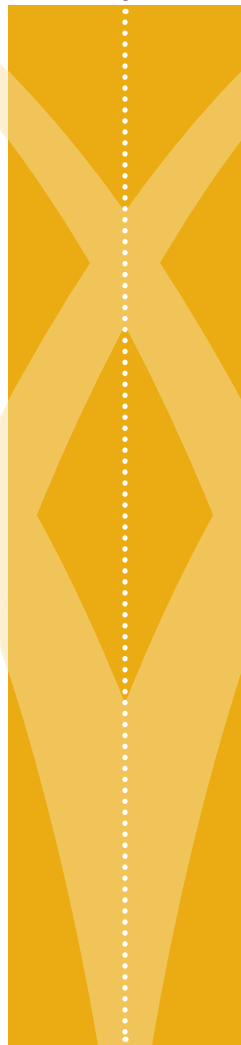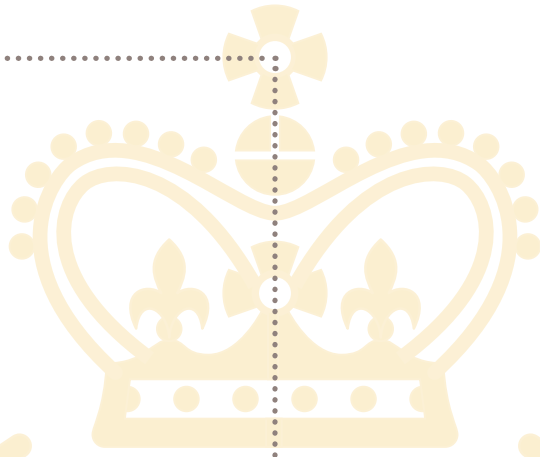**2016**

WILLIAM & MARY
**INFORMATION
TECHNOLOGY**

YEAR IN REVIEW

W&M IT is helping to build bridges across the university that span from one end of the student experience to the other and many points between with the Salesforce Constituent Relationship Management (CRM) system.

Find the latest on the CRM Building Bridges project on page 2.

Award Winning Staff

ACETO AWARD WINNER

Maria Elena Pada (also known as Mane), then with William & Mary Information Technology, was presented the Shirley Aceto Award at a reception in the Great Hall of the Sir Christopher Wren Building in June of 2016. She was honored for the tireless work she has done across campus to benefit all William & Mary staff.

"Her talents, professionalism, dedication, and enthusiasm know no bounds," said Katherine Kulick, associate professor of modern languages and inaugural Aceto Award winner. Pada has recently moved to W&M's Human Resources department where she will use her talents to coordinate campus training programs. •

40 YEARS OF SERVICE

At the 2016 Employee Appreciation Service Awards W&M IT's Network Manager **Scott Fenstermacher** was recognized for his 40 years of service. "Under his leadership, he has shepherded the College's network through numerous upgrades and now manages this critical resource with a team of six. Many College operations are totally dependent on the network being up and running 24 hours a day, 365 days a year," said Chief Information Officer Courtney Carpenter (left) at the ceremony.

Fenstermacher (right) received the award on the same day he celebrated his birthday. At the ceremony, Senior Vice President for Finance & Administration Samuel Jones led the audience in singing Happy Birthday. •

TOASTED BY ADMISSION

W&M IT's **Patty Herrera Cox**, then with the Technology Support Center (TSC), and **Jim Supplee**, then with Windows Engineering, were both "Toasted by Admission" in February of 2016.

Patty Herrera Cox was toasted for coming to the rescue during the launch of admissions decisions for Early Decision. "Patty's quick action meant we had no downtime at a critical time in our process," said Associate Dean of Admission Betsy Dolan. "Her prompt attention and calm assessment and action is MOST appreciated."

Jim Supplee was toasted for fixing a technology-related issue at a particularly inopportune time, New Year's Eve — the night before the January 1st admission application deadline. "This is not the first time that Jim has come to our rescue on a holiday and a less than opportune time. I know I can always count on Jim's help and he never fails to deliver. The College needs more Jims," said Dolan.

