VIRGINIA TECH™

IT Division of Information Technology

Annual Report
Fiscal Year **2019**

Division of Information Technology

I am delighted and honored to introduce the Division of Information Technology annual report for the 2018-2019 fiscal year (FY 2019)! The Division of IT continued to evolve and adapt to meet Virginia Tech's growth and ever changing technology needs. As described in this annual report, our work in FY 2019 focused on supporting the teaching and learning, research and discovery, and outreach and engagement missions of Virginia Tech and strengthening the Division of IT through the seven pillars of the IT Strategic Plan for 2012-2018. We worked collaboratively across the university and beyond to advance teaching and learning; we invested in high-performance computing, training, and support to provide a competitive advantage to our research community; we worked to leverage technology to improve the experience of students, faculty, staff, and other members of the university community; and we advanced IT services to increase enterprise effectiveness. We also worked to strengthen the Division of IT itself and position it for the future by ensuring the

Scott F. Midkiff, Vice President for Information Technology & CIO

security and resilience of IT resources, improving communications with our customers and partners, and strengthening the IT organization and our people. We also looked to the future by launching development of the IT Strategic Plan and Operational Plan for 2018-2024.

Technology is a critical enabler of the aspirations and success of the modern land grant university. Technology, also, permeates almost every aspect of the Virginia Tech experience for prospective students, current students and alumni; for prospective and current employees; and for stakeholders, the broader university community, and our partners. I am proud of the achievements of the employees of the Division of IT in serving Virginia Tech's students, faculty and staff; in supporting the university; and in contributing to the well-being and advancement of the Commonwealth of Virginia.

Scott F. Midkiff, Ph.D.
Vice President for Information Technology & Chief Information Officer

The 2018-19 fiscal year (FY 2019) was strategically significant in many respects. At the university level, Virginia Tech's long-range plan for 2012-18, "A Plan for a New Horizon," came to a close, and the university transitioned from a strategic planning process to a continuous planning process with the adoption of its new long-range plan, "The Virginia Tech Difference: Advancing Beyond Boundaries."

Likewise, the Division of Information Technology's 2012-18 strategic plan—the first completed entirely under the guidance of Vice President for Information Technology and Chief Information Officer, Scott Midkiff—drew to a close. This strategic plan established seven pillars upon which the Division of IT focused its endeavors over the past six years. Pillars one through four were intended to directly support "A Plan for a New Horizon" and help the university meet its strategic goals by

1. Enabling networked learning in the networked university;
2. Providing competitive advantage through sustainable advanced cyberinfrastructure and collaboration;
3. Leveraging information technology to distinguish the Virginia Tech experience; and
4. Advancing information technology for enterprise effectiveness.

The remaining three pillars articulated how the Division of IT would achieve the first four, by

5. Ensuring the security and resilience of information technology resources;
6. Improving communications with customers and partners; and
7. Strengthening the information technology organization.

At the foundation of all pillars is the Division of IT's mission to serve the university community and the citizens of the Commonwealth of Virginia, applying and integrating information resources to

• Enhance and support instruction, teaching, and learning;

• Participate in, support, and enhance research;

• Foster outreach, develop partnerships with communities, and promote the capabilities of advanced networking and communications; and

• Provide, secure, and maintain systems allowing the university to accomplish its missions.

The projects and initiatives highlighted in this annual report moved us toward meeting the goals set forth in one or more of these pillars, thus supporting the Division of IT's mission and the long-range goals of Virginia Tech.

Fiscal Year 2019 Financial Summary

The financial summary below provides an overview of the total budgeted funds and expenditures of the Division of IT during FY 2019.

Vice President for Information Technology Financial Summary Fiscal Year 2018-19

	Total Budget	Total Expenditures
Education and General Funds	$49,587,632.81	$41,531,221.21
Equipment Trust Funds	$ 3,469,138.12	$ 3,213,127.71
Auxiliary Operations	$23,208,805.00	$19,491,254.67
Sponsored Grants and Contracts	$ 1,982,159.66	$ 401,710.91
Continuing Education / IDDL Funds	$ 215,490.00	$ 2,307.00
Overhead Funds	$ 1,586,573.97	$ -
Other Sources	$ 276,101.51	$ 247,422.00
Total	$80,325,901.07	$64,887,043.50

Enabling Networked Learning in the Networked University

Pillar 1 supports Virginia Tech's long-range goal set in "A Plan for a New Horizon" to "continue to investigate, develop, and utilize current and emerging technologies to enhance traditional classrooms, provide mobile access, and expand high-quality distance-learning opportunities." Networked learning prioritizes accessibility, purposeful innovation, and anytime, anywhere connectivity to enhance the learning experience at every level of the university. Networked learning recognizes the interconnection of disciplinary expertise, pedagogy, and technology to improve the quality, effectiveness, and efficiency of teaching and learning.

Technology updates to physical learning environments increase productivity and reach

Technology-enhanced Learning and Online Strategies (TLOS) Connected Classrooms are videoconference-enabled rooms with added technology such as document cameras, automated recording, and adjustable podiums. Of the 11 Connected Classrooms, six are in Blacksburg and five are in the Northern Virginia Graduate Center. All were updated in FY 2019 with the adoption of Zoom and Kaltura. The upgrades included new computers, Zoom Rooms PCs, cameras, microphones, and recording systems.

Media in the classrooms can now be automatically started, stopped, and connected, minimizing use of class time for connections. The updates helped reduce the number of service requests by nearly 60 percent between fall 2017 and spring 2019, with most requests taking less than five minutes to resolve. Continued user interface improvements and training opportunities should help to further reduce incident totals.

The 4-VA conference rooms in Torgersen and Burruss Halls, along with the 1210 Torgersen conference room, Innovation and Outreach Studio, and 1120 Torgersen Professional Development Network (PDN) classroom were also updated. The classroom in 3080 Torgersen was transferred to the Center for Excellence in Teaching and Learning. Across all physical learning spaces, Connected Classrooms hosted 138 classes and facilitated 454 PDN workshops, but there is capacity to increase usage.

Torgersen 1120 was reconfigured into a TLOS Professional Development Classroom

Accessible Technologies builds awareness of accessible design

Accessible Technologies (AT) launched three campaigns to promote Choosing Accessible Learning Materials (C.A.L.M.): checking contrast, creating captions, and describing images. The campaigns tied in with outreach efforts that included consultations, weekly brown bag lunches, expanding the Accessibility Network, facilitating more than 20 Professional Development Network workshops, and hosting a Global Accessibility Awareness Day reception.

Community outreach included facilitating a Roanoke City School technology demonstration; helping to organize the first Virginia Higher Ed Accessibility "Unconference" in partnership with the University of Virginia, George Mason University, and James Madison University; and developing the New River Valley Accessibility Partners Community of Practice. The Accessible Media Bootcamp was offered for both university and K-12 education professionals.

During spring 2019, AT piloted the Accessibility Professional Certification Grant Program. Through the work of the first cohort, Virginia Tech became the most-credentialed International Association of Accessibility Professionals (IAAP) public college or university in the country. Fourteen members earned the Certified Professional in Accessibility Core Competencies (CPACC) certification, and nine members earned the Web Accessibility Specialist (WAS) certification. The nine members passing both exams received the Certified Professional in Web Accessibility (CPWA) credential.

AT also assessed accessible media tools and selected two new enterprise tools; Grackle for Google, which evaluates a site's accessibility and suggests improvements, and EquatIO, which enables spoken and visual methods for mathematics. Blackboard Ally was selected for a 2,000-student pilot in efforts to increase online learning inclusiveness.

TLOS adopted the Keep C.A.L.M. slogan for its 'Choosing Accessible Learning Materials' campaign in FY 2019.

Grant programs support excellence in digital pedagogy

Institutional grants offered by TLOS strengthen teaching and learning activities and support research and development of emerging learning technologies.

Design and Develop proposals are eligible for funding in two categories: individual course development and full graduate degree or certificate programs. Of the 48 proposals submitted in FY 2019, 31 course development or revision projects and one multi-semester certificate program received funds totaling $252,000. Award recipients receive weekly consultations, content planning, and dedicated assistance from Learning Experience Design instructional designers and media specialists.

4-VA at Virginia Tech grants support collaborative endeavors, course sharing, course redesign, and collaborative research in support of the collaborative's goals. During FY 2019, 4-VA funded 39 of 50 proposals with awards totaling $512,937.40. Among the funded proposals were 27 collaborative research awards, six course development proposals, and six shared courses or collaborative endeavors proposals.

