Division of Information Technology

Operational Plan for 2019 – 2021

IT Operational Plan for 2019 – 2021

Contents

Pillar I: Innovation in Teaching and Learning

With partners within and external to the university, we focus on the intersection of innovation, pedagogy, and technology to ensure that Virginia Tech can achieve its vision, mission, and goals for undergraduate and graduate education in Blacksburg, Roanoke, the Greater Washington, D.C. Metropolitan Area, and beyond.

Priorities:

A. Scale online undergraduate, graduate, and professional programs through instructional design, cohort-based training, assessment, and innovation and adoption of emerging technologies.

B. Develop data-informed learning and teaching tools and practices that integrate existing institutional data and new sources of learning data to help faculty, departments, and colleges understand and improve student learning outcomes.

C. Provide technology and support resources focused on lifelong learning and inquiry, consistent with our global land grant mission. **(No initiative for the 2019 – 2021 OP.)**

D. Facilitate mobile strategies for teaching and learning and substantially increase appropriate use of the cloud for experiential learning, content delivery, and collaboration.

Priority A: Scale Online Programs

Scale online undergraduate, graduate, and professional programs through instructional design, cohort-based training, assessment, and innovation and adoption of emerging technologies.

Initiative description

- Establish meaningful connections with campus partners to better align support efforts with academic program priorities
  - Form an advisory group.
  - Establish academic liaison program.
- Collaborate on appropriate standards for physical and digital learning environments
  - establish video standards (technical and procedural) for instructional use
  - apply standards to connected classroom environments

Outcome and benefit/impact of the initiative

Outcome

- Improved alignment of support activity with academic priorities.
- More consistent teaching and learning experiences within learning environments.

Benefit/impact

- Increased trust in Information Technology as key partners.

- Improved quality of user experience by instructors and students.

Key milestones

- Establishment of advisory group
- Establishment of liaison program
- Published video standards
- Connected Classroom improvements

Key measures or metrics (for outcomes, benefits, and/or impact of initiative)

Count, costs and utilization measures

- Participation in advisory group
- Meetings with liaisons
- Number of classrooms adhering to standard

Process gaps impacting achievement of this priority that will be closed or reduced

- Cultural history that makes academic/IT collaboration difficult
- Lack of existing model for liaison network
- Lack of centralized authority/accountability for consistency in learning environments

Technology gaps impacting achievement of this priority that will be closed or reduced

- Lack of a client relationship management tool
- Inconsistency of technology provided in learning environments.

Priority B: Develop Data-Informed Learning and Teaching Tools and Practices

Develop data-informed learning and teaching tools and practices that integrate existing institutional data and new sources of learning data to help faculty, departments, and colleges understand and improve student learning outcomes.

Initiative Description

Establish appropriate partnerships with academic units to improve our capacity for, and our focus on, the strategy for data-informed learning and teaching.

Outcome and benefit/impact of the initiative

Outcome

- Formal relationships established with each college in the university.
- A collaborative set of deliverables identified and improved over time.

Benefit/impact

- Services provided by TLOS (course design, faculty professional development, media creation, teaching support, assistive technologies, emerging technologies exploration, grants, etc.) will be provided in ways that benefit academic priorities and initiatives.
- Services will be utilized by more individual faculty, but also be applied in support of more strategic purposes.

Key milestones

- Working with the Provost's office, the initiative will be introduced to Academic Affairs Council this spring. Assuming approval, planning work will then occur over summer and partnership work will begin in Fall, 2019.
- A documented plan for prioritization of services will be in place for all colleges by the beginning of Spring, 2020.
- An impact report describing work done via this arrangement will be provided to each college on a quarterly basis beginning at the end of Spring, 2020. (A summary report will be provided to the Provost and to the VPIT)

Key measures or metrics (for outcomes, benefits, and/or impact of initiative)

- Participation by all colleges (demonstrated by a collaboratively defined agreement).
- Annual interviews/surveys/feedback from key partners (associate deans/deans) and from participants (faculty/staff)

Process gaps impacting achievement of this priority that will be closed or reduced

- Role of college liaison (TLOS side) must be defined and staffed.

- Role of college partners (associate deans) must be defined and identified.
- Coordination process (frequency of contact, topics, decisions, etc.) must be collaboratively defined, documented, and improved over time.

Technology gaps impacting achievement of this priority that will be closed or reduced

A formal system of documenting roles, responsibilities, processes and agreed-upon outcomes must be established and used consistently.

Priority D: Facilitate Mobile Strategies for Teaching and Learning

Facilitate mobile strategies for teaching and learning and substantially increase appropriate use of the cloud for experiential learning, content delivery, and collaboration.

Initiative description

- Identify and improve opportunities for mobile/cloud strategies dealing with computer labs.
  - Analyze current classroom computer lab strategies (including printing)
  - Using data from analysis and guidelines from best practices, migrate appropriate activities into a more flexible mobile/cloud-based environment
- Working with academic partners, facilitate targeted course development support that uses mobile/cloud practices to increase flexibility and personalization of learning.
- Create professional development opportunities for faculty that provide exposure to and socialization of mobile/cloud technologies for instruction.

Outcome and benefit/impact of the initiative

Outcome

- Documented understanding of current practices in providing computer labs.
- Transition some computer labs to mobile/cloud environments.
- Completed course redesigns that incorporate mobile/cloud strategies.
- Improved understanding of cloud/mobile strategies by faculty

Benefit/impact

- Improved user experience for faculty and students in computer labs.
- Increased flexibility in course delivery through the use of mobile/cloud strategies.
- Faculty are better prepared to incorporate emerging technologies with less disruption.

Key milestones

- Completed computer lab assessment and recommendations.
- Completed transitions from traditional computer labs to mobile/cloud labs.
- Mobile/cloud course redesign RFP announced

Key measures or metrics (for outcomes, benefits, and/or impact of initiative)

- Number of instructional computer labs updated using mobile/cloud strategies
- Number of courses redesigned to incorporate mobile/cloud strategies
- Number of faculty participating in events promoting mobile/cloud strategies

Process gaps impacting achievement of this priority that will be closed or reduced

- Procurement, user management, and fiscal processes required to deliver mobile/cloud technologies to faculty and students.
- Process for service analysis and improvement.
- Meaningful mobile/cloud frameworks to guide course redesign activity.
- Process for targeted (mobile/cloud) professional development curriculum design and delivery.

Technology gaps impacting achievement of this priority that will be closed or reduced

- Mobile/cloud platforms for production services (including mechanisms for user management and billing that are appropriate for instructional activity).

Pillar II: Advancing Research and Discovery

We strive to advance scholarship and increase competitiveness in innovation and research at Virginia Tech by providing access to advanced cyberinfrastructure for a broad set of Virginia Tech researchers.

Priorities:

A. Establish a sustainable business model for shared advanced cyberinfrastructure that leverages a cost-center model, central and unit-level investment, and a coordinated approach to high-performance computing across the university.

B. Facilitate appropriate cloud-based and on-premises compliance-based—and collaborative data sharing and computing environments that are scalable, adaptive, and agile.

C. Advance the ability of Virginia Tech researchers to easily leverage scalable and secure public and on-premises cloud resources for computing, storage, and collaboration. **(No initiative for the 2019 – 2021 OP.)**

Priority A: Establish a Sustainable Business Model for Advanced Cyberinfrastructure

Establish a sustainable business model for shared advanced cyberinfrastructure that leverages a cost-center model, central and unit-level investment, and a coordinated approach to high-performance computing across the university.

Initiative Description

Develop a business model that provides

- the research computing services required to maintain research competitiveness
- transparent mechanisms to identify the full costs associated with each particular research computing service
- clear metrics that demonstrate the return on investment associated with each particular research computing service
- appropriate comparisons between available technology to guide both researcher adoption and strategic investments

Outcome and benefit/impact of the initiative

Outcome

A sustainable business model that establishes a clear association between funding allocated to the Division of IT, specific research computing services delivered to researchers, and associated research and education outcomes.

Benefit/impact

- Provide VT departments and researchers access to tools and services needed to advance their research programs and provide them with a competitive edge in obtaining external funding, and attracting, recruiting and retaining top faculty and students.
- Provide VT administration with clear metrics to guide strategic investment.

Key milestones

1. Gather Information
    - Identify current inventory of products, services and resources (ARC, CCS, NI&S)
    - Identify inventory of products and services provided by peer institutions and the associated business models
    - Identify consumers of each service (current and projected), their assessment of our services and the costs to deliver
    - Identify services to be provided
    - Identify costs associated with each service

2. Develop initial model and recommendation
    - Develop model
    - Simulate its operation
    - Develop recommendation for next steps

Key measures or metrics for outcomes, benefits, and/or impact of the initiative

- A business model in operation
- Analytics and operational reporting of the model available to provide insight and improvements

Process gaps impacting achievement of this priority that will be closed or reduced

- Current funding model makes infrastructure planning difficult. Funding model may need high/low years to allow for large system purchases.
- Lack of clear association between particular DoIT personnel and support for particular services.
- Lack of dedicated and embedded (in ARC) HPC system administrators vested in the success of this Pillar
- Insufficient staff to handle additional workload associated with detailed cost accounting
- Mechanisms for supporting existing production services need to be distinct from mechanisms to explore, develop and deploy new services
- Overlapping services increase the cost and fragment effort and investment

Technology gaps impacting achievement of this priority that will be closed or reduced

- Ability to keep pace with rapid changes in technology
- Difficult to project costs for new technologies where historical data is unavailable
- Institutional cloud aspirations may not be in line with future cloud provider business models.