Cox and Supplee continue to work in W&M IT now in new positions within the department. •

IT MANAGEMENT TEAM

Courtney Carpenter
Chief Information Officer

Bernadette Kenney
Deputy Chief
Information Officer

Peter Kellogg
Director of Infrastructure &
Security

Michael Murphy
Director of Academic &
Technology Support Services

Rachel Pace
Director of Data
Management

Corinne Picataggi
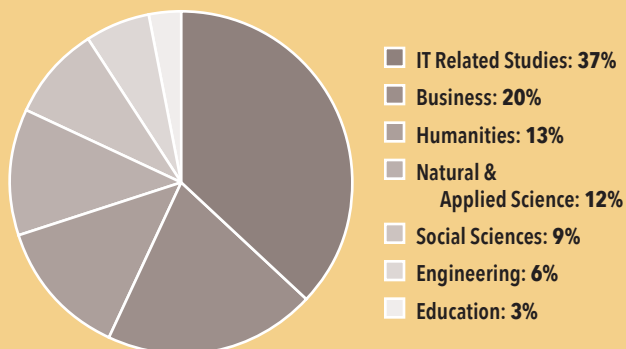Director of Software Systems

The IT management team: (from left) Rachel Pace, Peter Kellogg, Bernadette Kenney, Courtney Carpenter, Michael Murphy, and Corinne Picataggi

POST-SECONDARY EDUCATION BACKGROUNDS

When you think of IT, you think everyone has a computer science degree, right? Surprisingly, W&M IT staff members come from very diverse education backgrounds. While post-secondary education fields related to IT certainly make up a good percentage of our staff's background (37%), business fields are also quite popular (20%), followed by the humanities (13%), and sciences (12% for natural & applied sciences, 9% for social sciences).

Some of the atypical post-secondary education fields among W&M IT staff include: Biology, English, Theology, Communications, Political Science, Nuclear Engineering, Occupational Safety, Philosophy, Music, Theater, Clothing & Textiles, International Relations, Agriculture, Journalism, Exercise Science, and Healthcare.

- IT Related Studies: **37%**
- Business: **20%**
- Humanities: **13%**
- Natural & Applied Science: **12%**
- Social Sciences: **9%**
- Engineering: **6%**
- Education: **3%**

IT ADVISORY COMMITTEE (ITAC)

Information Technology Advisory Committee (ITAC) membership reflects the diverse academic and administrative interests of the William & Mary community. The fundamental aim of ITAC is to further institutional goals through the effective use of information technologies. Committee members contribute input and feedback on IT policies and make recommendations about how and when priority projects should be implemented. The committee also plays an advisory role in procedural, organizational, and support issues as they relate to academic services and business practices affected by technology use.

MEMBERS

Courtney Carpenter
CIO and ITAC Co-Chair

Michael Halleran
Provost and ITAC Co-Chair

Ginger Ambler
Vice President
for Student Affairs

Paul Blossom
Professor, Mason School of
Business (beginning Fall 2016)

Henry Broaddus
Vice President
for Strategic Initiatives

Carrie Cooper
Dean of University Libraries

Terry Driscoll
Director of Athletics

Keith Griffioen
Professor of Physics

Laura Heymann
Vice Dean & Class of 2014
Professor of Law

Mark Hofer
Spears Term Distinguished
Associate Professor,
School of Education

Sam Jones
Senior Vice President for
Finance & Administration

Matthew Lambert
Vice President
for University Advancement

Dennis Manos
Vice Provost for Research &
Graduate/Professional Studies

Salvatore Saporito
Associate Professor
of Sociology

John Wells
Dean and Director of VIMS

EX OFFICIO MEMBERS

Gary Anderson
CIO/Director Information
Technology and
Network Services, VIMS

Kent Erdahl
Director of Internal Audit

Michele Jackson
Associate Provost
for University
eLearning Initiatives

Peter Kellogg
Director of Infrastructure &
Security

Bernadette Kenney
Deputy Chief
Information Officer

Michael Murphy
Director of Academic &
Technology Support Services

Rachel Pace
Director of
Data Management

Corinne Picataggi
Director of Software Systems

Constituent Relationship Management

The implementation of the Salesforce Constituent Relationship Management (CRM) system is a multi-year strategy-driven effort that focuses on helping William & Mary constituents (students, faculty, staff, alumni, parents, corporate partners, volunteers, and friends) engage effectively with the university.

William & Mary's iconic Crim Dell bridge provides a visual representation of how the CRM is being constructed. Like the Crim Dell, CRM also has two "piers," each with a foundation in one of our major campus systems — the Banner system on one side (for student recruitment and admission) and the Advance system on the other (for engagement).