Students in the College of Architecture and Urban Studies industrial design program using Think-a-Sketch, a sandbox model project supported by TLOS.

Innovation in Learning grants support the evaluation and implementation of technology-enhanced teaching and learning approaches. These grants were paused in FY 2019 as TLOS's "sandbox model" and "innovation pipeline" processes were refined. During the transition, TLOS support consisted of in-kind technology contributions, use of the Innovation and Outreach Studio, and staff time including the new team of 12 Student Innovation Fellows.

Digital learning environments continue growth

Canvas remains the hub of Virginia Tech's digital learning environment—more than 90 percent of faculty used Canvas in FY 2019. The integration of 32 new tools into Canvas from 22 vendors enhances the learning infrastructure.

In late FY 2018, the video conferencing tool Zoom replaced WebEx, and the video content management system Kaltura replaced Echo360. During FY 2019, Zoom hosted 12.2 million

meeting minutes across 51,000 meetings with 12,767 users from 152 countries. In addition to Zoom recordings automatically saved to Kaltura, 10,070 videos were added through Canvas sections. Unlike past tools, Kaltura offers the option to request and edit captions, improving the university's ability to meet accessibility guidelines. Approximately 13 percent of videos had added captions in FY 2019. As awareness of captioning options grows, TLOS expects this number to increase significantly.

In August 2018, TLOS partnered with the Office of Undergraduate Academic Integrity to implement the plagiarism detection software Turnitin Feedback Studio. Turnitin provides feedback on the originality of writing along with spelling and grammar suggestions. Faculty must add Turnitin to a Canvas course for students to use the software. In FY 2019, 96 Canvas sites (2,232 students in total) used Turnitin, resulting in 19,179 similarity reports.

Over 10,000 Canvas sections were recorded in Kaltura in FY 2019.

Helping Virginia Tech faculty and staff leverage benefits of online collaboration tools

Online collaboration is integral to the networked university. To help faculty and develop effective online collaboration strategies, Collaborative Computing Solutions (CCS) implemented hands-on workshops to explore available tools at Virginia Tech, including Microsoft Teams, G Suite for Education, and Slack.

Facilitated by Virginia Tech's Professional Development Network, workshops were available both in the classroom and via Zoom. Department-focused workshops were also offered by request.

Workshops are continuously reassessed through attendee feedback and surveys to ensure they align with the current needs of faculty and staff and meet specific learning objectives, including to:

- Raise awareness of collaboration tools available to Virginia Tech faculty and staff
- Explore and teach best practices for combining tools to solve common collaboration needs
- Learn which sharing use cases are and are not supported by the tools

Pillar 2:

Providing Competitive Advantage through Sustainable Advanced Cyberinfrastructure and Collaboration

Advanced cyberinfrastructure—including high-performance computing (HPC), large-scale storage systems, visualization, software and middleware, and advanced networking—is important to recruit top researchers, grow and sustain computational and data-intensive research programs, and enable graduate education involving data-intensive and high-performance computing. Enhanced collaboration is necessary to support scientific and interdisciplinary research in the networked university and global research communities. In FY 2019 the Division of IT made great strides to advance on-campus cyberinfrastructure, forge new collaborative relationships, and elevate Virginia Tech's competitive advantage.

Leading and supporting innovation in research computing

Advanced Research Computing (ARC) is a leader in the science and application of high-performance computing, enabling research and innovation. During FY 2019, ARC provided resources for 1,489 different projects across the university, with five active supercomputing resources: BlueRidge, Cascades, DragonsTooth, NewRiver, and Huckleberry.

In addition to providing supercomputing infrastructure for Virginia Tech, ARC spends approximately a quarter of their time supporting active research projects across the university, with total active grants and funding that exceeds $1.8M. To share their expertise with the HPC community, and maintain connections with other innovators in higher education, ARC personnel attended ten key conferences in FY 2019. At the conferences, ARC contributed through presentations of research, committee leadership, and by offering tutorials and workshops.

Fostering innovation in deep learning

To encourage engineering students to push beyond boundaries, ARC hosted a pair of hackathons in the spring and fall of 2019. The theme of the hackathons was to accelerate and deploy deep learning models.

During the multi-day events, teams from the departments of Computer Science, Electrical and Computer Engineering, and Aerospace and Ocean Engineering met with ARC computational scientists to discuss the parameters of the challenge, explore the possibilities of deep learning, and present their submissions. Winning teams developed submissions that addressed real-world issues, including tools to help decide the positioning of robots in indoor environments, detect defects in 3D printed objects, and determine the presence of corn plants in fields.

These competitions give students crucial experience in conceptualizing and solving problems that are relevant for today's research computing needs, and help prepare them for professional work.
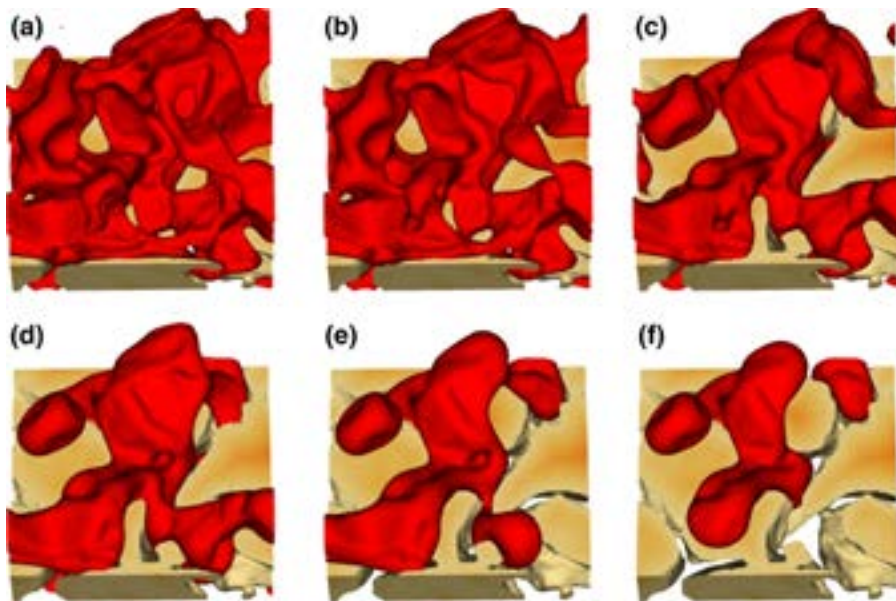
Excellence in high-performance computing

The Oak Ridge National Laboratory's Leadership Computing Facility (OLCF) honored ARC computational scientist James McClure by selecting his project, titled 'Lattice Boltzmann Methods for Porous Media,' as one of eight research projects to participate in the Frontier Center for Accelerated Application Readiness program. McClure's research project endeavors to model multiphase flow processes within heterogeneous rock structures. Along with the other seven projects chosen for the readiness program, using the Frontier supercomputer for this project will help OLCF configure and develop Frontier, ensuring that the supercomputer will be able to perform large-scale science when it opens to users in 2022.

ARC computational scientist James McClure helped to develop a geometric model characterizing fluid flow in porous rock.

Leveraging HPC for graphics processing

ARC worked closely with the School of Visual Arts to support design students needing a faster and easier way to process their 3D animations. A portion of ARC's powerful computing resources were allocated to rendering the students' animations. ARC also hosted training workshops for creative technologies students to help guide them through the new rendering process.

Rendering for "Eggceptionally Unfortunate," an animation sequence created by a 2018 graduate of the College of Architecture and Urban Studies creative technologies program, was completed using ARC's supercomputing clusters.

Before this, students in the creative technologies program had relied on campus computer labs to render their work, but the processing time needed to handle the huge batch files was significant. Students had to stay with the computers during a process that could take hours, or even days, to ensure that the process would not be interrupted.

To support these students, the Institute for Creativity, Arts, and Technology (ICAT) reached out to ARC, which was able to offer high-performance computing services on ARC's clusters. Moving the files to ARC resources not only processed the files in a fraction of the time previously required but also made it possible for processing to take place remotely, which freed the students from the need to personally monitor lab computers during the rendering process. Students can now access the university's ARC cluster resources from any location.