Priority B: Facilitate Collaborative Data Sharing and Computing Environments

Facilitate appropriate cloud-based and on-premises compliance-based and collaborative data sharing and computing environments that are scalable, adaptive, and agile.

Initiative description

Progress with the Identification of and technology support for Research use cases associated with each major cloud service provider and the associated cost model for both compute and data.

- Provide faculty with a clear view of available research computing services that includes both local infrastructure and external cloud service providers
  - data storage costs and data accessibility
  - costs associated with data movement and accessibility
  - data security and compliance restrictions
  - compute costs and technologies available from each resource
- Establish a support model for maintaining configuration of cloud instances by identifying and communicating the level of support that is provided by relevant entities:
  - services that are provided by cloud service providers and associated costs
  - services that can supported centrally from the Division of IT
  - services that can be supported in a decentralized manner by relying on Departmental IT staff
  - aspects of support that are the responsibility of the user
- Facilitate data movement between resource types
  - understand costs associated with data movement between resources
  - local networking requirements and performance
  - provide locally supported resources to facilitate data migrations between resources
- Provide training to the Virginia Tech research computing *community* through specialized seminars, organized workshops and in-person consultations.

Outcome and benefit/impact of the initiative

Outcome

- Improve the visibility of research computing services available to Virginia Tech researchers
- Ensure that VT researchers are able to access to a wide range of research computing technologies, such as
  - On-premise cloud (OPC)
  - public cloud (AWS, Azure, etc)
  - storage and archival appropriate for sharing and compliance use cases
- Facilitate interoperability for use cases where multiple resource types are used

- Establish clear expectations with respect to the level of support that is provided for research computing services
- Protect long-term strategic interests of VT with respect to locally generated data and associated costs

Benefit/impact

- Facilitate research applications that leverage new technologies and early adoption of potentially transformative technologies
- Promote best practices that foster security and regulatory compliance
- Enhance research productivity by facilitating access to critical technologies
- Effectively manage costs associated with research data
- Ensure that Virginia Tech faculty and students are prepared to leverage investments made toward infrastructure and services
- Supplement educational curriculum with valuable skills-oriented training

Key milestones

1. Summarize available research computing services from a single website
2. Identify research use cases associated with each major cloud service provider and understand associated costs (for both compute and data)
3. support containerization to improve application portability
4. support data movement software tools to facilitate application portability
5. Identify VT owned data sources with significant strategic value

Key measures or metrics for outcomes, benefits, and/or impact of initiative

- Participation by ARC/CCS/ITSO in the privacy and research data protection program (PRDP) committee
- Estimate the number of users and volume of research data associated with commercial cloud providers

Process gaps impacting achievement of this priority that will be closed or reduced

- Employee turnover and under-staffing hinder the support of existing services and the deployment of new services
- Portal development to serve Virginia Tech High Performance Computing researchers and provide a user friendly access to on premise and available public resources, such as
    - AWS: https://vt4help.service-now.com/sp?id=sc_cat_item&sys_id=7c580964dbdf7a40515ff209af961951
    - Azure: https://vt4help.service-now.com/sp?id=sc_cat_item&sys_id=6ac79651db554f04515ff209af96197a

  - Cloud consultation: https://vt4help.service-now.com/sp?id=sc_cat_item&sys_id=9cbc51b00f0d7600b97f0bcce1050e1c
  - Research Data Compliance and IT Consultations
  - https://vt4help.service-now.com/sp?id=sc_cat_item&sys_id=343a9502dbf30f001e072fe51b96195b
  - Advanced Research Computing (links to allocation interface / website)
- Address cost barrier associated with performing exploratory research in the cloud
- Establish clear mechanisms to fund cloud services from proposals and start-up packages
- Protect long-term strategic interest of VT with respect to locally generated data and associated costs

Technology gaps impacting achievement of this priority that will be closed or reduced

- Mechanisms to facilitate data movement and workload migration will be introduced
- Costs associated with research computing services will be made more transparent across all levels of the university
- Accessible training activities will help faculty to maximize research productivity.

Pillar III: Leveraging Technology for Outreach

We work with partners to leverage technology and apply our knowledge and expertise for outreach beyond the university in support of technology-related economic development and educational efforts in the Commonwealth of Virginia communities and in the wider region.

Priorities:

A. Enhance and expand the Virginia Cyber Range to increase scale, expand access, and extend functionality in service to K-12, community college, and university educators, advancing cybersecurity education for the Commonwealth and the Nation.

B. In partnership with local governments and other external partners, identify and advance one or more "smart city" or similar test beds or pilot projects to advance research and applications.

C. Explore and pursue opportunities to expand community and regional broadband infrastructure to support university initiatives in the greater Washington DC metropolitan area, Roanoke, New River Valley, and statewide to promote research, education, and economic development. **(No initiative for the 2019 – 2021 OP.)**

D. Formalize the Division of IT K-12 STEM outreach initiative into a cohesive, focused program that effectively engages regional K-12 students and enhances engagement by division employees.

Priority A: Serve K-12 via Virginia Cyber Range

Enhance and expand the Virginia Cyber Range to increase scale, expand access, and extend functionality in service to K-12, community college, and university educators, advancing cybersecurity education for the Commonwealth and the Nation.

Initiative Description

- Expand cyber range reach within public high schools and colleges in Virginia and create a new Virginia Tech service center called the US Cyber Range patterned on the successful Virginia Cyber Range.
    - Work with the Virginia Department of Education, Virginia school districts, and higher education institutions to increase awareness of resources provided by the Virginia Cyber Range.
    - Conduct a US Cyber Range "proof of concept" pilot with National Integrated Cyber Education Research Center (NICERC) located in Bossier City, LA. (NOTE: NICERC is funded by the Department of Homeland Security to provide K-12 educators nationwide with STEM and Cyber curriculum and resources, professional development, and collaboration opportunities.)
    - Establish US Cyber Range as a service center with the ability to provide resources and services to public and non-public clients.
    - Market US Cyber Range products and services to non-public clients in Virginia and all prospective customers outside Virginia.

- Reinvest proceeds to expand and improve courseware and exercise area offerings for users of the Virginia Cyber Range and the US Cyber Range.

Outcome and benefit/impact of the initiative

Outcome

- Increase scale, expand access, and extend functionality
- Advance cybersecurity education for the Commonwealth and the Nation

Benefit/impact

- Provide the necessary revenue to hire the talent to continually enhance and expand the capabilities of the Virginia Cyber Range (and the US Cyber Range).
- Extend Cyber Range benefits to schools (and potentially small businesses) throughout the nation to provide virtual environments for immersive hands-on cybersecurity education and training with the ultimate goal of growing a much-needed cybersecurity workforce in Virginia and throughout the US.

Key milestones

- Establish US Cyber Range as its own entity.
- Hire necessary technical talent to enhance and expand the Virginia/US Cyber Range cloud-based infrastructure.
- Conduct initial limited launch of the US Cyber Range.

Key measures or metrics for outcomes, benefits, and/or impact of initiative

- Increase in number of schools using the Virginia Cyber Range
- Increase in the number of entities using the US Cyber Range
- Increase in the number of enhancements in the Virginia/US Cyber Range
- Increase in number of cyber certifications earned by high school students taking the VA DOE CTE courses
- Decrease in number of cyber workforce gaps in the Commonwealth/nation

Process gaps impacting achievement of this priority that will be closed or reduced

- Ability to establish US Cyber Range separate from Virginia Cyber Range
- Unforeseen obstacles in collecting revenue outside of Virginia state fiscal processes
- Ability to hire required personnel (technical and non-technical); non-technical will be needed to manage “new” US Cyber Range business

Technology gaps impacting achievement of this priority that will be closed or reduced

- Limitations of AWS cloud infrastructure

Priority B: Foster Advancement of "Smart Cities"

In partnership with local governments and other external partners, identify and advance one or more “smart city” or similar test beds or pilot projects to advance research and applications.

Initiative Description

- Progress to lay groundwork for development of an Innovation Zone in concert with the development of Virginia Tech’s Innovation Campus planned for Alexandria VA.
    - Build on cross-disciplinary and regional relationships established though development of a Platform for Advanced Wireless Research (PAWR) proposal to develop a shared vision for an Innovation Zone project in the vicinity of the Innovation Campus.
    - Participate with university and community planning and construction processes to ensure requisite infrastructure and pathways are available to support the project.
    - Identify requirements for licensing and permitting necessary for deployments and experimentation.
    - Identify sources of funding and prospective industry and governmental partners.
    - Identify other municipalities and regions where opportunities for smart city partnerships may be developed.