Throughout 2016, the work on CRM has focused on building the foundation for the two piers and preparing for future construction of the span between them.

*Work on the **STUDENT SIDE** in 2016 focused heavily on Admissions. Accomplishments included:*

- Recruitment modules were configured for the School of Education, the School of Marine Science, and Arts & Sciences graduate programs
- Online applications were developed which provide the ability to receive applications, letters of recommendation, waivers, and online payments
- Inquiry forms were developed for graduate programs and became ready for use
- Undergraduate Admissions went live with the TargetX Decision module and the first decisions made using the tool were for Early Decision 2017 students and Spring 2017 transfers
- Data mapping and integrations were completed from the Common Application to TargetX and then to Banner
- A security analysis of TargetX was conducted to better understand the requirements of both the undergraduate and graduate programs

*Work on the **ADVANCEMENT SIDE** in 2016 focused on data integrations between current and future systems. Accomplishments included:*

- Data mapping and an integration was built between Advance (current system) and Advancement Connect (a donor system that connects to Salesforce) to allow data to flow to and from both systems
- An integration was built between Cvent (events system used by Advancement) and Advancement Connect while historic events in Advance were mapped and migrated to Advancement Connect
- System testing of integrations was successful and accommodations were made for the needs of live data
- Custom triggers and process flows were built within Advancement Connect to better meet business needs

IN 2017, *we anticipate going live with several components on both sides of the bridge. These include:*

- A new instance of Marketing Cloud attached to Salesforce/Advancement Connect
- The two-way integration between Advance and Advancement Connect
- Implementation of the Salesforce Linvio app for University Advancement events
- An integration between Cvent and Advancement Connect
- Recruitment and admission applications for the School of Education, Arts & Sciences, and the School of Marine Science
- Decision processing through TargetX for the School of Education, Arts & Sciences, and the School of Marine Science •

Keep up-to-date with the CRM project at:

crm.wm.edu
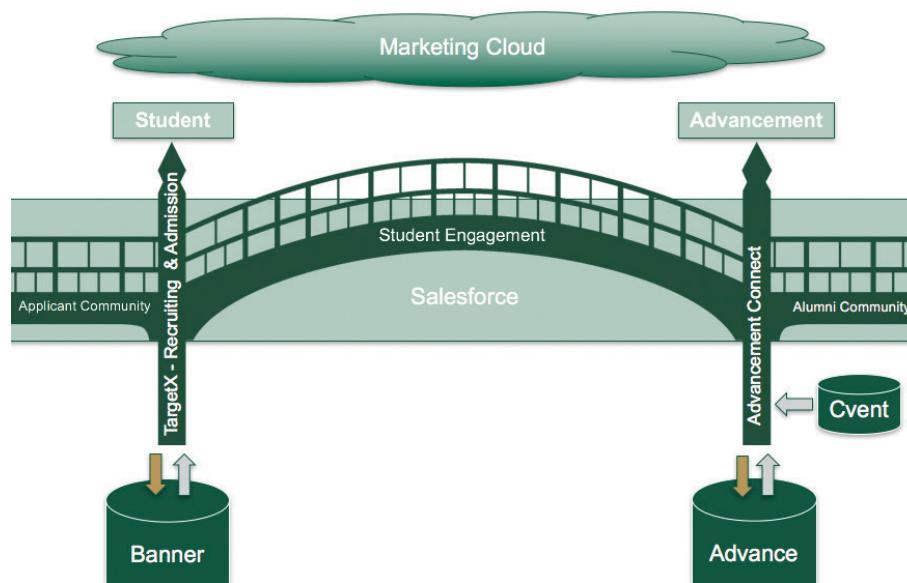
Centralizing Services, Expanding Support

In 2015, IT departments from Advancement, University Libraries, the Law School, and the Mason School of Business were consolidated under the central IT organization (W&M IT). These changes were largely based on the recommendations of the Censeo Consulting Group and supported the university's Business Innovation Initiative.

Since the consolidation, W&M IT has been working to centralize services in order to streamline processes and remove duplication of efforts. On the other side of the coin, W&M IT support services have greatly expanded to assist users from the newly added departments and their technology-based initiatives.