Solving research problems with the on-premises cloud

How can Virginia Tech make it easier for the research community to interact with the university's on-premises cloud? Network Infrastructure & Services (NI&S) collaborated with ARC to address this question and developed a push-button solution to provision customizable computing resources to meet the university's diverse needs. They also delivered push-button provisioning for application systems that have researchers using their desired application in less than five minutes.

In addition, NI&S and ARC increased system accessibility by customizing and releasing Virginia Tech's Open OnDemand solution. This is an NSF funded collaboration between Ohio Supercomputer Center, Virginia Tech, and the University of Buffalo, which simplifies the process of submitting jobs to ARC's research computing clusters and provides web-based access to interact with research storage, job submission, and interactive applications. This reduces the barrier of entry to research computing and provides a platform for ARC to deliver additional interactive applications to meet the needs of Virginia Tech's research community.

Free data compliance consultations help researchers use technology ethically and effectively

The Collaborative Computing Solutions (CCS) team provided a free consultation service through the 4Help Service Catalog to all faculty and staff working with data usage agreements for restricted data or research data, to help them to make informed decisions as to which environment best matches their needs without creating unnecessary overhead. CCS consultants worked one-on-one with researchers to evaluate projects in terms of compliance and to discuss data and computing needs to help them confidently determine available programs and resources at Virginia Tech and next steps.

The environments primarily considered are Office 365, G Suite, ARC's High-Performance Computing Environment, CCS's Secure Research Environment (SRE) for Electronic Protected Health Information and for Controlled Unclassified Information, and CCS's Virtual Machine Environment.

This collaboration has multiple benefits for faculty and staff across the university, making it possible to:

- Foster collaboration between researchers, the Research Division at Virginia Tech, and the Division of IT;
- Help researchers understand programs available through different units of the Division of IT that are designed to support research at the university;
- Assist in validating data compliance agreements and documents required for grant initiation; and to
- Connect researchers with university partners.

Pillar 3:

Leveraging Information Technology to Distinguish the Virginia Tech Experience

"A Plan for a New Horizon" called for the university "to implement programs and policies that create the superior research, learning, and workplace environments essential to a vibrant academic institution." Pillar 3 recognizes the integral role the Division of IT plays in making the Virginia Tech experience unique and valuable.

Key strategic areas of this pillar are to establish a level of security that continuously protects university data and research, to collaborate with other university groups in utilizing IT infrastructure to enhance physical security and safety, and to leverage technology to advance teaching and learning. During FY 2019, the Division of IT accomplished much to support this pillar.

Improving campus security with a more robust camera network

In fiscal year 2019, Network Infrastructure & Services (NI&S) expanded the university's security camera service through the installation of around 100 new cameras, bringing our campus-wide total to more than 600. Cameras are used by university stakeholders including Virginia Tech Emergency Management (VTEM) and the Virginia Tech Police Department (VTPD).

The VTPD identified a need to allow for map-based selection of security camera video to help first responders view live video of specific locations. NI&S proposed and implemented a new software solution that uses Geographic Information System (GIS) map layers and security video data with campus data maps. Implementation has been completed for all exterior cameras and will be implemented for interior cameras on a multi-layered university map.

NI&S developed and installed software that allows for map-based selection of video footage from the 600+ security cameras throughout the Virginia Tech campus.

In addition, NI&S implemented a centrally managed update service which allows for remote updates to cameras across campus with the latest security patches. These efforts have greatly increased the efficiency of the service.

Improving emergency communications for a safer campus

VT Alerts allows the university to communicate with students, employees, and others when immediate action is required during an emergency. New annunciator modules allow VT Alerts to be broadcast through systems already in place, such as fire alarm speakers, ensuring people can receive alerts promptly in or near any building.

NI&S completed the second phase of the VT Alerts Annunciator initiative in 2019, enabling 23 more buildings on campus with annunciator modules, bringing the total to 36 buildings. To date, 3,641 speakers are enabled to receive VT Alerts notifications throughout the university.

Further improvements to server and application infrastructure during the past year have focused on

increasing the reliability of VT Alerts through the implementation of high availability systems. A new feature allows users to choose which buildings receive alerts, instead of sending the message to every building.

In FY 2020, VT Alerts Annunciator program is expected to nearly double in size, with 32 new buildings designated for annunciator installations.

Helping new Hokies get connected while accommodating their unique needs

NI&S installed new VT Alerts annunciators across the Blacksburg campus in FY 2019.

Alt text: Map of Virginia Tech with buildings color coded to depict installation of VT Alerts annunciators.

Information Technology Experience and Engagement (ITEE) student programs include a variety of outreach events each year for students, faculty, and staff to promote their services and accommodate their users' unique needs. One of their biggest tasks is coordinating 4Help's involvement with first-year, transfer, and international student orientation. The primary function during orientation is helping students prepare to log into services and set up their devices. Students stop by the 2-Factor Authentication check-in station to verify their set up and login, and they attend a comprehensive presentation covering WiFi, printers, software, and more.

4Help representatives help new Virginia Tech students get connected.

ITEE provides expanded in-person support during the beginning of the school year to accommodate students starting their first semester. ITEE also helps students that arrive in the summer get their devices ready for class, including Summer Academy students, International students, and the Corps of Cadets. At the Gobblerfest booth each fall, ITEE further promotes services through in-person contact and through giveaways imprinted with contact information.

Providing certified electronic diploma access to Virginia Tech alumni

In fall 2018, Enterprise Systems (ES) initiated a project for the University Registrar to enable Virginia Tech alumni to retrieve an official, portable, and verifiable electronic version of their diploma. The project was completed during the spring 2019 semester, and the service is now available through HokieSPA for all students who graduated after the fall of 2018.

State government licensing agencies, future employers, or any other entity that wishes to validate the achievement of a Virginia Tech graduate can do so via the certified electronic diploma. The document is digitally signed and encrypted so that it is trusted and readily accepted.

Streamlining admissions and enrollment processes

In 2018, ES helped Virginia Tech deploy Slate, a customer relationship management (CRM) tool implemented by Enrollment Management to manage applicants and enrollment decisions. Used by more than 1,000 colleges and universities, Slate is designed and developed exclusively for higher education.

Using Slate, Undergraduate Admissions can review and manage all interactions, communications, applications, test scores, relationships, and materials in one place.
Slate also integrates bidirectionally with the university's Enterprise Resource Planning (ERP) system, Ellucian Banner.

In May 2019, the Graduate School began a project to transition away from the Connect system to use Slate as the means for enabling prospective students to request information about Virginia Tech Graduate programs.

Pillar 4:

Advancing Information Technology for Enterprise Effectiveness

The university's long-range plan states that "as the university prepares to move into the next planning period, we will be challenged to continue to meet demands for increased productivity and efficiency without sacrificing quality." Pillar 4 addresses this aspect of the plan by challenging the Division of IT to leverage information technology as a means to achieve organizational and operational effectiveness.

In FY 2019, the Division of IT collaborated with groups across the university to streamline enterprise functions, reduce resource expenditure, improve user experience, and provide more effective tools for university stakeholders.

Modernizing data warehouse systems yields cost savings

In April 2019, Enterprise Systems (ES) completed a major effort to modernize the extract, transform, and load (ETL) process that creates the university's data warehouse. The effort included converting more than 900 IBM DataStage jobs to the open-source Talend technology. The result of this effort will save the university at least $60,000 in licensing costs as well as improve the reliability of the daily process that creates this data source, which is critical to the daily operations of Virginia Tech.

Enhancing the error detection mechanisms within the load process should improve data quality. The effort has reduced the daily load time from over nine hours to just under four hours, which is significant given today's limited maintenance windows. Re-architecting the infrastructure to run Talend in the container platform Docker puts the Division of IT in a position to support future data integrations and cloud-based deployments.

