated features and functionality of the Microsoft 365 platform. To support the migration, the Division of IT partnered with Microsoft to host an **extensive series of live training sessions** throughout the summer and fall semesters. Campus members still have access to recordings of each session.

Campus Collaboration Results in Cloud Innovation

IT professionals from across campus comprise the Aggie Innovation Platform (AIP) Technical Working Group and collaborate to remove barriers, helping researchers and IT professionals take advantage of powerful cloud technologies. But AIP does more than facilitate cutting-edge research —the AIP community is key to empowering IT professionals across campus. According to community members, the real value of AIP is gathering with like-minded individuals from across campus to share ideas and solutions. Strengthening professional development for IT pros while reducing the burden of on-campus infrastructure and maintenance confirms the AIP platform and community approach will be critical to the future success and innovation of IT at Texas A&M.

To read more about cloud technologies, visit
it.tamu.edu/annualreport

Research Support

SUCCESSFUL RESEARCH

Technology is now more than a tool to help researchers, it is integrated into the research itself. In the past, researchers would collect and store hundreds of data points on a flash drive. Now data points collected can easily number in the millions. It takes powerful computing resources to handle these data sets, and successfully establishing and executing a technology strategy is critical to the success of our researchers.

As we move forward, a key area of focus will be supporting our partners in their research efforts. By helping researchers identify and implement their tech platforms, they can spend more time focused on their research and not the technical infrastructure needed to support it. Core to this goal is providing access to leading-edge technologies including cloud computing, 5G and IoT to power cutting-edge research.

Supporting Innovation

Researchers must have access to powerful computational and analysis platforms to be successful. The Division of IT will create a team dedicated to supporting researchers with technology. The research support team will focus on integrating technology with research to both facilitate grant applications and fulfill tech needs once funding is awarded.

Research support starts with funding proposals. The team will be available to offer consultation on system specifications and resource requirements for grant proposals.

Once funding is awarded, the Division of IT will provide dedicated resources to assist researchers with technology implementations.

1. Find the right combination of fully managed and scalable computing services for a project's needs and budget.

2. Help researchers transition their analyses and models from desktops and departmental servers to more robust and scalable cloud resources when relevant.

3. Provide consultation and support for all the tech platforms available on campus, ensuring systems are used in an effective and efficient way.

4. Partner with vendors to bring cutting-edge technology services to campus and build custom platforms to enable easy access for all researchers.

RESEARCH SUPPORT ACHIEVEMENTS

STAR Supports STRIDES in Research

Secure Technologies for Aggies Researchers (STAR) provides cloud technology for researchers that is secure, compliant, rapidly available and easy to scale. STAR offers a variety of tools from data analytics and machine learning to robotics and data warehouse services.

In 2021, Texas A&M University entered an agreement with the National Institutes of Health - Science and Technology Research Infrastructure for Discovery, Experimentation, and Sustainability (STRIDES) initiative. STRIDES provides access to rich datasets and advanced computational infrastructure for biomedical researchers. The division will release a new STAR/STRIDES environment in Amazon AWS in April.

Researchers Save Time, Improve Accuracy of Funding Proposals

Researchers can save time using new IT templates to accurately and efficiently prepare research proposals. The templated statements include information on the campus network, data centers, AIP and STAR cloud technology, cybersecurity, FERPA and HIPAA data protection, and the Texas Data Repository (TDR). The templates have also been added to the university's Data Management Plan (DMP) Tool.

Innovation Thrives Through Research, Cloud Partnership

The partnership between research and IT has already resulted in increased funding and prestige along with invaluable research.

ALI MOSTAFAVI

When professor Ali Mostafavi (College of Engineering) applied to Microsoft's AI for Health program and received over $100,000 in credits, he knew he needed a partner to help him make the best use of his cloud infrastructure. College of Engineering IT and the AIP support team helped Mostafavi transition his research data to the AIP. AIP's direct network connection to campus was a game changer for the speed of his research. And his IT partners helped him avoid costly data egress charges. Read more at *u.tamu.edu/mostafavi.*

JOY ALONZO

Professor Joy Alonzo (College of Pharmacy) says that while some researchers may be apprehensive about using the cloud, she has seen the many advantages of distributed computing. The AWS and STAR environments are designed to work with large data sets and do the analysis so researchers don't have to do the correlations themselves. These powerful computing features along with a HIPAA-compliant database means the cloud services are now crucial to her work. Read more at *u.tamu.edu/alonzo.*

ZENON MEDINA-CETINA

Professor Zenon Medina-Cetina (College of Engineering) has always preferred to manage his own computing services on campus. But, when high-profile COVID projects presented unique technical challenges, he partnered with IT to design a new 'Texas A&M-on-premise and AWS cloud' advanced computing collaborative model. The collaboration paid off. The Department of Homeland Security approved his new technology design immediately — and they take security very seriously. Read more at *u.tamu.edu/medina-cetina.*

To read more about research support, visit
it.tamu.edu/annualreport

Customer Service

CUSTOMER-FOCUSED SUPPORT

As technology is increasingly integrated into teaching, learning and research, quickly and effectively solving IT problems is essential. Quality IT support hinges on the ability to create an efficient and effective mechanism to resolve campus members' tech problems.

Reorganizing and Redefining Support

To ensure high quality, consistent customer service, the Division of IT will create an integrated support model for the entire campus, resulting in a simplified, streamlined and efficient support experience for campus members.

The Division of IT recognizes our current support model and organizational structure must change to achieve these goals. We've identified the following priorities:

1. Launch a common IT ticketing system to improve the ability to track, prioritize and solve user needs efficiently, decreasing service time and increasing end-user trust.