In 2016, service expansion and support initiatives for each of the four departments included:

CROSS-DEPARTMENTAL COLLABORATION

In a true collaborative effort, IT groups hailing from the Mason School of Business and Advancement (both now part of W&M IT) are working together on a key data integration of giving/pledge information to the Mason School of Business financial system. This will allow the Mason School of Business to better align their constituents' philanthropic activities to current and projected budget lines. Senior Software Engineer **Mike Hayes**, who previously worked for the Mason School of Business and now works for W&M IT, is leading the integration effort. •

Advancement
- Tech support for Advancement provided by W&M IT's Technology Support Center (TSC)
- Advance, the Donor Management system used in Advancement, supported by W&M IT
- Consultation services for the Endowment Report
- Project management support and data integration for the Give Campus volunteer management portal
- Adobe Experience Manager technical support
- Hosting for Amazon Web Services (AWS) websites used for the campaign:
  - Giving.wm.edu
  - Advancement.wm.edu
- Server space and technical consultation for Scholarship/Endowment Report tools
- Integrations between Advance and Salesforce

University Libraries
- Georgian Papers Programme hosted on W&M IT servers (http://georgianpapers-us.wm.edu)
- Aid in implementation of a new Integrated Library System (ILS)(Alma/Primo)
- Banner integrations created for automated patron loads that are updated nightly
- Technical support for the digital archive
- Amazon Web Services (AWS) Cloud move testing for various library services: digital archive, special collections, and catalog

LEARN MORE about the Library's new catalog system at: https://goo.gl/FfZXt8

Law School
- Networking infrastructure installation for the new wing of the Law School, including 3 seminar rooms, 20 offices, 2 interview rooms, and 1 new courtroom
- Installation and reimaging of classroom podium computers
- MyLaw (the learning management system for the Law School) updated to SharePoint 2013

School of Business
- "One Tribe, One Login" project streamlined access to William & Mary IT resources for Mason users by consolidating the Mason ID with the WMuserid

READ MORE about the One Tribe, One Login initiative for the Mason School of Business here: https://goo.gl/nmO4NK

- Exchange mailboxes for Mason and W&M combined — including a switch to the W&M Outlook Web Access (OWA) website
- Network shared drives migrated
- Default login domain switched on all Mason faculty, staff, and classroom computers
- Migrated users to CAMPUS domain print server
- Completed implementation of Finanical Edge
- Mason faculty transitioned to using self-service Blackboard Course Generator for course creation
- Miller Hall classrooms adopted Panopto lecture capture solution, replacing Tegrity
- Mason Swipe, a web-based application used for tracking event registrations and attendance, was evaluated for use outside the Business School (Reves Center for International Studies and Academic Advising)
- Windows 10 deployed to classroom podium computers in Miller Hall •

STUDENT INVOLVEMENT & ORGANIZATION MANAGEMENT

William & Mary Information Technology has been helping Student Leadership Development implement a system called CollegiateLink, a module of Campus Labs. Known as TribeLink on campus, the system will document student experiences such as participation in clubs, interest groups, service hours, and campus events using a web interface and card swipe tracking system. These experiences are then compiled into an "involvement record" (a transcript for non-academic participation), which may be utilized in areas across campus, like Career Services, for customized advising and support.

TribeLink is also the new hub for managing recognized student organizations. The system provides a directory of clubs and organizations and useful management tools for student organization leaders. •

LAPTOP DONATIONS TO GHANA

For the fifth consecutive year, decommissioned W&M laptops were donated to Ghana as part of W&M IT's ongoing support of the Student Partnership for Aid and International Development (SPAID) and their partnership with Humanity and Community Development Projects (HCDP) Ghana.

Making the journey over the summer of 2016, the 25 laptops were hand-carried by SPAID to the Volta Region of Ghana to help students in Adaklu Kpatove Primary and Junior High School with research, computer literacy, and other educational pursuits.

Olivia Jebb, a 2016 graduate of W&M and leader of the student group wrote, "The community and school were so excited to set up their new computer room for the students. The students, teachers, administrators, community members, and the NGO that we work with all send their greatest gratitudes to the W&M IT Department. **The partnership that our organization has formed with you has really been one of the most impactful aspects of the work we do in Ghana**." •

Olivia Jebb '16 (below, center) led the effort to deliver 25 W&M decommissioned laptops to the Volta Region of Ghana to be used in local schools.

CIO Courtney Carpenter [in blue shirt] leads accounting students on a tour of the Jones Hall Data Center.

ACCOUNTING STUDENTS VISIT JONES HALL DATA CENTER

Students in Prof. **Michael Stump**'s Auditing Information Systems class in the Mason School of Business' Master of Accounting program got a rare glimpse inside the Jones Hall data center.