Outcome and benefit/impact of the initiative

Outcome

- Create opportunities for Virginia Tech and partner communities to become a global locus for innovation in wireless technology and smart systems.

Benefit/impact

- Drive regional economic opportunities.
- Promote opportunities for related funded research at Virginia Tech and other regional institutions.
- Provide opportunities for student participation and research.
- Contribute to technological and societal advancement.

Key milestones

Timing will be dependent on the development of the Innovation Campus but we can lay the groundwork and work on partnerships on an ongoing basis.

- Articulate and achieve shared vision and buy-in from Virginia Tech Innovation Campus leadership and community partners.
- Secure necessary underlying infrastructure including cable pathways, fiber, antenna locations with power and laterals, etc. (pursue this regardless of other milestones; we will eventually need this and it should be done during construction).
- Secure initial funding resources.

- Build initial testbed with partners.

Key measures or metrics for outcomes, benefits, and/or impact of initiative

- Users of the testbed who may be industry, government laboratories, other universities. This can be taken to infer local economic activity stimulated as well as intangibles like reputation.
- Enabled funded research activities.
- Number of student research projects and/or student participants

Process gaps impacting achievement of this priority that will be closed or reduced

- Agreements with partners, particularly Arlington and Alexandria, for use of supporting infrastructure including fiber, power, poles, building attachments, etc. and processes including construction, permitting, etc.
- Communication with prospective partners including local economic and community development interests, local government, commercial partners, local citizenry, federal partners, and sources of funding.
- Intra-universities relationships and agreements among participating departments/centers/institutions, DoIT, the Greater Washington, D.C. Metropolitan Area leadership/operations for development, support, and sustainment.
- Business model and processes to enable development and sustainment. Cost recovery flows.
- Marketing to promote awareness of test and demonstration capabilities and to secure participation.
- Permitting for experimental licenses if needed.
- Shared methods for data governance, security and privacy.

Technology gaps impacting achievement of this priority that will be closed or reduced

- Concept is inherently forward reaching and will require broad, novel system design and invention for hardware, software, management, monitoring and control. PAWR demonstrated expertise and capacity to tackle challenges with a cross-disciplinary approach.
- Network connectivity including area connectivity requiring local construction and wide area connectivity linking the Zone to the MREX in Ashburn to reach MARIA (Including VT campuses), Internet2, commodity internet, cloud and content services. WAN connectivity can be addressed together with Innovation Campus connectivity.
- Power and any environmental.

Priority D: Formalize Division of IT's K-12 STEM Outreach Program

Formalize the Division of IT K-12 STEM outreach initiative into a cohesive, focused program that effectively engages regional K-12 students and enhances engagement by division employees.

Initiative Description

Establish a division-wide strategy for a program of supported *Ut Prosim* STEM outreach to students in grades K-12. Goals include:

- **For K12 Students**: Offering or joining partners in regular K12 STEM events to boost regional interest in and expose more students, especially at-risk students, to STEM careers
- **For DoIT Employees**: Increase employee engagement of DoIT F/S by providing opportunities to participate in service and Ut Prosim oriented STEM events

Outcome and benefit/impact of the initiative(s)

Outcome: the result of the change derived from completing the action, from using the outputs of the initiative(s).

Provide opportunities

- for regional K-12 students to participate in Division of IT sponsored[1] STEM related activities
- for Division of IT employees to demonstrate *Ut Prosim* (that I may serve) by giving time for sponsored K-12 STEM related activities
- for Division of IT senior leadership to promote greater engagement and cooperation among their employees by supporting employee *Ut Prosim* time within defined parameters

Note that Sponsored mainly means DoIT approved. Most *Ut Prosim* STEM opportunities only need oversight and approved *Ut Prosim* time, with little to no monetary funding for most events.

Benefit/impact: improvement or value created by the outcome(s)

- Creates a pipeline of future employees and future students by increasing visibility and appeal, and by promoting our brand
- For K12 Students:
  - Boost exposure to and interest in STEM subjects and careers for children in our region*
  - Forge regional relationships with existing schools and corporations through STEM events
- For the Division of Information Technology and Virginia Tech:
  - Provide faculty/staff a predictive STEM outreach calendar of opportunities
  - Increase faculty/staff opportunities to demonstrate Ut Prosim through time spent in more regular STEM events*
  - Expand faculty/staff competencies in leadership, communication, and teaching
  - Build faculty/staff 'soft' skills in addition to technical skills, such as public speaking, audience assessment

*outcome

- Increase DoIT employee *Ut Prosim* STEM participation by providing flexible work options for exempt employees and overtime compensation for non-exempt employees that work more than the standard 40 hour work week
- Reinforce relationships with the surrounding STEM community as a provider of quality STEM outreach and education in our region
- Provide opportunities to interact with other DoIT and campus employees outside their normal work teams

Key milestones (2 to 4)

- KidsTech University
- Annual Diversity Event
- VT DoIT/PEERS STEM Career Day
- VT Science Festival

Key measures or metrics for outcomes, benefits, and/or impact of initiative(s) (1 to 4)

- **Kids:** Number of K-12 children per year exposed to DoIT STEM events
- **Partners:** Annual number of regional and state STEM partner engagements (e.g. KTU, CEED, MCPS, RBTC, etc)
- **Events:** Number of DoIT STEM opportunities per year
- ***Ut Prosim* time:** Number of DoIT employees involved in STEM activities per year

Process gaps impacting achievement of this priority that will be closed or reduced

- Technical & Non-Technical Helpers: To fully engage with these efforts, we need to expand and nurture a cadre of Leaders and Helpers willing (and unafraid) to dedicate defined amounts of time per semester to help make these STEM events a reality.
- DoIT senior leadership support and help in promoting *Ut Prosim* STEM events to employees
- Owner/Contact or Lead awareness of University Accommodations of Persons with Disabilities (policy 4075)

Technology gaps impacting achievement of this priority that will be closed or reduced

Pillar IV: Enhancing Organizational Excellence

We strive to promote and enhance organizational excellence across the university through services and technologies that advance data-informed decision-making, enterprise effectiveness, and innovation.

Priorities:

A. Advance the university's use and aspirations for data-informed decision-making by providing aggregation of data through data lake models, tools and services for analytics and visualization, enhanced data governance, and role-based access while ensuring appropriate privacy, security, and compliance.

B. Foster new and enhance existing partnerships across the university to provide effective solutions that best serve Virginia Tech's students, faculty, staff and other stakeholders and to ensure that enterprise services, projects, and plans are agile, responsive, and promote organizational excellence.

C. Work with the Division of Research and Innovation to evolve the university's research administration systems, including Summit, through a common roadmap and collaborative deployment that reduces barriers for researchers and administrators and scales with the university's growing research enterprise.We strive to promote and enhance organizational excellence across the university through services and technologies that advance data-informed decision-making, enterprise effectiveness, and organizational innovation.

D. Partner with others at the university and beyond to explore innovative "smart campus" capabilities for sustainability, safety, and efficiency, and institutionalize and scale capabilities that provide significant value. **(No initiative for the 2019 – 2021 OP.)**

E. Align enterprise applications to meet evolving constituent expectations for mobile-enabled solutions and promote innovation in user experience.

F. Enable timely, accurate, streamlined access to data and IT Resources to all members of the university community.

G. Expand the use of Robotic Processing Automation (RPA) tools and technologies.

Priority A: Advance Data-Informed Decision Making

Advance the university's use and aspirations for data-informed decision-making by providing aggregation of data through data lake models, tools and services for analytics and visualization, enhanced data governance, and role-based access while ensuring appropriate privacy, security, and compliance

Initiative Description

- Progress with production implementation of a data lake service for the university
  - Transition data lake pilot to a service
  - Identify and connect data lake sources to the data lake

- Refine and develop governance for data lake usage
- Develop and operationalize the architecture for data services for analytics and reporting

- Launch the RBAC program (3 related projects). See priority F.
  - Develop the charter for the RBAC program
  - Kickoff the RBAC program
- Promote effective usage of data visualization and data reporting tools
  - Initiate an IT consulting service for data lake, analytics tools, and reporting needs
  - Evaluate Ellucian Analytics to improve operational reporting and analysis for administrative processes
  - Revitalize VT data warehouse and operational reporting
- Data Classification and Protection
  - Provide access to new services and training to help users manage the use of data
  - Initiate data management processes

Outcome and benefit/impact of the initiative

Outcome

- Improve ability to identify official versus ad hoc data definitions
- Decrease risk of privacy, security, and compliance issues with data usage and access
- Increase standardization of data requests, data integrations, and authorization

Benefit/impact

- Assist constituents in locating, understanding, and trusting university data
- Increase trust and understanding for operational and analytics data usage by establishing data lineage and taxonomy
- Expand clarity and visibility of data usage and authorization for data trustees and stewards

Key milestones

- Production delivery of a data lake in an AWS environment for the Academic Decision Support analytics initiatives
- Deployment of initial governance process for data lake instantiation
- Implementation and initial reporting using the Ellucian Analytics Student higher education data model
- Hiring the Enterprise Systems Director to lead consulting service for data lake services and analytics tools
- Initiate RBAC Program(changed to DSAAP) for implementation of a role-based access control framework

Key measures or metrics for outcomes, benefits, and/or impact of initiative

- Production analytics and reports available for campus operational and strategic usage
- A data lake service available for campus production usage with initial services for the Provost Academic Decision Support department
- RBAC program in execution

Process gaps impacting achievement of this priority that will be closed or reduced

- Unclear expectations and lack of clarity of roles and responsibilities in delivery of data lake technologies between Division of IT and university partners
- Scope of effort required to develop and provide ongoing support for data lineage and taxonomy
- Inconsistent data request and approval processes across Division of IT

Technology gaps impacting achievement of this priority that will be closed or reduced

- Ongoing operational funding model for AWS data lake implementation
- Enterprise Service Bus for consistent data integrations and canonical data end points
- Appropriate tools for managing/tracking data lineage and taxonomy

Priority B: Foster New and Enhance Existing Partnerships across the University

Foster new and enhance existing partnerships across the university to provide effective solutions that best serve Virginia Tech's students, faculty, staff and other stakeholders and to ensure that enterprise services, projects, and plans are agile, responsive, and promote organizational excellence.