A new path for transparency and service delivery in software procurement
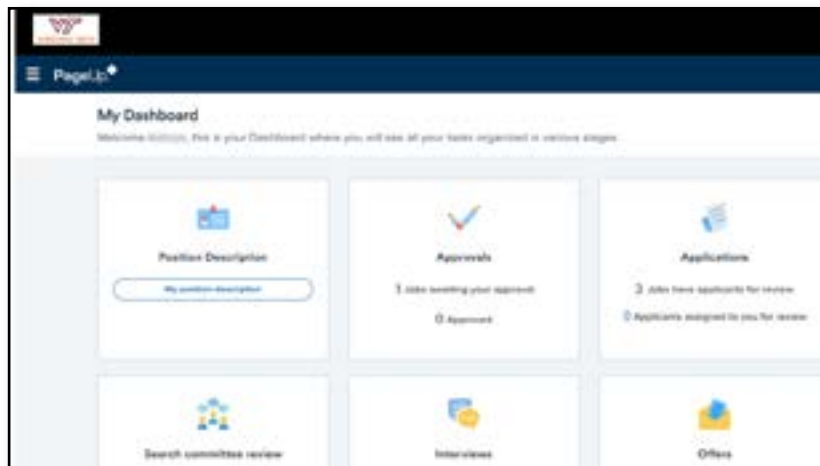
In the culmination of a project that began in 2017, IT Procurement and Licensing Solutions (ITPALS) launched a new intake portal for software procurement and software license agreement review. The new service, located within 4Help's Service Catalog, promotes transparency and efficiency for the end user while adhering to university requirements. The process seeks answers on how the requested software will be used; where it will be hosted; if protected data classifications are involved; and whether the license agreement requires a signature. Responses trigger automated workflows that route each request through the review process and can be expanded to add reviewers for accessibility, export control (ITAR), and Office of Sponsored Programs legal review as needed.

ITPALS shepherds the process with input from the end user, vendor, data stewards, and our legal counsel. Once requests are fully vetted, ITPALS assists with issuance of purchase orders and works with new data stewards to define requirements and establish access. ITPALS' role in the review process for new and existing software purchases and subscriptions has grown exponentially with the rise of cloud hosted solutions, and is critical to maintaining the university's strong posture on IT security.

In May of 2019, ITPALS also launched a new contract management system called Cobblestone. Cobblestone features a public portal for easy access to contract information, a keyword search that allows departments to search for existing software solutions, and the ability to prepare renewal notifications prior to contract expiration. Virginia Tech currently has over 800 software license agreements entered in Cobblestone. ITPALS' customer service and reporting capabilities have been greatly enhanced through the implementation of the 4Help Service Catalog and Cobblestone portals.

Streamlining hiring and new employee onboarding with PageUp

The Division of IT played integral roles in migrating Virginia Tech's job posting, hiring, and new employee onboarding system from PeopleAdmin to PageUp throughout FY 2019. This new system launches a new job application site and onboarding portal to bring new employees into their roles more quickly and efficiently. Human Resources (HR) and a group of cross-functional partners, including ES, delivered this solution to establish common, consistent recruiting and hiring processes for Virginia Tech.

PageUp provides a more comprehensive, efficient system for recruiting, hiring, and onboarding new Virginia Tech employees.

ITPALS was also a key player in the transition to PageUp, participating in HR committee meetings and vendor demonstrations to explore applicant tracking options for Virginia Tech. ITPALS negotiations with PageUp resulted in a contract that provided significant cost savings, additional program options, and a phased implementation timeline for Virginia Tech.

ES has provided technical project management for the implementation of PageUp and continues to work in partnership with HR for technical support and ongoing enhanced integration with Banner.

Flexible access for all our stakeholders

Secure Identity Systems (SIS) launched a project to create a new authentication architecture that would enable the use of external IDs (from Facebook, LinkedIn, Google, etc.). This would enable service providers to target services to users coming in with credentials they already have, instead of only being accessible to users with an active VT Username and passphrase or a Guest ID. Enabling these options would simplify access for many users and require less-frequent passphrase management.

The planned technologies open up the potential for more modern authentication protocols identical to those used on mobile phones, where users are asked to log in less frequently, and may enable increased use of cloud services that may only support the latest protocols.

During FY 2019, efforts centered around scoping the project, developing initial requirements and specifications, and evaluating possible vendors and partners.

Toward automated access management

Providing a sensible and consistent approach to enterprise identity and access management that is scalable, user friendly, and secure has been a long-held goal of the SIS group. During FY 2019, SIS made significant progress toward the achievement of these goals. Acting on recommendations made by the Role-Based Access Working Group, which was formed to evaluate stakeholder needs, SIS began a project to automate the provisioning of access for different tiers and to develop access management policies that would form the basis of a true enterprise identity governance strategy.

SIS explored challenges related to processing requests for access, provisioning, and deprovisioning of access. A review of current processes indicated where bottlenecks occurred and the wide range of different methods currently used to provide access. Some systems are very complex, requiring the aggregation of data from a functional area, Enterprise Directory, and Banner. The evaluation resulted in an initial inventory of access techniques and revealed areas where methods need to be updated.

The issues are complex and the project is ongoing, but when it is complete, the Division of IT will be better positioned to meet the needs of stakeholders in an ever-changing environment.

Banner 9 upgrade provides cleaner, more efficient user interface

Virginia Tech relies on Ellucian Banner, the Enterprise Resource Planning (ERP) solution used to manage many critical business processes at the university. In FY 2019, ES completed an upgrade that revitalized the Banner ERP, modernizing the technology to position Virginia Tech for the future. An improved user interface provides a responsive design that enables enhanced support for mobile devices.

Part of this multi-year project included an effort aimed at reducing customization within Banner by evaluating the modifications Virginia Tech had added to the previous platform and deprecating those that were no longer needed. In total, more than 130 modifications were eliminated, significantly reducing maintenance time as Ellucian makes changes going forward. The new architecture also includes the Ellucian Ethos platform, which will enable future data analytics and third-party product integrations.

Banner 9 provides Virginia Tech the opportunity to modernize our overall ERP environment, reaffirm university business processes within the ERP, and align our applications for best practice implementations in the future.

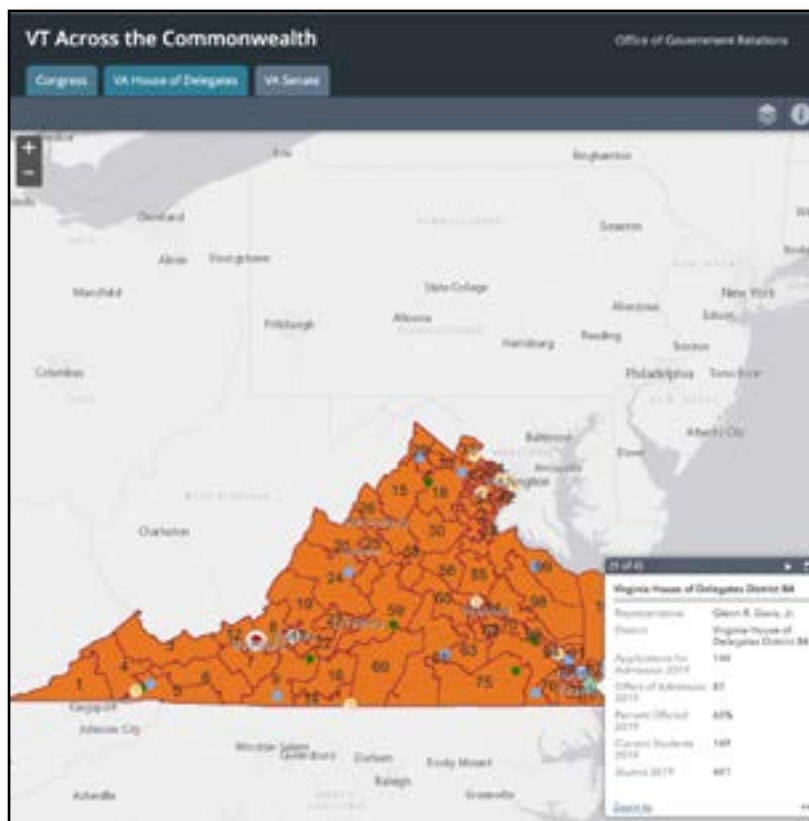## Leveraging technology for more effective fundraising

Generating philanthropic resources are critical to achieving Virginia Tech's strategic priorities. In preparation for the next capital campaign, ES collaborated with university stakeholders to improve online giving, enabling recurring payment functionality and online payment options through Paypal and Venmo, as well as enhancing integration between the online giving application and the university's fundraising and constituent relationship management (CRM) software, Blackbaud CRM. After the successful completion of this effort in June 2019, a subsequent project began focused on enhancing the online giving user experience.

Custom mapping application enhances Virginia Tech's government relations

In FY 2019, the Enterprise Systems GIS group created a web-based mapping application for the Virginia Tech Office of Government Relations, called Virginia Tech Across the Commonwealth, which allows the office to display metrics detailing Virginia Tech's impact across the state by legislative district.