Chief Information Officer **Courtney Carpenter** led the class through the racks of servers as they saw firsthand the controls that are in place to ensure the security, reliability, and integrity of the data center and William & Mary's network communications infrastructure. •

COMMUNICATING WITH INTERNATIONAL STUDENTS

Communication with new and current W&M students in other countries can be cumbersome. Certain countries have firewalls in place that prevent students from accessing their **WMApps** (aka Google) email accounts, the primary mode of communication for the university. To solve this problem, W&M IT deployed a new **VPN** specifically for incoming international students, current students, and faculty traveling/studying abroad.

The VPN allows remote access to the W&M network, thereby enabling them to check their WMApps account and access other W&M resources. The service debuted in the summer of 2016, just in time to help newly admitted international students come to campus prepared for the 2016–2017 academic year. •

LECTURE CAPTURE MADE EASY

W&M's new lecture capture tool, **Panopto**, has been gaining popularity throughout the past year. Panopto is a user-friendly tool for recording multiple types of events including in-class lectures, presentations, and tutorials that can be easily distributed to students through Blackboard. •

PANOPTO BY THE NUMBERS	
USERS —	2,804
FOLDERS —	644
SESSIONS —	3,820
VIEWS —	45,119
CLIENTS —	519

BLACKBOARD MOVED TO THE CLOUD

Blackboard, William & Mary's Learning Management System, moved to the Cloud in August of 2016. Servers that were previously located on campus and managed by W&M IT are now hosted and managed by Blackboard. The move was part of the Business Innovation Initiative, a strategic effort to improve effectiveness and efficiency across the university. Being in the Cloud minimizes maintenance downtimes and provides faster response times when working within the Blackboard application, which help faculty and students alike. •

W&M Blackboard

Academic Spaces

NEW BUILDINGS, NEW TECHNOLOGY

We celebrated the opening of two academic spaces in 2016 — one being the third phase of the Integrated Science Center (ISC3), the other being the newly renovated Tyler Hall. W&M IT was intimately involved in the planning for these buildings.

Taking on the challenge of coordinating new building infrastructure with the classroom technology that will occupy it (a task that had previously been contracted out), W&M IT got involved early. This meant that we were able to implement equipment that is compatible with the technologies that faculty use as well as assure support for the classroom equipment when the buildings became fully operable. •

W&M IT's Academic Technology team visited the stage area of the new amphitheater-style classroom in ISC3 when it was under construction to discuss the plans for the screen setup with the new laser-phosphor projectors.

HPC MOVED TO ISC3

The three-person team that supports data-intensive research computing at William & Mary, (W&M IT's High Performance Computing [HPC] team), and their array of high-tech equipment moved to the newly constructed Integrated Science Center in the summer.

The move brought together the SciClone cluster (previously in Jones Hall) and Storm cluster (previously in the ARC at the Jefferson Lab) into one integrated unit. During the move, equipment such as switches, nodes, file servers, and front ends were uncabled, unracked, and transported to the new building. Then they were recabled and reracked in a different layout, and with an improved network configuration. •

High Performance Computing (HPC) servers are now located on the 1st floor of the Integrated Science Center in room 1251. With the glass-front room, you can stop by anytime and watch the exciting computer power in action.

BRINGING TECHNOLOGY TO MONROE'S HIGHLAND

James Monroe's Highland, previously known as Ash Lawn-Highland, was the official residence of fifth U.S. President, James Monroe, from 1799 to 1823 and has been owned by the College since 1974.

In order to make full use of the site, which is rich in both history and landscape, W&M IT worked with Highland staff to install a projector and an audio system in the summer of 2016. There may also be an upgrade to Highland's phone and network infrastructure at a future date. •

Special Collections, William & Mary Libraries

WHAT ABOUT THOSE CLASSROOM PODIUMS?

Ever wonder where the classroom podiums come from? W&M IT's **Steve Haag** from the Classroom Support team makes them all by hand in his home carpentry workshop. He was especially busy last year constructing 42 podiums for the ISC3 and Tyler Hall classrooms. •

Pictured is the last of the podiums Steve Haag built in his home workshop for the 2016 construction projects.

Advancing and Improving Technology

PREPPING FOR BANNER 9

The latest iteration of Banner (Banner 9), promises to be a more adaptable, mobile-friendly, user-oriented experience. However, there is extensive work on the back-end that must be done to get ready for it.