Initiative Description

- In collaboration with new and existing partners, develop and leverage application portfolios, project plans, and technology roadmaps that provide strategic value and promote operational excellence.
- Provide metrics and data that enable assessment of IT services, projects, and plans to evaluate effectiveness and encourage partnerships.

Outcome and benefit/impact of the initiative

Outcome

- Improved stewardship of university resources for strategic institutional technology needs
- Increased transparency of IT priorities and initiatives with university leadership and partners
- Better strategic relationships for technology services and plans across the institution that more effectively coordinate and align technology directions

Benefit/impact: improvement or value created by the outcome(s)

More effective utilization of information technology for advancing strategic goals of the university

Key milestones

- Developing application portfolios and roadmaps that align IT plans with university goals and objectives.
- Developing consistent processes and structures for communicating with partners and promoting visibility into IT services and plans.

Key measures or metrics for outcomes, benefits, and/or impact of initiative

Division of IT is included in strategic planning processes of our partners as a critical partner for success.

Process gaps impacting achievement of this priority that will be closed or reduced

- Inconsistencies in the organizational structure of IT creates barriers for effective prioritization, results in inequitable allocation of IT resources, and inhibits effective delivery of services

- Contract review and approval is a significant barrier to viewing IT as a strategic partner given the increasing volume and complexity of application portfolios and data management. Could VT explore an outsourced contract process that utilizes an outsourced company like Carahsoft for the contract review and negotiations?
- Greater maturity in project management processes and resource management is needed across Division of IT units
- Information distribution within Division of IT and with partners is inconsistent across the Division and needs to become more reliable and visible
- Stakeholder collaboration and engagement is uneven across IT areas resulting in issues with communication, prioritization, and resource utilization

Technology gaps impacting achievement of this priority that will be closed or reduced

- The VT ServiceNow implementation needs to be redesigned to more effectively advance agile, responsive partnerships between IT and university constituents. ServiceNow at VT is heavily focused on Help Desk needs, is not an agile service, and needs much more stakeholder direction.
- IT needs to develop metrics and assessments that correlate services, projects, and resources to institutional strategic goals, objectives, and needs.

Priority C: Work with the Division of Research and Innovation

Work with the Division of Research and Innovation to evolve the university's research administration systems, including Summit, through a common roadmap and collaborative deployment that reduces barriers for researchers and administrators and scales with the university's growing research enterprise.

Initiative Description

- Enhance and expand the functionality and the usage of Summit, the university's research administration system.
- In collaboration with the Division of Research and Innovation, develop a roadmap for the continued development and delivery of services within the Summit system

Outcome and benefit/impact of the initiative

Outcome

Reduction in administrative barriers for researchers and administrators

Benefit/impact

Increased services that scale to the needs of the university's growing research enterprise

Key milestones

- Delivery of additional services as determined by the roadmap for the Summit application
- Operational support for Summit provided by Enterprise Systems

Key measures or metrics for outcomes, benefits, and/or impact of initiative

- Expanded usage of the Summit application for additional administrative needs
- The current Agreements Tracking application will be decommissioned when this functionality is delivered in Summit.

Process gaps impacting achievement of this priority that will be closed or reduced

The model for long-term operational support for a large internally-developed enterprise application is not currently in place with resource requirements identified and processes defined.

Technology gaps impacting achievement of this priority that will be closed or reduced

(none listed)

Priority E: Align Applications to Meet Expectations for Mobile-Enabled Solutions

Align enterprise applications to meet evolving constituent expectations for mobile-enabled solutions and promote innovation in user experience.

Initiative Description

- Provide a mobile experience that personalizes the Virginia Tech services that university constituents need to succeed
- Evaluate and select mobile platforms to provide broader mobile services across constituent groups and applications
- Proactively and intentionally evaluate and deploy mobile capabilities that are currently available in the portfolio of existing VT applications.
- Promote and advance training and broader understanding on the capabilities and opportunities that exist in VT collaborative environments
- Encourage a “mobile-first” approach across VT applications and services

Outcome and benefit/impact of the initiative

Outcome

- An improved user experience that better meets the expectations of university constituents
- More effective utilization of the mobile capabilities of applications that are already in use at VT
- An improved, standardized environment for deploying new mobile capabilities that facilitates continued innovation and advances progress in meeting user experiences

Benefit/impact

- Improves the user experience and service capabilities of university constituents
- Provides university constituents with an experience that aligns with VT’s reputation as a technology leader

Key milestones

- Select and implement a mobile platform that facilitates and accelerates mobile capabilities and encourages innovation in user experiences
- Advance deployment and adoption of mobile capabilities in existing VT applications and services
- Determine strategy for support of mobile application services including organizational structure and design standards for custom apps

Key measures or metrics for outcomes, benefits, and/or impact of initiative

- Deployment and adoption of mobile apps for VT services in new and existing applications
- Replacement/decommissioning of the current HokieMobile app
- Delivery of HokieSpa services through mobile environments

Process gaps impacting achievement of this priority that will be closed or reduced

- Contract review and approval for a mobile platform
- No single unit is responsible for moving forward our mobile capabilities across the division, each group may be operating in isolation and therefore does not always have the capabilities to make progress.

Technology gaps impacting achievement of this priority that will be closed or reduced

- Integration between applications to create an exceptional user experience is a challenge. What is user expectation for a "VT experience"? Can expectations be met given the myriad of applications and services used at VT?

Priority F: Enable Streamlined Access to Data and IT Resources

Enable timely, accurate, streamlined access to data and IT resources for all members of the university community.

Initiative Descriptions

- Implement Social Account login to Virginia Tech services (External Identities)
  - Enable use of social media accounts already possessed by community members for access to certain VT apps and services
  - Verify and validate accounts to the highest extent possible
  - Ensure addition of these types of accounts enhances, rather than limits, accessibility for all members of the community
  - Strive to be inclusive and in compliance with Universal Design principles
- Progress in Implementing Identity and Governance Administration (IGA) services including Role Based Access Controls (RBAC) and Attribute Based Access Controls (ABAC)
  - Enable the development of business processes for access control (RBAC & ABAC)
  - Implement supporting technology that would allow a holistic approach to centralized, data-informed, efficient, secure, and auditable access control
  - Implement technology to enable:
    - Managing RBAC and ABAC Policies
    - Enterprise Access Request Processing
    - Provisioning/deprovisioning of IT Resource access.

Outcome and benefit/impact of the initiative

Outcomes

- External Identities Project
  - "Social account login" capabilities could improve the speed of login and service access for external constituencies, and new affiliates, including students
  - "Social account login" capabilities could improve the ease with which all affiliates, new and existing, interact with VT IT services
- IGA Program
  - Reduce the number of accounts needed by individuals for access to VT services
  - Make access to VT data and IT resources consistent with enterprise roles
  - Increase the efficiency of the approval process for data trustees and stewards
  - Improve relationships between the Division of IT and data trustees/stewards
  - Data access would take precedence over access to services

Benefits/impacts

- External Identities Project
  - Successful implementation of a secure "Social Account login" would serve to reduce barriers to access; e.g., potential donors to the university could use existing accounts to make pledges
  - "Social account login" could allow Virginia Tech to meet constituents where they already (virtually) live
  - "Social account login" could allow more rapid access to new VT IT services
- IGA Program
  - Reduce complexity of data retrieval on the part of the user as their role would define their access
  - Provide overall improvements in speed and efficiency of provisioning and de-provisioning accounts.
  - Enable enforcement of Segregation of Duties policy enforcement

Key milestones

- External Identities Project
  - Establishment of a RACI model for communications and input
  - The ability to login to a VT IT service using a social account (low level security or low level assurance account)
  - Continual review of services for appropriateness to allow access through the "Social account login" program
- IGA Program
  - Initiate RBAC Program for implementation of a role-based access control framework
  - Complete Pilot implementation of enterprise role management tools (Pilot Project)
  - Project for delivering a process framework for defining roles to implement RBAC in execution (Project 1)
  - Project for delivering a framework and process for mapping service roles to enterprise roles in execution (Project 2)
  - Project for Implementation of a technical process for instantiating granted authorities to those services based on roles in execution (Project 3)