Metrics can be generated to reflect congressional district, Virginia House of Delegates district, or Virginia Senate district, and configured to include counts of alumni and currently enrolled students, as well as applications and offers of admission.

Virginia Tech facilities, including the Agricultural Research and Extension Centers, are also displayed on the mapping application. Separate interfaces exist for use by the general public and for internal decision support.

Enterprise Systems GIS created a custom, interactive map that allows users to visualize Virginia Tech's impact across the commonwealth.

Ensuring the Security and Resilience of Information Technology Resources

Protecting our information technology infrastructure against disruptions from natural and human-made threats is critical to Virginia Tech's ability to operate and succeed. Data privacy has become an ever higher priority as we conduct more business on personal devices and as the number and sophistication of cyber attacks grow.

Pillar 5 focuses on IT's critical role in supporting the security and resilience of information technology resources, protecting physical and online spaces, and safeguarding data in the networked learning environment. FY 2019 saw a number of noteworthy improvements and initiatives in this ongoing and fundamental function of the division.

Improving IT security processes

When a Virginia Tech user's account is compromised, the Division of IT takes steps to shut off access to IT services, reset passwords, and secure the user's device(s) before re-enabling services. Previously, this process required the creation of a single ticket which was passed from group to group within the Division of IT, a stepwise process that was not documented and was sometimes variable in execution. Often, information on steps taken was not relayed to the affected user or 4Help, leaving them with significant uncertainty.

To address this, a cross-organizational team with representation from the IT Security Office (ITSO), Network Infrastructure and Services (NI&S), Collaborative Computing Solutions (CCS), Secure Identity Services (SIS), and IT Experience and Engagement (ITEE) reworked the process for handling compromised accounts. The new workflow provides a specific, consistent process for every compromised account, with activities being routed to the correct groups. This allows multiple steps to be carried out simultaneously and decreases the total time needed to complete the effort. The steps required to complete the process are also documented within each task, which helps teams focus on what needs to be done and can help new team members fulfill the work quickly.

The new process notifies the user as well as anyone they are working with in 4Help that their account or device is compromised, preventing wasted effort in troubleshooting issues that are likely explained by the compromise. Finally, the process enables detailed tracking of resolution times and identification of bottlenecks in the process.

Upgrades to routers, switches, and cabling enhance connectivity across campus

NI&S upgraded the data center network to replace aging routers and switches that provide connectivity for Virginia Tech. This upgrade allows the data center to support higher performance standards and allows for better network resiliency.

The 18-month process included selecting the appropriate technology as well as the procurement, initial deployment, testing, and migration of the new equipment. NI&S worked to make this a transparent, consistent, and efficient process by building in automation to help manage the network during service changes.

NI&S upgrades to technology infrastructure throughout campus improved connectivity and access to Virginia Tech's networks.

Highlights from the project include new 10G Ethernet access services, increased network resiliency, new overhead cabling, and upgraded virtual local area network (VLAN) connections, which are no longer limited to individual routers.

Keeping cyberattacks at bay

The new DNS firewall safeguards against potentially malicious websites, protecting Virginia Tech network users against theft or data loss.

In the ongoing effort to protect user data from potential compromise, the ITSO implemented a new Domain Name Service (DNS) firewall service in 2019. This service provides additional safeguards over internet traffic, helping protect users, computers, and data from viruses, malware installation, and other attacks that could lead to the theft or corruption of data.

The ITSO began stepwise implementation of the new firewall on March 7, 2019 and was ready to scope, customize, and test the new service by the end of March. By early April 2019, internet traffic and hosts at Virginia Tech's campuses, centers, and institutes were protected by the firewall. Users retain the ability to opt out and can use standard DNS resolvers from NI&S as an alternative.

Improving encryption of sensitive data in campus email systems

CCS improved the security of sensitive data being transferred via email or other methods and the overall protection of our identity and systems through two programs focused on email security.

Microsoft's Azure Information Protection (AIP) program allows users to label their emails and certain files as containing Personally Identifiable Information (PII) or Family Educational Rights and Privacy Act (FERPA) data. With these labels, the data and email are encrypted and prevented from being forwarded, thus lowering the risk of unwanted data exposure. In addition, Microsoft provides a user with the ability to encrypt any email, providing protection when the labels don't apply.

CCS also launched a university-wide anti-phishing and spam awareness campaign in collaboration with the ITSO and ITEE, which elevated the awareness and empowerment of the university community about email threats such as spear phishing, or targeted email scams designed to mimic messages from familiar parties. The campaign included knowledge base articles, campus notices, flyers, news articles, and additional resources to equip various audiences with knowledge and skills to better detect, protect against, and report suspected malicious emails and phishing attempts.

The Division of IT's anti-phishing campaign aimed to raise awareness of cyber-scams such as spear phishing.

Better passwords

When someone at Virginia Tech creates a new password, that password is checked against a massive list of passwords that have been compromised or are known to be weak. If the password is on that list, it will be disallowed, even if it meets the complexity requirements. This check is in compliance with National Institute of Science and Technology (NIST) guidelines. However, as this list grows (currently it includes more than half a billion entries and is increasing rapidly), it has become increasingly difficult to complete this vetting in a timely manner. It was clear that a different method of vetting passwords was needed.

To evolve the process, Virginia Tech implemented a 'bloom' filter to the password vetting process in January 2019. A bloom filter (named after the original developer, Burton H. Bloom) is a probabilistic filter, which makes it possible to search massive datasets extremely quickly by introducing a small chance of inconsequential error. It sounds counterintuitive; a bloom filter returns a definite 'no', or a maybe 'yes,' with a one in 1000 chance of a false positive. All the 'maybe yes' answers do not pass the test, resulting in a process that is vastly quicker than a full check of the list. To help developers around the world understand this abstract concept and determine how and when to apply it, IT security specialist Richard Tilley published a technical report through Georgia Tech's College of Computing. This work is intended to help software developers understand the complexity of lesser known data structures, such as bloom filters, and to determine how and when to use them to solve large, real world problems.

The implementation of the bloom filter has resulted in increased security for new passwords, by virtually ensuring that passwords on the compromised list are never permitted, while saving time, cost, and processing cycles.

Supporting departments experiencing a data breach

In order to reduce the prevalence of information security risks, the ITSO conducts periodic vulnerability assessments, scanning computers campus-wide for high-risk exposures. The ITSO may also scan potential vulnerabilities that are of particular interest to attackers.

In addition to these broad assessments, the ITSO also offers vulnerability scans to departments and individuals by request. These scans identify potential vulnerabilities and security problems with operating systems, application software, and network configurations. A vulnerability scan can target a specific area of concern (example: web server configuration) or be a broad audit of a complete system. After the scan has been completed, the ITSO prepares a summary report outlining any major security concerns and provides a complete copy of the reports. These scans assist system administrators in addressing potential security problems.

While this service has been available for some time, the availability of this process was not well known. In FY 2019, the ITSO added an option to request vulnerability scans through Virginia Tech's 4Help Service Catalog.

Continuing the network equipment life cycle

Started in 2015, the Infrastructure Technology Life Cycle Management Program is a coordinated effort between NI&S and the Office of Budget and Financial Planning to keep Virginia Tech's campus

network infrastructure up to date, with a focus on upgrading network hardware. Every year, NI&S aims to refresh approximately one-seventh of the existing campus network infrastructure. Wired upgrades were the focus for FY 2019—NI&S refreshed 4,056 ports across 37 buildings and upgraded core connectivity for the buildings from 2 Gigabits to 20 Gigabits per second. Users may notice higher data speeds, but overall the upgrade was seamless. These upgrades also allow for improved software maintenance on ethernet switches and new technical features.

NI&S upgraded wired infrastructure for 37 buildings in FY 2019, resulting in higher data speeds across much of campus.

Unifying identity service strategy

At the start of FY 2019, SIS welcomed a new executive director, and significant effort was placed into understanding and prioritizing the full portfolio of projects and services under the SIS umbrella. Several efforts were poised on the edge of major milestones or completion, while others were struggling to move from theory to implementation. At the same time, the Division of IT was embarking on the development of the next strategic plan, which led to the identification of new goals and the affirmation of continuing goals for innovation across the division.