Throughout 2016, William & Mary Information Technology was busy making the necessary preparations for Banner 9. This included moving our Banner web servers from aging Solaris servers to modern Linux servers and implementing our two-factor authentication system which will be used for Banner logins. Preparations also included extensive testing and evaluation of upcoming Banner 9 apps in comparison with our current processes and environment. •

WINDOWS 10

Windows 10 is making its debut at William & Mary. With the sunset of Windows 7, W&M IT has conducted extensive testing and piloting of Windows 10 throughout 2016. Starting January 2017, most new faculty and staff computers will have Windows 10 installed. Windows 10 will also be piloted on select student lab and podium machines during the 2017–2018 school year. •

WIRELESS NETWORK UPGRADE

An upgrade to the wireless network took place throughout 2016. The project entailed upgrading all wireless equipment throughout the entire campus, while creating more effective configurations of that equipment, and upgrading the wireless protocol. The upgrade started in residence halls in the spring and summer and then moved to academic and administrative buildings during the summer and fall. In all there were **2,664** access points installed as part of the project. •

The final wireless access point of the upgrade project was also the hardest to reach. It was installed outside of the Campus Recreation Center over the 2016–2017 winter break.
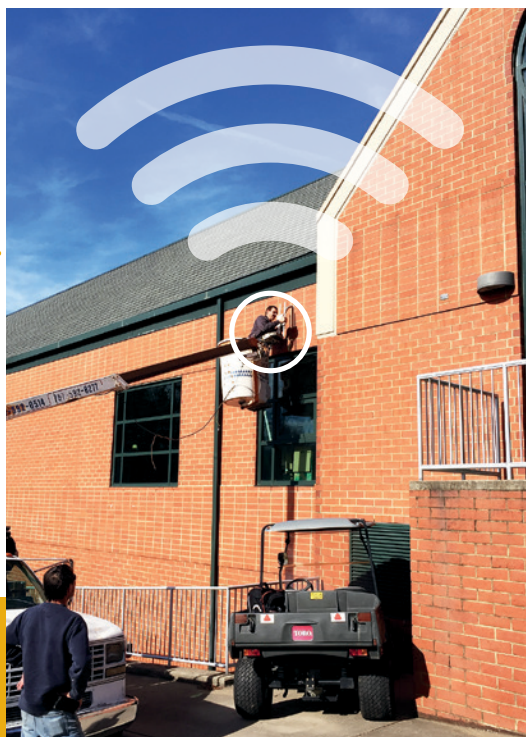
Read more about the wireless network upgrade at https://goo.gl/2XDivl

Nicknamed the "Shew-bot", the robot allows W&M IT's Shewlyn Chen-Stewart to interact freely with her coworkers, even though she is currently working from Nebraska. Her biggest challenge? "Pushing the button for the elevator," joked her supervisor Corinne Picataggi.

TELEPRESENCE

W&M IT has been testing telepresence technology with one of our own.

Shewlyn Chen-Stewart works for W&M IT but has lived in Tennessee and now Nebraska for the past five years due to her husband's job. For several years she telecommuted, which primarily involves communication via telephone and occasional office visits. It worked successfully; however, interactions and personal connections were limited with this arrangement. Now with telepresence, Chen-Stewart is able to "roam" around the department, interact more freely with her coworkers, and have "face-to-face" conversations with her supervisor.

The telepresence setup consists of the robot (model Double 2), two iPads (one on the robot, one for Chen-Stewart), an app, and a charging station. Using the app, she is able to activate the robot remotely and then drive it around to come and go as she pleases.

"We hope this will allow Shewlyn to engage more in brainstorming, planning, and just general participation and discussion at a higher level," said W&M IT Director of Software Systems **Corinne Picataggi**. "We're also testing it to better understand the technology in a real-world environment, to learn where we could leverage it in other areas across the university." •

Data Integrations

At William & Mary, most data is generated from an internal system such as Banner, Advance, Blackboard, or the Accounts databases, all of which W&M IT manages. However, most departments want to receive data from an internal system and put it into an external system that is more specialized for the needs of their own department.

For example, W&M IT recently implemented a system called **T2 for the parking services department**. T2 needs demographic data from Banner to identify who is eligible to buy a parking pass. It also uses Banner for enhanced features related specifically to parking services, such as payroll deductions for employees to purchase a parking pass.