Key measures or metrics for outcomes, benefits, and/or impact of initiative

- External Identities Project
  - A reduction in calls to VT 4Help related to obtaining credentials
  - A reduction in calls to VT 4Help related to access to services
- IGA Program

- RBAC program in execution
- Increase in the number and efficiency of enterprise roles created and available for use
- Reduction in time needed by data trustees and stewards to authorize access to data
- Reduced time for access provisioning and de-provisioning

Process gaps impacting achievement of this priority that will be closed or reduced

- External Identities Project
  - Alumni who want transcripts and donors who wish to pledge currently need a PID to accomplish low risk operations
  - New services are delayed or abandoned for these constituents in the current environment
- IGA Program
  - There is confusion over the definition of roles, who assigns or approves them, and what the roles are authorized to access
  - No adequate classification of data risk levels for each data domain
  - Coordination with distributed IT (research data, for example; Data Lake driver)
  - Inconsistent data request and approval processes across Division of IT
  - No Data Council for coordination among different data domains

Technology gaps impacting achievement of this priority that will be closed or reduced

- External Identities Project
  - The current infrastructure doesn't have capability to handle multiple accounts for users
  - Higher ED is missing a modern, Mobile-first, protocol for login using OpenID Connect
- IGA Program
  - There is currently a lack of enterprise scale services to implement:
    - RBAC/ABAC frameworks; nothing that exists today can work with all services
  - No integrations strategy or service
    - No Enterprise Service Bus strategy or tool
    - No API management layer strategy or tool
  - No data dictionary/classification tool

Priority G: Expand the Use of Robotic Processing Automation

Expand the use of Robotic Processing Automation (RPA) tools and technologies.

Initiative Description

This initiative is an item in the Institutional Excellence Roadmap.

- Deliver the infrastructure required to support Finance Information Technology (FIT) with their Robotics Process Automation initiative. Serves as foundation for other automation initiatives.
- Deploy the Abbyy FlexiCapture application platform to support FIT's RPA initiative.

Outcome and benefit/impact of the initiative

Outcomes

- Create ability for accounts payable to scan and process invoices.
- Automation of accounts payable paper invoices via a "bot" which will process scanned invoice data and load into Banner.

Benefit/impact

Increased automation support for the 150,000+ invoices processed annually by Accounts Payable.

Key milestones

- Deployment of the infrastructure
- Deployment of the application platform
- RPA solution go-live

Key measures or metrics for outcomes, benefits, and/or impact of initiative

Monthly time required for invoice processing.

Process gaps impacting achievement of this priority that will be closed or reduced

Technology gaps impacting achievement of this priority that will be closed or reduced

Pillar V - Differentiating the VT Experience

We strive to provide a technology experience for the university community and stakeholders that is consistent, robust, and exceeds expectations.

Priorities:

A. Strive for a robust mobile experience, leveraging a unified approach to user engagement to provide access to University IT services.

B. Explore, plan, and provide the communications and collaboration platforms for the next decade, which includes how we communicate and collaborate by voice, video, messaging, and data sharing.

C. Strive for a consistent experience across all Virginia Tech locations, especially Blacksburg, Roanoke, and the Greater Washington, D.C. Metropolitan Area, including for access to university services, local connectivity, connectivity between locations, and connectivity to the Internet and research and education networks.

D. Ensure accessibility to provide the Virginia Tech technology experience to all members of the university community.

E. In partnership with the Virginia Tech community, work to safeguard the privacy of their data and ensure transparency in how their data is used and shared.

Priority A: Strive for a Robust Mobile Experience

Strive for a robust mobile experience, leveraging a unified approach to user engagement to provide access to University IT services.

Initiative Descriptions

- Proceed with production implementation of a Unified Endpoint Management (UEM) system for the university to improve management and security of mobile and other endpoint devices
  - Transition UEM project from pilot to a service
  - Identify partners and support mechanisms
  - Establish processes and procedures for use
  - Develop and distribute user documentation
  - Develop metrics and reporting streams for users and management
- Explore a Mobile as a Platform (MaaP)/Hokie Mobile app
  - Explore methods to provide a “mobile first” approach to application development and implementation, and service delivery
  - Identify methods to reduce duplication of efforts and fill existing gaps
  - Focus on both internal services as well as external (hosted) services, including instructional services
  - Enable for the entire university community (affiliates, guests, visitors)
- Promote an outstanding “User Experience” for IT services

- Engage experts in UX design
- Ensure Universal Design adherence

Outcome and benefit/impact of the initiative

Outcomes

- A solution that can be used to manage and secure most, or all, endpoints is procured
  - The purchased product serves as an enabler for future projects to enhance the security posture of Virginia Tech
- A service blueprint and business model is created for the UEM service
- Key stakeholders and partners are identified to work toward a more robust mobile experience
- Data content that should be included in apps and databases (e.g., GIS levels for buildings; ADA map of campus, etc.) is identified.

Benefits/impacts

- IT personnel in colleges and administrative divisions would be enabled to manage and secure university-owned/funded endpoints
  - The possibility for managing and securing personally-owned devices could be evaluated as a future project/initiative
- Better support for Critical Security Controls (CSCs) would be enabled across the university
- A remote method to manage and secure devices, which would save time and effort currently spent physically managing devices, would be provided
- An enhanced and more secure mobile experience for users regardless of the brand or model of their devices would be possible
- The utility of mobile apps would be increased allowing for consistency in service delivery and message styles
- Opportunities for communication and engagement with the university community would be increased and could be leveraged in a more timely manner

Key milestones

- Peer institution benchmarking is performed
- Test environments are established and stakeholders engaged
- Content is made available in a secure manner, and content providers are involved in processes

Key measures or metrics for outcomes, benefits, and/or impact of initiative

- Measure cost savings, as defined by labor time required to manage end points, after deployment of UEM solution *[Note : Creating a baseline will be required.]*
- Assess improvements in university adherence to CSCs after deployment of UEM solution
- Developers have access to a Mobile as a Service (MaaS) requirements document which includes UX and Universal Design Best Practices
- University services are more accessible through mobile devices

Process gaps impacting achievement of this priority that will be closed or reduced

- Current endpoint management product/solution primarily addresses security and stability of devices running Windows or Linux operating systems, but there has been an increase in usage of other devices and operating systems (e.g., iOS and Android)
- Without a remote means to manage and secure devices, IT personnel must physically manage devices
- A business model for how to deal with financial implications does not exist
- A mechanism/process for moving data from current locations into accessible mobile ready environments does not exist
- A mechanism/process for converting data from its current format into an accessible mobile ready format does not exist

Technology gaps impacting achievement of this priority that will be closed or reduced

- Investigation suggests that comprehensive security and management of endpoints is achievable through a strategy of Unified Endpoint Management (UEM), for which a solution is not currently available
- There is currently no platform to enable a Mobile as a Service (MaaS) effort
- Code standards and guidelines, as well as the code itself, need to be created

Priority B: Explore, Plan and Provide Communications and Collaborations Platforms

Explore, plan, and provide the communications and collaboration platforms for the next decade, which includes how we communicate and collaborate by voice, video, messaging, and data sharing.

Initiative Description

See initiative *Explore a Mobile as a Platform (MaaP)/Hokie Mobile app* described under Pillar V Priority A. Mobility needs and requirements for communications and collaboration platforms will drive decisions on applications and services. Standards should be established and understood in concert with planning for the next generation of these platforms be they locally developed, procured, or hosted.

Priority C: Strive for a Consistent Experience across All Virginia Tech Locations

Strive for a consistent experience across all Virginia Tech locations, especially Blacksburg, Roanoke, and the Greater Washington, D.C. Metropolitan Area, including for access to university services, local connectivity, connectivity between locations, and connectivity to the Internet and research and education networks.

Initiative Description

See initiative *Explore a Mobile as a Platform (MaaP)/Hokie Mobile app* described under Pillar V Priority A. As mobile access becomes the norm, establishing criteria for applications and services across the enterprise will assist in providing a consistent experience regardless of location. Additional resources must be identified to provide robust and resilient infrastructure at “remote” locations.

Priority D: Ensure Accessibility

Ensure accessibility to provide the Virginia Tech technology experience to all members of the university community.

Initiative Descriptions

- Establish a formal program within the Division of IT to raise awareness regarding, and increase the number of personnel certified in, the International Association of Accessibility Professionals (IAAP) including Web Accessibility Specialist (WAS) and/or the Certified Professional in Accessibility Core Competencies (CPACC).Provide funding as needed for training and certification.

  (Could be in partnership with the Accessibility Professionals Certification Grant Group, made up of members of the Division of IT, the University Libraries, and University Relations.)

  - Include partners in distributed IT units
  - In collaboration with the web developers subcommittee of the Accessibility Network at VT, identify appropriate enterprise-level automated and/or manual testing processes, tools and/or services.
  - Strive to improve the procurement, development, and maintenance of electronic information technology (EIT) to ensure alignment with accessibility standards.