The executive team in SIS reorganized their portfolio into a new strategic roadmap of services. The roadmap captures the strategic drivers, type of work or change, and projected impact of each project or initiative, and shares details of project status and when the initiative is being worked. The roadmap is available publicly on the SIS website and is updated quarterly.

Modern certificates for secure access to applications

An identity certificate is an electronic password that allows entities to exchange data securely over the internet. In recent years, Belgian certificate provider GlobalSign had a number of issues that raised questions about the security of their certificates, and their resolution of the issue created a number of other problems for sites using the faulty certificates.

To help safeguard university resources, SIS worked with IT Procurement and Licensing Solutions (ITPALS) to review the possibility of exiting our contract with GlobalSign. An analysis of alternatives resulted in a recommendation to explore a new contract with the InCommon Certificate Service. InCommon, supported by Internet2, provides unlimited certificates for U.S. institutions of higher education for an annual fee. The move to InCommon would include all types of certificates (SSL

[secure sockets layer], extended validation, personal certificates, and code signing certificates) across all domains (.edu, .net, .org, etc.). During FY 2019, SIS completed the move from GlobalSign to InCommon, swapping out the faulty certificates on more than 400 sites and platforms across the university, and reducing our costs for identity certificates by more than $30,000 per year, while extending new functionality.

Streamlined management of group access

Enterprise Directory groups (commonly referred to as ED groups) allow SIS to provision access to groups of users based on their roles within Virginia Tech. ED groups are managed through a tool called Group Manager, which is supported by a codebase developed and maintained by the Middleware group. To enable new functionality and reduce the time required to maintain the older version of the application, which lacked a modern interface and was increasingly out of sync with newer applications and university branding, a new Group Manager tool was developed.

The new Group Manager retains all of the essential functions of the legacy tool, and a rewrite using javascript modernized the application. Organization data was added with new additive groups that allow current employee data to simplify the creation of groups, and improves deprovisioning when an employee leaves or changes roles. Deprovisioning users is an important need and a major goal of role-based access control. Once the new Group Manager emerged from the beta phase, SIS worked with group owners and data stewards to move more groups into the new tool.

Pillar 6:

Improving Communications with Customers and Partners

Pillar 6 addresses the idea in "A Plan for a New Horizon" that Virginia Tech is a university where "students, faculty, and staff operate in a world of increasingly permeable boundaries," and calls for the Division of IT to "reduce and eliminate silos that inhibit teamwork and collaboration...and that impede partnerships and collaboration with others at Virginia Tech and beyond."

In the 2012-2018 strategic plan, the Division of IT affirmed its commitment to continually improve communication with stakeholders; to empower employees, customers, and partners with knowledge and skills to use technology resources with confidence; and to create an environment in which employees, students, and partners can comfortably voice their needs. In FY 2019, the division delivered on a number of initiatives towards these goals.

Inspiring teachers to build cybersecurity into public school curricula

The Virginia Cyber Range has made great strides in its goal to strengthen the cybersecurity education community throughout Virginia. They hosted the inaugural Virginia Cybersecurity Education Conference at James Madison University on August 14-15, 2018. Close to 200 educators and partners came together to raise the bar

Roxana Cromwell, Rock Ridge High School business teacher, at the 2018 Virginia Cybersecurity Education Conference.

for cybersecurity education in Virginia. The conference theme, "Innovative Teaching and Learning in Cybersecurity," inspired attendees to engage students at all grade levels in hands-on, meaningful educational activities related to cybersecurity.

Virginia Secretary of Education Atif Qarni delivers the keynote address. Image courtesy of JMU Creative Media.

The event featured a Jeopardy-style capture-the-flag competition designed to test participants' knowledge and skills on a range of computer security problems. Workshops and panels addressed topics including network defense, secure coding, diversity in cybersecurity, and cyber ethics. Virginia Secretary of Education Atif Qarni delivered the keynote address, emphasizing the need to integrate STEM and cybersecurity in K-12 education to better prepare students for future opportunities.

VASCAN recognizes Virginia Cyber Range's impact on cybersecurity education in Virginia

Irvin Hall, Hampton City Schools educator, and others, attend the keynote address. Image courtesy of JMU Creative Media.

The Virginia Cyber Range is a commonwealth initiative to enhance cybersecurity education in public high schools, colleges, and universities in Virginia. It provides an extensive courseware repository for educators along with a cloud-based environment for hands-on cybersecurity training for students.

Within two years of its creation in 2016, the Virginia Cyber Range has grown from serving two Virginia universities to more than 160 high schools, 16 community colleges, and 13 universities across the state—a more than 15-fold increase in usership.

Virginia Cyber Range director, David Raymond, earned recognition from the Virginia Alliance for Secure Computing and Networking (VASCAN) for leading the Virginia Cyber Range team during this period of exponential growth and for facilitating VASCAN in its mission to strengthen information technology security programs within the Commonwealth of Virginia.
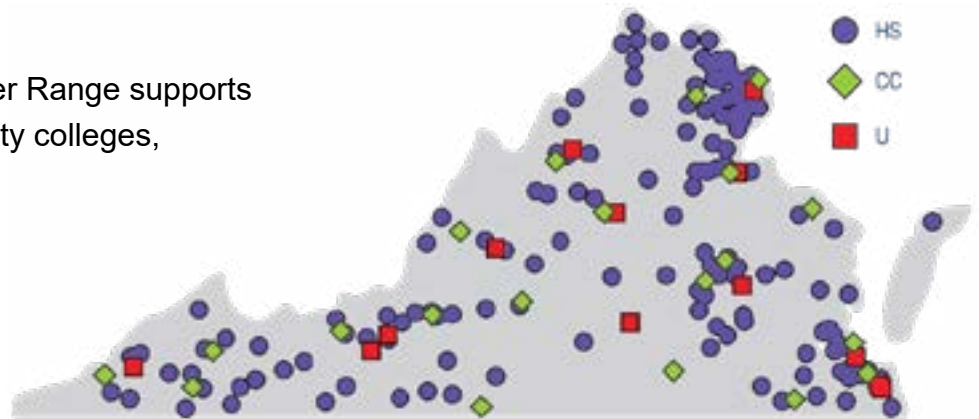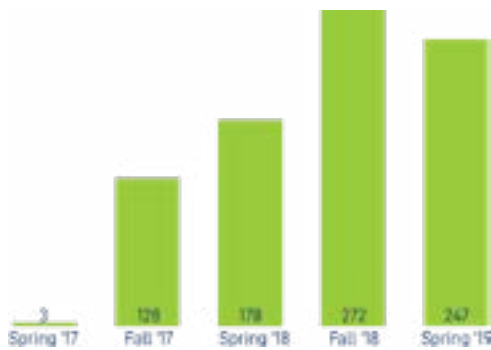
VA Cyber Range growth in services and reach

July 2018-June 2019

As of June 2019, Virginia Cyber Range supports
182 high schools, 20 community colleges,
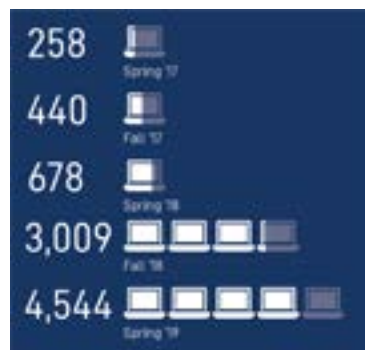and 13 universities in Virginia.