Making systems like T2 and Banner talk to each other requires a data integration. If the integration is only pulling data from one system to another, such as demographic data, it is called a **one-way integration**. These integrations are usually simple flat files. They require programming, but are not usually complicated if the data is pulling from the internal system to the external system, which is generally the case. However, one-way integrations can be more complicated if the data is going the opposite way (external system to internal system).

If the external system has to pull data and also push data back to the internal system, it is called a **two-way integration**. These integrations can be much more complicated, both from a data-integrity standpoint and a security perspective. In the example of the T2 system, there is a two-way integration that allows T2 and Banner to talk back and forth for payroll processing.

This is one example of the many external systems that integrate with our internal W&M systems. With a growing quantity of external systems being purchased at W&M, data integration requests are on the rise. Each new integration is an effort requiring valuable personnel time to evaluate the potential integration, program it, and then manage it.

On the opposite page is a map of the existing data integrations between internal and external software systems at W&M. Keep in mind that **this is only part of the integration story**. Besides the integrations needed for data, there are additional integrations to provide services such as authentication, web services, user-interface connections, security, etc. •

MOVED TO THE CLOUD IN 2016

The following systems either moved to the cloud or are new cloud-based systems. Most have data integrations connecting them to internal W&M systems.

- AidData Application Tools
- Alma/Primo (Library Catalog)
- Blackboard (Learning Management)
- CampusLabs (Accreditation)
- Cornerstone (Performance Evaluation)
- Equifax (I-9 Employment Verification)
- Financial Edge (Mason Finance)
- Give Campus (Crowdfunding/ Ambassador Portal)
- Haven (Student Affairs)
- Live Text (School of Ed. Accreditation)
- NCAA (Information on Athletes)
- Poll Everywhere (Polling System)
- StarRez (Housing)
- Studio Abroad (Study Abroad)
- Symplicity Accommodate (Accessibility Services)
- T2 (Parking)
- Workplace Answers (HR)
- Zoom (Videoconferencing)

GOING TO THE CLOUD IN 2017

- Athletics Compliance (Replacement System)
- CampusLabs — CollegiateLink (Student Orgs)
- CampusLabs — Outcomes (Student Assessment)
- CampusLabs — Baseline (Student Assessment)
- Chrome River (Travel Management)
- Cornerstone (Learning Management)
- Digital Archive (Library)
- DocuSign (Electronic Signatures)
- Email — Microsoft Office 365
- FAMIS (Facilities Management)
- Raisers Edge (Mason Finance)
- Salesforce CRM (Marketing, Events, Grad Admisssion)
- Volunteer Management (Advancement)

66

Number of systems managed by W&M IT with data integrations in 2016. The number is continuously growing.

Salesforce

Other Systems

1   3

1

1

1

Blackboard

5

3   3

3

8   20

1   1   1

Banner

1

Advance

1

1

1

CS Gold
(ID System)

1

1

1

1

1

1

Operational
Data Store
(ODS)

1

2   10

3

Accounts
Database

2

Other Systems

ICONS

Systems in the Cloud going to the Cloud, or hosted offsite

Onsite systems hosted by W&M

INTEGRATIONS

One-way integration with arrow indicating direction of data flow

Two-way integration

Number of systems integrated between the two items

Decisions about Data

Bits of storable, transmittable computer information are known as data. Data can be measured, collected, reported, analyzed, and visualized. It is becoming an increasingly valuable resource. It can provide understanding, enable connections, and help track what has happened in the past — often to provide guidance for the future. With a growing reliance on data for daily transactions and decision making, the hunger for data has been on the rise.

At William & Mary, IT makes sure that collected data is stored, secured, and ready for use. But how we do so is currently under consideration. The Salesforce Constituent Relationship Manager (CRM) invited conversation about the role of a Master Data Management (MDM) system at W&M. The MDM could bring together key data from disparate systems for more streamlined retrieval.

In the long run, the MDM would no doubt prove to be valuable. Data from various systems could be cleaned and retooled to be mapped into the MDM. This would allow us to easily unite W&M data sitting in external systems with our internal systems for sharing or analysis. An MDM would bring together those kinds of "data outposts."

"We are working to identify what is best for William & Mary at the moment. An MDM is something that we can consider in the future," said W&M IT Director of Data Management Rachel Pace.