Outcome and benefit/impact of the initiative

Outcomes

- Identification and maintenance of sites, services, apps, and digital content that conform to accessibility requirements as outlined in VT Policy 7215
- Establishment of a priority of sites/services/apps/content for remediation
- Awareness and understanding how diverse audiences engage and consume digital content

Benefits/impacts

- Improved ease with which all affiliates, new and existing, interact with VT IT services
- Reduced exposure to regulatory penalties.
- Demonstrable commitment to digital accessibility and establishing a culture of proactive universal design.

Key milestones

- Establishment of a RACI model for communications and input
- Networking with peer institutions on their policies, procedures, and programs is expanded
- Continual review of services for adherence to the four principles of accessibility within the Web Content Accessibility Guidelines (WCAG).

Key measures or metrics for outcomes, benefits, and/or impact of initiative

- A reduction in calls to VT 4Help related to access to services (may need data from another source)
- A decrease in WCAG Level A, AA, and AAA violations found in digital content

Process gaps impacting achievement of this priority that will be closed or reduced

- Disparate groups within the Senior Vice President for Operations and Administration area are engaged with accessibility at one level or another. Establishing accessibility protocols for IT services does not currently receive the same attention as physical accessibility issues

Technology gaps impacting achievement of this priority that will be closed or reduced

- A robust accessibility service/tool providing automated and/or manual prioritized remediation assistance for enterprise use is not available

Priority E: Work to Safeguard Privacy of Data

In partnership with the Virginia Tech community, work to safeguard the privacy of their data and ensure transparency in how their data is used and shared.

Initiative Description

Begin development of a "Privacy Working Group" made up of faculty and staff recommended by key stakeholders engaged in working with student, HR, research, and all known forms of data in use at the university

Outcome and benefit/impact of the initiative

Outcomes

- A definition of "data privacy"
- Agreement on expectations related to individual and group data privacy
- Promulgation of rules and guidelines for all data stewards to implement to protect data privacy

Benefits/impacts

- Successful formation of a group, and continuing its existence to periodically review necessary changes in guidelines as technology and needs change, would raise awareness of the issue across the enterprise
- Creators, stewards, and users of data would have an increased understanding of rights and responsibilities related to data privacy
- In the event rules similar to the General Data Protection Regulation (GDPR) are enacted in the commonwealth or the U.S., this group and their output could serve as a first-step toward compliance

Key milestones

- Establishment of working group with appropriate charge to advise key stakeholders
- Establishment of RACI model for communications and input

Key measures or metrics for outcomes, benefits, and/or impact of initiative

- Improved knowledge of what IT (both Divisional and distributed) consumers expect related to privacy of their data
- Building trust among university affiliates whose data is being handled by university IT processes

Process gaps impacting achievement of this priority that will be closed or reduced

- The CIO and Division of IT bear responsibility, but have limited authority over protecting data in all its forms

Technology gaps impacting achievement of this priority that will be closed or reduced

- Understanding what types of data affiliates are concerned with would allow more efficient use of technical resources in devising or identifying methods and tools to ensure privacy

People: Investing in and Enabling our Workforce

We will foster a culture of employee engagement committed to attracting, retaining, and developing skilled IT talent by:

A. Creating an inclusive culture that promotes and values diversity
B. Maintaining effective recognition programs for exceptional contributions
C. Providing a welcoming, safe, and accessible work environment for all employees
D. Creating clear pathways for career development and advancement opportunities
E. Strengthening the capabilities of our organization through effective performance management practices
F. Being flexible to offer options that support a high quality work life balance
G. Cultivating trusting relationships that enable collaboration and innovation.

Operational Plan Initiatives

Four Operational Plan initiatives together address all seven of the strategic priorities above: IT Framework Project, IT Connect Program, IT Climate Survey and Action Plan, and Leading with Values initiative.

IT Framework Project

We will develop a division-wide career framework that provides clear outlines for roles, and that facilitates technical and professional career paths and progression in the Division.

Outcome and benefit/impact of the initiative

Outcome

- Inventory of talent across the division
- Expanded career opportunities
- Clear understanding of the technical and soft-skill competencies required for roles and levels of responsibilities
- Improved career coaching and planning
- Better awareness of market trends and competitive threats
- Relevant and market-informed titles and pay ranges

Benefit

- Market-competitive, equitable compensation
- A divisional resource of our current capabilities and gaps to help inform strategies for attracting, retaining, and developing talent
- Increased capacity for delivery of products and services
- Reduced organizational risk and costs in succession planning

- Higher employee engagement
- Better understanding of how internal talent can be developed, leveraged and shared across the division
- Decreased time to fill vacancies within the Division of IT
- Improved retention of high performers

Key Milestones

- Role matrix with pilot group completed
- Completion of the activities to
  - obtain senior leadership agreement
  - develop and execute a communications plan to supervisors at every level, and to all of IT
- Market-based pay utilizing position profiles
- Market gap analysis of IT compensation
- Phased implementation plan for the division

Key measures or metrics for outcomes, benefits, and/or impact of the initiative

- Market gap analysis of IT compensation
- IT Climate survey analysis
- Retention rate analysis
- Time-to-fill recruitment analysis
- Reduced turnover rates related to lack of satisfaction with organizational systems that support career advancement and lack of opportunities for career advancement
- Climate survey percentage of employees reporting high satisfaction with perceptions that clear paths for growth and advancement exist with the organization
- Climate survey percentage of employees reporting high satisfaction an adequate system for; professional development in their department

Process gaps impacting achievement of this priority that will be closed or reduced

- Success of this initiative depends on IT leadership advocating, adopting, and communicating the framework, its context and philosophy as part of normal leadership and operational activities, especially in recruiting and workforce management.
- The adoption of this framework is a large initiative involving considerable change from current practices. Clear communication and commitment to the framework by all management is especially critical to the success of this initiative.
- Framework maintenance
- Workforce planning

Technology gaps impacting achievement of this priority that will be closed or reduced

Tool to manage the career progression mapping, talent inventory, and employee profiles for development and training

IT Connect Program

We will establish a systematic process that enables managers and employees to provide and receive ongoing feedback, clarify goals and organizational objectives, and discuss career development and advancement.

Outcome and benefit/impact of the initiative

Outcome

- Continuous communication between managers and employees
- Managers serve as coaches
- Increased job-fit alignment
- Stronger relationships between managers and employees

Benefit

- Enables healthy workplace culture
- Climate survey percentage of employees reporting high satisfaction that they have clear goals and objective for their job
- Climate survey percentage of employees reporting high satisfaction with employee engagement
- Climate survey percentage of employees reporting high satisfaction with having regular meetings with their supervisors to plan and advance their career goals.
- Climate survey percentage of employees reporting higher satisfaction with sense of purpose
- Climate survey percentage of employees reporting high understanding of their alignment to organizational goals

Key Milestones

- Training for managers and employees conducted
- Implementation of pilot
- Assessment of the program

Key measures or metrics for outcomes, benefits, and/or impact of the initiative

- Climate survey percentage of employees reporting high satisfaction an adequate system for; professional development in their department
- Climate survey percentage of employees reporting high satisfaction that their work is not regularly reviewed with professional development in mind
- Increased participation of the employee award and recognition program
- Climate survey percentage of employees reporting high satisfaction with performance feedback
- Number of communication and engagement meetings held with stakeholders about the program

Process Gaps impacting achievement of this priority that will be closed or reduced

The success of this project is dependent upon leadership adopting, and modeling behaviors that promote a constructive performance feedback environment.

Technology gaps impacting achievement of this priority that will be closed or reduced

None

IT Climate Survey and Action Plan

We will conduct a continuous assessment of the organizational climate through an anonymous employee feedback mechanism. Anonymous employee feedback will help us to identify organizational practices that have influence on employee engagement and overall employee satisfaction. The climate survey data will be used to inform current initiatives and develop new initiatives to improve the workplace.

Outcome and benefit/impact of the initiative

Outcome

- Measured employee job satisfaction
- Measured employee engagement
- Identified drivers of employee engagement
- Better understanding of employee experiences
- Identified areas of strength, as well as opportunities for improvement
- Prioritized and focused efforts for workplace improvements

Benefit

- Resource for reflection aimed at fostering responsibility for improvement our workplace and experience at all levels
- Increased employee engagement
- Increased overall employee satisfaction
- Pipelined communication
- More transparency
- Increased trust

Key Milestones

- Survey conducted each alternate year
- Communication (and engagement) plan designed
- Completed analysis and report-out to leadership (within 2 to 3 months)
- Communication (and engagement) plan executed

Key measures or metrics for outcomes, benefits, and/or impact of the initiative

- Percentage of employees reporting high satisfaction with their job
- Percentage of employees reporting high commitment to their job
- Percentage of employees reporting high satisfaction with each driver of employee engagement

- Number employees participating in the survey
- Number of communication and engagement meetings held with stakeholders

Process Gaps impacting achievement of this priority that will be closed or reduced

The success of this project is dependent upon leadership supporting, encouraging and inviting employees to participate in providing feedback.