This map represents the high schools (purple dots), community colleges (green diamonds), and universities (red squares) that use the Virginia Cyber Range.
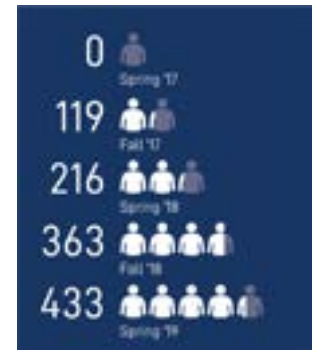
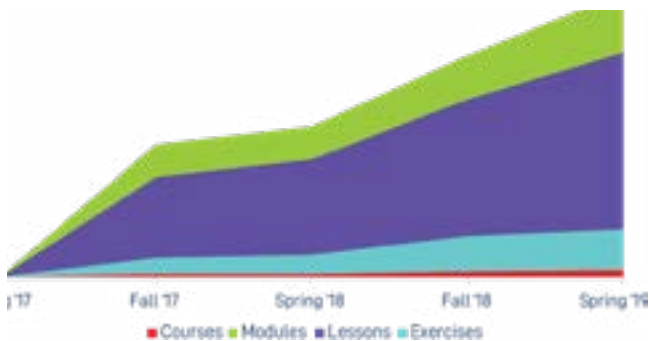**Number of virtual classrooms supported by the Virginia Cyber Range.**

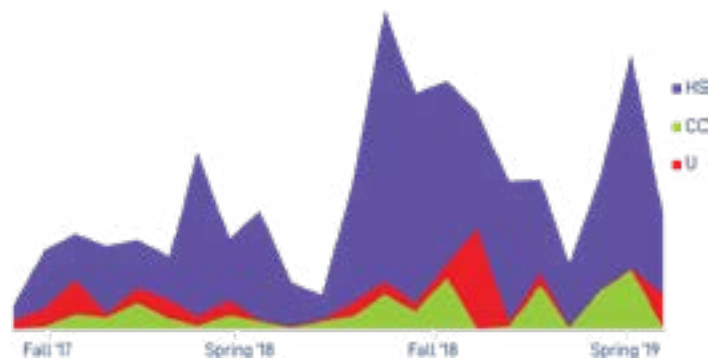20,000 virtual machines were provisioned in Fall 2018.

Exercise area users over time. The Virginia Cyber Range has experienced 15x user growth in 2 years.

Courseware repository accounts over time.

208 unique courseware materials including courses, modules, lessons, and exercises are available in the courseware repository.

Virginia high schools, community colleges, and universities have downloaded more than 8,800 total files from the courseware repository.

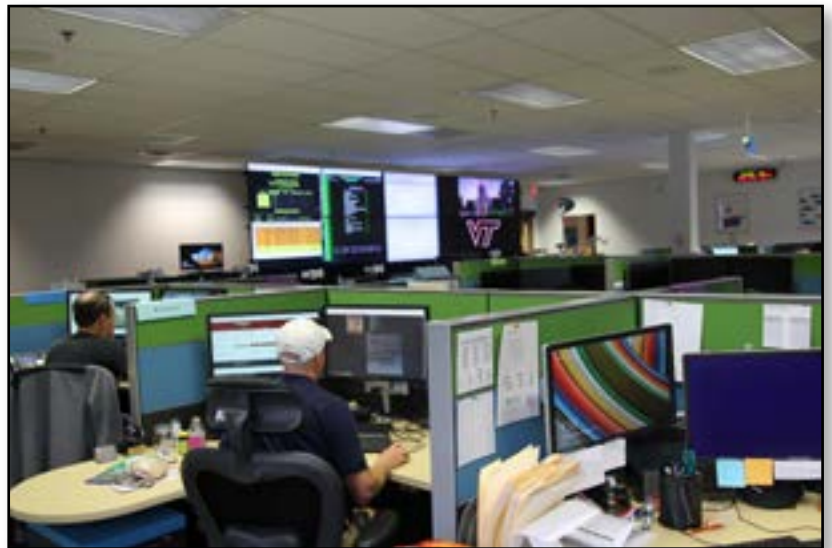## Microsoft Users Group helps Virginia Tech students, faculty, and staff use software more effectively

The Microsoft User Group (MUG), initiated and managed by Collaborative Computing Solutions (CCS), provides a collaborative platform to the Virginia Tech community to discuss and distribute information on how to use new product features, enable best practices, and avoid common pitfalls.

Open to anyone at Virginia Tech who would like to use Microsoft products more effectively, MUG offers presentations given by Virginia Tech employees and Microsoft representatives, as well as in-depth workshops and training opportunities. Topics covered in FY 2019 included Azure Lab Services and Shared Services, Microsoft Teams, Securing the VT Active Directory, and IT Security Office (ITSO) Recent Attack Trends and Threats.

Encouraging honest, actionable feedback with more user-friendly surveys

As part of efforts to ensure consistent quality of service, IT Experience & Engagement (ITEE) began conducting user experience surveys to better capture user sentiment. This additional metric enables ITEE to measure success intentionally and objectively, with the added benefit of identifying employee training needs. Ideally this metric will be measurable not only at the division level, but down through departments, teams, and all the way to the individual.

New user experience surveys are helping 4Help deliver excellent IT support to Virginia Tech.

By simplifying the survey from six to three questions, ITEE hopes more users will provide feedback to increase the overall response rate. This effort promotes the idea that user feedback is valued and points toward providing more informed decisions with regards to future priorities and training. These surveys are in alignment with the Division of IT's core values of Care and Striving for Excellence.

Building a shared platform for service delivery

All efforts made by the Division of IT converge at the point where a university client or user reaches out with a question or need related to one of our tools or services, and during FY 2019, ITEE fielded more than 30,000 calls and resolved over 65,000 incidents in support of our users. To provide support
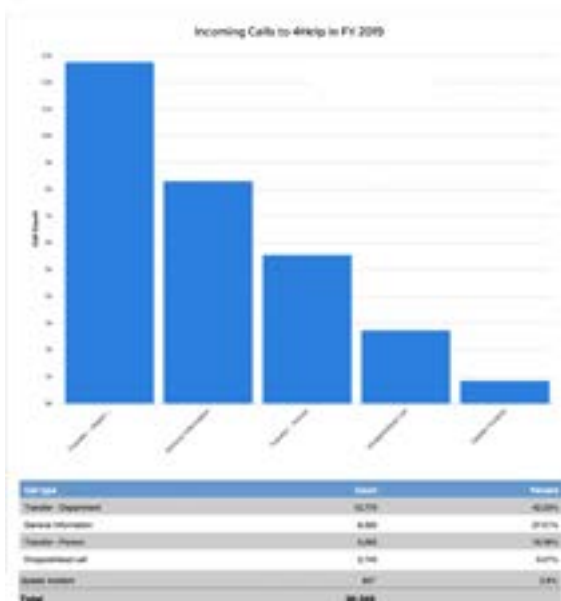
most effectively, ITEE is committed to developing an IT Service Management (ITSM) strategy for service delivery and IT support for a variety of platforms.

During FY 2019, ITEE supported onboarding into ServiceNow, our ITSM system, to semi-automate IT services in Industrial and Systems Engineering, Admissions, Engineering Technology, the U.S. Cyber Range, and the Payment Card services office by adding them to the 4Help Service Catalog.

Several groups within the division also added their services to the Service Catalog, including IT Communications, IT HR, ITEE Training, and the IT Facilities team. ITEE continues outreach to IT departments and service units across the university, working with them to map out ITSM strategies for their offerings and to consolidate their IT services under the ServiceNow platform.

Over 120 IT service offerings can be ordered through ServiceNow.

ITEE staff fielded over 30,000 calls made to 4Help through the ServiceNow platform in FY 2019.

While the vast majority of ServiceNow tasks are associated with 4Help incidents, the platform is used for service requests and delivery, project facilitation, and other IT functions.

Hosting world-class cybersecurity training through SANS

In March 2019, the ITSO participated in the SANS Partnership Series program, an international program designed to provide access to world-class cybersecurity training for professionals in organizations that have a clear impact on national security, but who may not have the means to conduct the same caliber of training in-house.

SANS Partnership Series classes are open to faculty and staff at any educational institution as well as to state and local government employees. The ITSO hosted the course "Security Information and Event Management (SIEM) with Tactical Analytics," which drew close to 65 attendees from institutions across the US, Canada, and Sweden. This was the 16th year that ITSO has hosted this event.

In addition, ITSO staff presented at various events throughout the fiscal year, including the IQPC (International Quality and Productivity Center) Chief Information Security Officer's Symposium, the VASCAN annual conference, the 2019 EDUCAUSE Security Professionals Conference, SANS Institute Blue Team Summit, Security West, Northern Virginia Bsides, South Carolina COLASEC, Fairfax County Government IT Security Day, and SW VA Bsides at UVa-Wise.

Pillar 7:

Strengthening the Information Technology Organization

Pillar 7 recognizes that the Division of IT must continually grow and adapt to meet the evolving nature of demands placed on our employees. The division's strategic plan for 2012-18 identified recruitment and professional development as two areas of focus in its efforts to strengthen the organization. In FY 2019, the Division of IT made strides in these areas, improving recruitment processes to attract and support a more diverse workforce, supporting current and future employees with updated workspaces and professional development opportunities, and defining core values that affirm the division's commitment to its employees and the university.