2. Improve first-call resolution, reduce the number of "touches" on a ticket and resolve even complex problems quickly.

3. Analyze support trends to strategically address key technology issues.

4. Restructure campus-wide intake processes for IT incidents, creating a "Mission Command" approach to quickly funnel tickets to the appropriate support resource. Service requests should be separated from incidents.

Measuring Success with Metrics

World-class customer service and IT support must include self-service solutions that are easy to use, along with a central service desk that quickly resolves technology problems. Support metrics will identify common technology issues, helping us adjust and improve service performance. Additionally, a centralized service desk will improve the division's ability to collect and compile campus-wide data to better inform university leadership about the needs and gaps in IT services. By improving both IT support and services, we increase our partners' success and ensure the campus community can focus on learning, innovation and research.

CUSTOMER SERVICE ACHIEVEMENTS

TechList Helps Students Find Campus Tech Necessities

The New Aggie TechList website was released to give incoming students a customized list of IT hardware and software they need based on their major and where they will live. The site was highlighted by Texas A&M Today and featured on the EdScoop website. Before the NewAggie TechList, Help Desk Central received hundreds of calls from incoming students and their parents regarding technology needed for campus.

IT Alerts Notify Campus Quickly

The division officially launched **Enterprise IT Alerts,** allowing campus members to receive text alerts when an important campus service is down, including internet, email, Canvas, Howdy, CAS and the campus data centers.

Strengthening Support

A redesigned **Help Desk Central website** was launched in the summer and makes getting assistance quicker and easier than ever. Visitors can search the knowledge base for answers or contact HDC staff through live chat, email, phone call or in-person visit.

To provide as much student support as possible during move-in week, Help Desk Central also set up **pop-up stations** at three locations across campus. HDC personnel helped with common issues such as connecting to Wi-Fi, setting up accounts and changing passwords.

PARTNER SUCCESS

Empowering Student Success

The Texas A&M Graduate and Professional School implemented a document processing submission system to encompass the full degree plan lifecycle of students. With help from the Division of IT, the system allows students to enter the degree plan with the list of courses for their graduate degree, select committee members for their program, submit the degree plan for multiple levels of approval and make changes to the degree plan if needed. What took days or even weeks in the past, can now be done online in minutes.

To read more about customer service, visit
it.tamu.edu/annualreport

Maximizing Value

A core focus for the Division of IT is delivering a clear return on investment for the university and System. Whether we're working to save time or money, we are dedicated to maximizing value for our customers and partners.

Cloud Automation Saves Time and Money

Prospective Aggie Innovation Platform (AIP) customers can now quickly choose their cloud service from the IT Service Catalog. The service request collects pertinent information and then a series of automated steps take over. Ultimately, the customer receives an email with their access information and how to start using their new cloud resources. **The amount saved per account created is approximately $500, and the automation will save the division over $44,000 each year.**

Additionally, the AIP now has a pipeline to create autonomous, virtualized computational server images or templates that meet university security controls and run on a diverse set of cloud environments. The resulting images are ready for customers to use within their linked Amazon Web Services (AWS) accounts, **saving the one to two days and high error rates** of building an image directly from the hardware. Images will be released for Azure and Google Cloud in the near future.

Division of IT's Online Portal Helps Vaccinate 100,000 Brazos County Residents

The Division of IT - Texas A&M Health worked days, nights and weekends to quickly develop a new system for scheduling vaccine appointments at the Brazos County Community COVID-19 Vaccination Hub, which scheduled more than 100,000 vaccinations in 2021.

The team was able to develop the program quickly thanks to a head start provided by REDCap, a secure web application the team had experience using for collecting and reporting COVID-19 testing data. That migration turned out to be critical for the new vaccination scheduling software, which would eventually receive overwhelming traffic when 160,000 appointment requests hit the system in a 60-second period.

New Code Maroon Vendor Offers Savings While Increasing Features

The **Code Maroon Shared Service** is saving over **$190,000** per year through its contract with a new vendor, AppArmor. Moving Code Maroon to AppArmor's cloud also eliminated five on-campus servers required for notification and their related costs.

AppArmor also provides more functionality for users; especially with the Code Maroon Mobile App, which is available to all campus members and their friends and family. Additionally, the Code Maroon desktop notification client is now available for personal computers off campus.

Focused Effort Adds Value to University

The Division of IT continually seeks ways technology can save our partners and the university time and money, maximizing the value our services provide.

- The division released the **Data Classification + Research Resources Tool** to help researchers simplify and streamline the process of submitting data classification and technology requirements for their grant applications, especially when PHI is involved. The tool ensures the university follows data privacy and protection requirements, as well as state and federal laws.

- The *Laserfiche Automated Billing System* has delivered substantial savings to the university. Automating processing for salary letter generation, personnel files, new student hires, termination and promotion is saving **over $31,000** per year. Utilizing Laserfiche for the budget and OTM/ALWP processes saves approximately **$39,000** per year.

- The Texas A&M University System and the Division of IT are saving **$120,000** over three years after *renegotiating the Cisco Duo Two-Factor*

Authentication contract. Work is underway to streamline additional contract management for shared System-wide IT services.

- Texas A&M's *Accessibility Conformance Evaluation (ACE) tool* gives the campus and System a full listing of Electronic and Information Resources (EIR) and access to the Voluntary Product Accessibility Template (VPAT®) for each. By skipping unnecessary paperwork and reducing the wait time for the purchase of electronic resources, ACE saves approximately **$12,000** in staff time each year.

- Exchange administrators are saving time using a *new shared mailbox lookup tool* from the Division of IT. The tool is running in the cloud on Microsoft Azure for **only pennies per year**. In the past, this same tool would have cost $500 annually using traditional virtual machines (VMs).

Division of
Information Technology

View our full annual report online:
IT.tamu.edu/annualreport