Technology gaps impacting achievement of this priority that will be closed or reduced

Employee Engagement Survey platform with role-based dashboard functionality.

Leading with Values: Core Values Implementation

We will establish a language and set of behaviors aligned with Virginia Tech's core values to help strengthen our organization through defining common expectations for how we interact with one another within the Division of IT, and with others at the university and beyond.

Outcome and benefit/impact of the initiative

Outcome

- More engaged employees,
- Increased retention,
- More diverse workforce.

Benefit

- Greater productivity in our organization, and
- Improved overall performance.

Key Milestones

- Senior leadership team assessment and action plan
- Next-steps plan for leadership engagement activities
- Division-wide training and communication activities executed
- Division-wide assessment of progress

Key measures or metrics for outcomes, benefits, and/or impact of the initiative

- Focus group feedback (both internal to and external to IT)
- Climate and other survey results

Process gaps impacting achievement of this priority that will be closed or reduced

The success of this project is dependent upon leadership adopting, modeling, advocating and communicating core values behaviors, as well as the vision, context, and invitation to engage to all divisional staff and applicants.

Technology gaps impacting achievement of this priority that will be closed or reduced

None.

Processes: Investing in Operational Excellence

We embrace a culture of continuous improvement, striving for excellence in everything we do, to deliver services that are responsive to the university's needs and nimble by committing to these transformational principles:

A. Collaborating to leverage our collective expertise

B. Identifying and eliminating barriers, unnecessary workflows and duplicative and/or redundant effort, processes, and steps

C. Using best practices to deliver our services

D. Working in partnership with stakeholders to ensure our work is aligned with Virginia Tech strategic priorities

E. Leveraging technology to simplify and scale processes

F. Deploying foremost organizational change management principles to navigate new systems, processes, and structures.

Operational Plan Initiatives

As part of strategic and operational planning, IT Senior Leadership determined that the division should focus on the process improvement imperatives B, C, and D above for the 2019 – 2021 operational plan. In the fall of 2019, three working groups were formed. Ideas were crowdsourced from everyone in the division as a place to start. Working groups and IT senior leadership worked to refine the filter the ideas, resulting in ten process improvement initiatives.

Although the initiatives have been categorized into one of three areas – identifying and eliminating barriers, working in partnership with stakeholders, or using best practices to deliver our services – several of them fit into more than one category.

Priority B: Identifying and Eliminating Barriers

Improve IT Asset Purchase and Management

Current processes are very individualized by department, which can lessen potential volume discounts, create duplication of effort, and make tracking of items less efficient. By combining efforts, funds, and using available vendor services, we will create more efficient processes for ordering, purchasing, and tagging of computer assets.

Outcome

Combined asset orders across all units in the division and vendor tagging of computer assets prior to receipt on campus

Benefit/Impact

Cost efficiencies for the division which are scalable to other areas across the university

- Combined purchasing power
- Fewer internal resources and duplicate effort
- More accurate asset tagging

Key milestones

Phase 1

- Fixed Assets group agrees to offsite tagging (already complete)
- Engage one vendor initially for offsite tagging (already complete...Dell)
- Start ordering with tagging as part of the purchase order from vendor (initiated mid January

Phase 2

- Audit of first orders to validate accuracy and confirm reporting is acceptable
- Determination of delivery process
- Coordination of various areas making volume purchases (in process)
- Tracking of items simplified by Banner uploads from vendor reporting files

Phase 3

- Recruit other vendors for tagging process
- Repeat stages one and two

Key measures or metrics for outcomes, benefits, and/or impact

- Number of departments utilizing the purchases and asset tagging
- Dollar value of savings on combined purchases and savings on labor costs from pre-tagging
- Number of items pre-tagged by vendors

Barriers

Coordination of purchases, reporting from vendors for tagged items, coordination of deliveries, change management and communication

Automate Paper-Based IT Processes

Several impactful paper-based internal processes that can be automated have been identified. Beginning with a small pilot project, analyze the steps, remove unnecessary ones, and apply appropriate technologies to the essential remaining activities. Follow with additional projects, incorporating refinements to the approach based on lessons learned and experience with the automation technologies.

Processes to consider include

- ITPALS signature for Microsoft Office 365 for students
- ICR/COLA requests
- Software licensing forms
- Home Use Forms
- Project initiation Forms
- On-boarding checklist
- IMCS DDDH Signature card
- Guest account creation

Outcome

Streamlined and automated processes

Benefit/Impact

- Cost efficiency from automation
- More effective ways of doing business
- Improved timeliness by eliminating non-value-added work, lag time between process steps, and physical signatures.

Key milestones

1. Initial process identified (ICR process?)
    a. Gather key stakeholders and obtain agreement on proceeding
    b. Determine project timeframe

2. Complete business process analysis

    Business process analysis is a vital precondition of automation in order to identify redundant and unnecessary steps. Analysis ensures that the process is distilled to the simplest possible number of requisite steps before it is slated for automation, resulting in more efficient conversion as well as increased overall efficiency for all actors involved in process request and fulfillment.

    One focus would be on those steps that require signature approval. Simplifying processes to reduce signatures to the minimal set required would position the process for further automation with use of digital signatures when a suitable technology or solution becomes available

3. Implementation of new processes

4. Reflect, reconsider, determine the next IT process to automate

After the initial conversion, the team would reflect on the implementation to identify problems and areas ripe for improvement. Documentation of how we went through our analysis will feed our next process analysis. The next conversion effort would presumably benefit from lessons learned resulting in tool and process refinement where each subsequent phase is more efficient than the last.

For next steps, key Division of IT stakeholders would assemble to discuss other vital business paper-based processes that are perceived to be difficult for consumers to complete, expensive for employees to fulfill, inefficient given technology available, or ineffective given updated university guidelines. Candidate processes would be ranked by perceived benefit from automation to guide the order in which processes converted. All steps would then be repeated again.

Barriers

- Lack of enterprise workflow software (Critical Needs Request has been submitted)

Improve Methods and Tools for Collaboration

Improve out methods and tools for collaboration by creating a framework that:

- Analyzes the activities and activity types (team, project, community, etc.) being performed (the use cases)
- Identifies the context of each activity – relevant interpersonal, transactional, and cultural/social context
- Discovers the perspective and objectives of leaders responsible for the activities and then
- Identifies the relevant tools and technologies that enable the collaboration in a natural way.

Outcome

A framework for assisting leaders and end-users in selecting appropriate tools and technologies that enable effective collaboration.

Benefit/Impact

- Utilization of a framework for determining enterprise foundational activities
- Guidance in tool selection for general collaboration activities
- Identification of situations that require alternative platforms/tools
- Improved efficiency by leveraging common tools/platforms

Key milestones

- Use case inventory and analysis
- Leader perspectives input
- Draft framework
    - Identification of foundational activities with stakeholders
    - Guidance on technology selection
- Validate draft framework
    - Identify small set of high-impact activities
    - Apply framework to activities to make platform recommendations
    - Adjust framework based on feedback
- Publish framework for general audiences

Key measures or metrics for outcomes, benefits, and/or impact

- Leader and end-user engagement reflected through participation in the feedback process
- Measure subjective success with before/after survey instrument

Barriers

- Analysis requires substantial effort and stakeholder engagement
- Resistance in face of preconceived platform choice (“best”, “favorite”, etc.)

Investigate Centralized Software Funding Model

Background

Large software packages utilized at the University tend to fit into one of two categories: specifically targeted software solutions (MatLab), or more broadly utilized products (Microsoft Office 365 ProPlus). Both categories currently utilize the *a la carte* model for software licensing, distribution and reconciliation. This model has been developed over many years based on outdated vendor software licensing programs, and may represent an opportunity for centralization, improved cost efficiencies, and process reengineering.

Current trends

For some time, software vendors have been moving to annual license-to-use subscriptions and away from one-time, perpetual software licenses. Vendors typically provide graduated volume discount pricing incentives.

An alternative to our current model is the aptly named "software bundle" model in which the common, predominant software solutions utilized by faculty, staff and students are grouped into a common VT software portfolio. All faculty, staff and students would be automatically licensed for this bundle during their periods of active affiliations with the University.

Initiative description

We propose completing a comprehensive cost-benefit comparison based on analyses of our current model and the software bundle alternative. If the analysis identifies significant potential in switching to a software bundle model, the Division of IT would take a lead in implementation.

Benefit/Impact

This model would provide efficiencies by reducing licensing complexities and associated support overhead. As all constituents are being licensed for all software products within the bundle, economies of scale are enabled. This scaling can also enable educational licensing ratios, further reducing total costs to students.

Barriers

- Cultural change associated with loss of local control
- Financial dependencies related to service center processing

Priority C: Using Best Practices to Deliver our Services

Create Communities of Practice and Centers of Excellence in the Division of IT

Initiative Description

We will adopt a framework that enables identification, incubation, and development of Communities of Practice (CoPs) and Centers of Excellence (CoEs) that incorporates existing best practices.