Crafting new division-wide strategic and operational plans

FY 2019 was a pivotal year for the Division of IT, marking the close of Virginia Tech's "A Plan for a New Horizon," and ushering in "The Virginia Tech Difference: Advancing Beyond Boundaries," a new long-range plan that follows the model of a continuous planning process.

Likewise, the Division of IT's 2012-18 strategic plan came to a close, and the division embarked upon an intensive process to lay out new strategic and operational plans with new objectives and goals, as well as an aspirational road map for the division with contributions from stakeholders across the university, as well as from our division's leadership team.

The [new 2018-2024 strategic plan](#) outlines how we will continue to serve the university in achieving its missions, realizing its vision, and meeting its goals. Information Technology is a critical enabler of higher education and permeates every aspect of the Virginia Tech experience, both on and off campus: the experience of our prospective students and their families, the learning and quality of life of our students, and the needs of research and teaching faculty, administrative personnel, alumni, and our communities. We will continue to uphold this vision in our work, seeking to make a positive difference for Virginia Tech.

Redefining our core values—and embracing them together

In FY 2019, the Division of IT defined and embraced ifive core values:

- Trust
- Inclusion
- Care
- Service
- Striving for excellence

These core values are the bedrock for the Division of IT Strategic Planning Framework and are at the heart of every action and interaction among Division of IT employees. They shape how employees work with each other and with the division's stakeholders and create a mutual understanding among employees for how we perform our work.

The spring 2019 all-hands retreat focused on the division's five core values.

In May of 2019, the Division of IT held an All Hands Retreat, giving division employees the opportunity to explore the core values together and discuss how they inform our work and actions as individuals, division units, and the Division of IT as a whole.

Improving diversity through innovative practices

Established in 2017, the IT Diversity Committee is responsible for implementing structures to promote sustainable transformation, increase Division of IT faculty, staff, and student diversity, and ensure a continually welcoming, affirming, safe, and accessible campus climate.

During FY 2019, the IT Diversity Committee had the opportunity to share the division's diversity and inclusion efforts with partners in higher education. Several committee members attended the 2019

EDUCAUSE meeting, handing out materials outlining new methods we implemented for increasing diversity through the recruiting process. Their presence encouraged and enabled discussion between Virginia Tech and representatives from other universities regarding inclusion and diversity and helped to strengthen our position as an inclusive university.

At both EDUCAUSE and the 2019 Women Advance IT conference, committee chair Joyce Landreth and Student Programs Manager Ryan Gorkhalee presented on recent changes in the recruitment and training of student workers. Their presentation, "Transforming the Student Experience: Work here! How Innovative Student Recruitment Techniques Increased Diversity," highlighted the changes made and their promising results, with the hope that other universities can adopt similar programs.

Cultivating the next generation of IT professionals through the Virginia Governor's School

For the past three years, the Information Technology Security Office (ITSO) has hosted high school student interns through the Virginia Governor's School Program, which provides academically gifted students with opportunities for hands-on learning and early career development experience outside the regular classroom.

Each six- to eight-week internship gives interns the opportunity to spend one afternoon a week with ITSO faculty and staff learning about our facilities and core functions of our unit, such as:

• Hard drive forensics	• Network traffic analysis with Security Onion, FireEye, Wireshark, and other tools
• Password cracking	
• Cyber Range lessons and CTF	• Penetration testing
• Python coding	• Malware analysis
• Machine hardening with CIS-CAT and other tools	• DNS Response Policy Zones
• Virtual machines	• Memory dump analysis (SIFT)

Participating in the Governor's School internship program is not only rewarding for the ITSO team, but has helped the ITSO, the Division of IT, and Virginia Tech build valuable relationships with local high school teachers, students, and families while helping to cultivate the next generation of cybersecurity professionals.

ITSO celebrates eight years as headquarters for the US Cyber Challenge Eastern Regional Camp

Since 2011, the ITSO has hosted the [US Cyber Challenge Eastern Regional Camp](#) on the Virginia Tech campus, with the 2019 camp taking place June 10-14. Designed to attract talented and skilled individuals and encourage them to pursue a career in cybersecurity, this week-long camp provides intensive, detailed courses on a variety of topics ranging from packet crafting, binary program analysis, web application hacking, and windows memory forensics.

Attendees and organizers of the US Cyber Challenge Eastern Regional Camp, on the Virginia Tech campus.
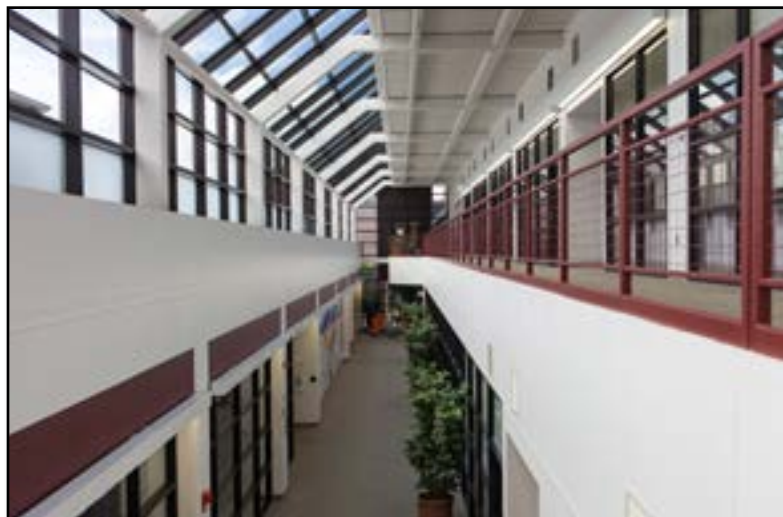
Camp participants, who must achieve top scores in a qualifying competition to receive an invitation, come to Virginia Tech representing a number of states east of the Mississippi and range in age from 18-50. Workshops are taught by instructors from the SANS Institute, the world's largest source for information security training and certification. The camp culminates with a Capture the Flag competition.

Hosting this camp has been a significant opportunity for the ITSO and the Division of IT to broaden cybersecurity training opportunities, as well as to showcase Virginia Tech and Blacksburg to some of the nation's most promising talent in the field.

Maximizing and modernizing our spaces

In the Andrews Information Systems Building (AISB), office space had been allocated on a 'space available' basis, resulting in a significant randomization of workspaces for the five units that share that building. To help 'defrag' the space, reunite teams, and permit a significant refurbishment and cleaning, a cross-unit group came together to plan a reallocation of space.

During FY 2019, cubicle and office reallocations sought to reunify teams as much as possible. In addition, several touchdown spaces were

A thorough and methodical refresh of AISB is making it a more pleasant and efficient place to work.

added for employees needing to work in the building on a transient basis. These improvements to our physical environment support the satisfaction and productivity of our employees in AISB, which in turn supports our strategic goal of improving organizational effectiveness. The effort will continue during FY 2020.

A modern, modular space for our mobile workforce

In FY 2017, the division added a new unit focused on improving the user experience: IT Experience & Engagement (ITEE). Office spaces allocated to the group were scattered across four buildings, and some spaces were dated and in poor condition. This added a layer of difficulty to the effort of bringing together the new unit. Plans for new positions and a dearth of reservable meeting space also made it clear that it was time to consider a small expansion of the Division of IT's footprint in Blacksburg.

The Division of IT's new space in UMall includes a Collaboration Studio, available to different teams for project collaboration, meetings, and creative endeavors.

After a search, contract negotiation, permitting, a limited construction phase, and complete remodeling, several of ITEE's employees were able to move into new offices located at 755 University City Boulevard, a second-floor suite of offices located in University Mall, near the University Gateway Center. The space included permanent offices for fifteen employees, modular hoteling space for up to 21 additional workers, a lactation room, break room, and six fully equipped reservable meeting spaces. ITEE faculty and staff were able to take occupancy in spring of 2019.

This report covers many of the Division of IT's most impactful efforts during the 2019 Fiscal Year. We're sure we missed some! We hope you have found this report useful in building your understanding of what we are about and how we strive to be of service to Virginia Tech.

If you have questions, or would like more information on the topics covered within this report, please contact IT Communications via email (it.communications@vt.edu). Thank you.

Office of the Vice President for
Information Technology MC 0169
800 Drillfield Drive / Suite 314
Blacksburg, Virginia 24061
vpit@vt.edu | (540) 231-4227