Outcome and Benefit/Impact

Outcome

- Establishment of processes or best practices that allow the selection, creation, governance, and running of CoPs or CoEs within the division
- Incorporation of CoP and CoE work products into divisional operations

Benefit/Impact

- A culture that creates, develops, and sustains best practices, enabling the division to better meet its mission
- Improved operational effectiveness as best practices that minimize risk and maximize service delivery are implemented
- Increased employee engagement and satisfaction that supports training and exploration of ideas and interests

Key milestones

- Conduct a Lessons Learned exercise on the existing working groups listed in the Initiative Description
- Assess previous and existing working groups to determine alignment and potential success as either a CoP or a CoE
- Launch the Common Application Platform CoE
- Evaluate the overall process and establish areas for continuous improvement
- Evaluate if the scope of the process can be expanded to incorporate people or groups outside of the division (future phase)

Key measures or metrics for outcomes, benefits, and/or impact

- CoP or CoE produce output that is made available to the division
- Sustainability of CoP or CoE cohesion and active participation

Barriers

- Adapting current communities to leverage identified processes requires ongoing effort and cultural change
- Establishing expectations that outputs (best practices) are to be implemented

Create a Center of Excellence for the Common Application Platform

Establish an organizational unit that provides application technology infrastructure and shared services for use by all applications development teams in the division. Platform services include providing the underlying infrastructure needed to run applications (networking, compute, storage, container platform, etc.).

Outcome and benefit/impact

Outcome

- Teams can leverage one shared platform on which to run their applications, rather than managing an entire application infrastructure locally within an individual unit in IT.
- Shared services used for application development and deployment are managed by a single team and provide a standard set of tooling, facilitating increased adoption, elimination of duplicate efforts, and improved ease of use.

Benefit/Impact

- Development teams can focus on value-added work, reduce application delivery time, and increase performance and security.
- A standard toolset for shared services enables effectiveness, efficiency, and increases productivity.
- Ability to deeply integrate various services and provide starting templates for teams, allowing for quicker spin-up of new efforts
- A dedicated team can focus on mitigating risks, monitoring costs, and providing training on cloud-based services.

Key milestones

- Formation of the Shared Platform and Services organizational unit
- Identification of a shared service or two and migrate responsibility to the shared services team. Examples might be GitLab (code.vt.edu) or Vault (secrets management used by ES)
- Identification of a process/platform for running applications on a shared platform. Explorations include how the application is delivered (perhaps containers), how it can be configured to leverage other resources (databases, caches, object stores, etc.), and how application teams can be granted access to logs and metrics.
- Selection of a legacy application (no longer under current development) and work to have it operated on the shared platform identified above
- Selection of an application under current development to be transitioned to run on the shared platform. Explorations might contain processes on how updates to the application are to be deployed and how additional resources might be managed.

Key measures or metrics for outcomes, benefits, and/or impact

- Number of applications being run by the platform team
- Number and adoption of shared services being run by the platform team
- Cloud expenditures - are our overall bills changing as the platform team is able to focus on needs, rather than relying on individual teams to learn their own best practices?
  - Overall costs - track changes to our total bill
  - Cost per application - track changes in cost to run each app
- Time to deliver new projects - are units better able to bootstrap new efforts when they don't need to manage the entire infrastructure?

- Number of projects being delivered by each unit - are units able to focus more on their value add rather than other needs?
- Deployment frequency - how often are applications/managed services deploying?
- Client satisfaction - are we better able to respond to user feedback and needs?

Barriers

- This is a significant culture shift and requires trust across organizations.
- Requires considerable technical direction and exploration, but will leverage current knowledge and use an iterative approach.

Implement Portfolio Management

The Division of IT will develop a Portfolio Management method that connects the execution of projects to the fulfillment of our strategies. As the first step, explore project portfolio management across the division using the collection of 2019 – 2021 operational Plan projects. Then in alignment with Institutional Excellence, understand and adopt common practices for project portfolio management.

Outcome and benefit/impact

Outcome

A framework for managing, reporting, and communicating the collective body of project work in the division.

Benefit/Impact

- More informed decision making
- More efficient use of resources
- Improved collective focus and collaboration across units
- Better view and enabling of strategic technology roadmaps
- Enhanced understanding of the value created by IT

Key milestones

- Determine the set of projects within the 2019 - 2021 IT Operational Plan
- Assign a project manager to each project
- Revisit Benefits/Value created and metrics for each project
- Standardize reporting information and communication method
- Begin reporting and monitoring Operational Plan projects
- Monitor and assess value created by completed projects and deliverables

Key measures or metrics for outcomes, benefits, and/or impact

- Easily available key project data for IT Operational Plan projects
- Common and accurate benefits tracking and monitoring information

Barriers

- Senior leadership commitment to the effort required
- Cultural change

Advance Business Relationship Management Practices

Improve comprehensive customer care within the division by determining all touchpoints, understanding needs, gathering feedback, and improving interactions and services on a continuous basis. Establish a "function" within the division charged with improving and coordinating Business Relationship Management practices. The structure of this "function" will be defined as part of this initiative. Once an initial structure is defined, begin with a pilot in an academic or administrative area having a high number of interactions with IT, and/or the greater Washington, D.C. metropolitan area.

Outcome

Better understanding across the division of customer needs, and improved capability for addressing those requirements.

Benefit/Impact

- Improved interactions between IT and areas served
- Increased efficiencies for university staff and IT
- Enhanced partnerships between IT and areas served
- More effective service delivery

Barriers

- Subject matter expertise for broad areas of service within the division.
- Lack of a comprehensive, common automation toolset for collaboration and knowledge-sharing.

Priority D: Working in Partnership with Stakeholders

Develop Enterprise-Wide Technology Roadmaps through Effective IT Governance

Establish an information technology governance framework consisting of principles and processes for prioritizing technology initiatives that address stakeholder needs and align with university strategic plans and timelines. In conjunction and synergistically, develop technology roadmaps that articulate the University's technology vision and plans for supporting overall strategic priorities.

Outcome

- Enterprise-wide technology roadmaps that define priorities, guide investments, and provide an integrated vision for technology directions
- Information technology governance framework to set technology directions aligned with evolving university needs, risks, and priorities using collaborative processes
- University leadership advocacy and adoption for information technology governance and technology roadmaps

Benefit/Impact

- Clarified expectations, transformations, and business impacts resulting from technology investments
- Better informed technology investment decisions based on integrated, customer-focused, and enterprise-level perspectives
- Improved understanding of stakeholder needs through transparent, iterative processes

Key milestones

- Evaluate and document the current technology landscapes across the enterprise.
- Through engagement with stakeholders, define technology gaps and the desired future state for technology to meet university strategic priorities.
- Design, develop, and deliver the technology roadmaps, along with the processes for creating and sustaining them, with the understanding that these processes will evolve as the university adapts its investment and assessment of technology needs
- Implement an initial IT governance framework including processes for stakeholder engagement and participation, for analyzing needs and setting priorities, for extensive communication of goals/actions/results, and for ongoing evolution of subsequent iterations of the framework.
- The IT governance process should follow core foundational principles including
    - Stakeholder input should be key to forming decisions that select and prioritize IT investment with ample opportunities and multiple means for providing input.
    - Stakeholder input should be balanced against resource constraints and enterprise technology priorities.
    - Inputs could take many forms such as end-user surveys, recurring interaction with business unit leaders, formally chartered communities of interest, etc.
    - Execute as a recurring process with regular frequency and following a well-communicated timeline that aligns with the timelines for established university planning and budgeting processes. The process timeline should be publicly documented and described so that stakeholders can fully understand and participate.

- The IT governance inputs, analysis, synthesis, and proposed decisions should be transparent and shared broadly, with continued opportunities for stakeholders to provide feedback on alignment, timeline, fitness of proposed solutions, etc.
- The governance process should be iterative, evolving and ongoing.

Key measures or metrics for outcomes, benefits, and/or impact

- Ongoing stakeholder involvement reflected by usage and evolution of the roadmaps as a key component of IT governance
- Comparison of technology investments to roadmaps priorities
- Number of common solutions identified across organizations resulting from roadmaps initiatives
- Initiatives/projects performed as a result of the IT governance process

Barriers

- Challenges with stakeholder involvement and limited commitment to an enterprise-wide perspective
- Inconsistency across the university for technology decision making processes and investments.

Establish a Data Analytics Community of Practice

Establish a Data Analytics Community of Practice for sharing knowledge of data analytics capabilities in highlighting and understanding trends and patterns in data.

Outcome

The Data Analytics Community of Practice will establish a connected community of individuals involved in data analytics efforts across the university.

Benefit/Impact

- Expanded knowledge and increased data analytics competency across the enterprise
- Increased collaboration between the Division of IT and stakeholders for initiatives involving data analytics
- Valuable community feedback for informing related analytics activities and initiatives such as data governance and data delivery
- Techniques used to effectively communicate insights gained from descriptive, diagnostic, predictive modeling, and visualization
- Increased competency in establishing and sustaining effective Communities of Practice

Barriers

- Diversity of stakeholder needs