Pace explained that there are systems with more focused functionality that are being considered to meet our current needs. These include tools to aid in improving data quality and data governance. Her team is also looking at various data collection solutions including data marts, data warehouses, virtual data hubs, and structured and unstructured data stores. These storage technologies would provide better access to data for reporting, analytics, and predictive modeling and could reduce the load on our core transactional systems. In addition, tools like **Qlik Sense** are currently being implemented by W&M IT to bring together data from multiple sources for enhanced analysis and reporting.

Meeting demands for data is a welcome challenge. Managing W&M data at an enterprise level is a complex process. With growing amounts of data and increasing data needs, comes growing needs for data management solutions. "We will keep working to keep data organized and flowing," said Pace. "We are continually looking for the tools that best suit William & Mary's current needs, but we also have to anticipate what we might need for the future." •

Qlik is Modernizing Data Analysis at W&M

To help make effective and efficient decisions, William & Mary wants to better employ the use of data analysis. The university has recently purchased licenses for two data discovery tools from the business intelligence and visualization software company, Qlik. These two tools, Qlik Sense and Qlik nPrinting, will provide an opportunity for W&M to examine data in diverse, contemporary ways that will allow the university to gain new insight into decision-making processes.

QLIK SENSE is a data visualization tool that can be used to create customizable apps that bring together data from multiple systems and data sources, bridging together data points. These apps can include visualizations such as charts, graphs, and tables that enhance the ability to understand and analyze our data in new and exciting ways.

QLIK NPRINTING features drag-and-drop functionality to create custom reports quickly and easily. In addition, through Qlik nPrinting, reports can be
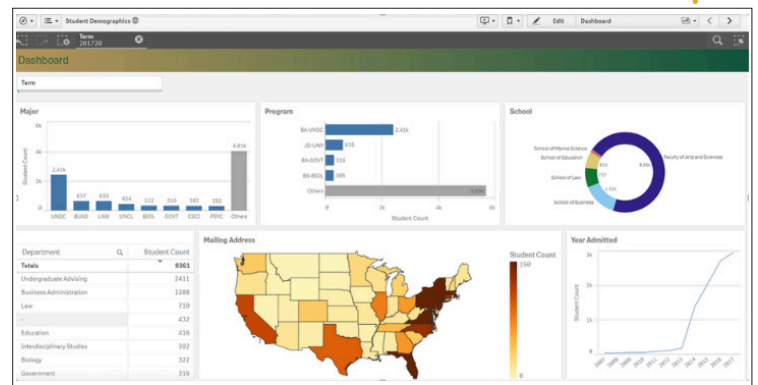
scheduled and delivered to users to provide access to information in a timely manner.

Qlik will be phased in slowly throughout 2017, largely because a complex security infrastructure, time-intensive data merges, and sophisticated back-end constructs are needed to enable each Qlik app. The first app to be released is finance-related. The second one is course capacity planning. Both have been in development in 2016 and are expected to be ready in the spring of 2017. •

CLOUD EMAIL EXPLORATION

Email for W&M faculty and staff is slated to be the next big enterprise-wide system to move to the Cloud. But the question in 2016 has been, to which Cloud should email move? Many cloud-based email services were under initial consideration, with Google Gmail and Microsoft Office 365 receiving the most deliberation.

To find which solution was the best fit for William & Mary, IT consulted with various departments on campus evaluating their email and business needs and then comparing it to the offerings and limitations of both services. Applications and tools related to each service were also considered. Findings were presented to ITAC (IT Advisory Committee) and other IT governing groups.

In the end, the decision was made to move faculty and staff email to **Microsoft Office 365** to meet the university's business needs and make use of its suite of applications (SharePoint, OneDrive, OneNote, Planner, etc). However, Google services will also be made available to faculty and staff (in addition to students) via single sign-on (SSO), making the Google for Education suite accessible to everyone at W&M. •

HR PROCESSES MOVE ONLINE

Cornerstone, William & Mary's new performance management system, took the paper-based employee evaluation system and moved it online to a user-friendly, web-based platform. W&M IT worked behind the scenes to build integrations and workflows for the new system. Cornerstone was first used for evaluations of Classified and Operational staff in December 2016, followed by performance planning in early 2017.

Cornerstone also provides a self-guided, continuous learning and training tool. Integrating with Lynda.com, it provides personalized training courses and maintains a transcript of courses taken by an employee. The learning management tool is currently under development and is expected to become available in spring of 2017. •

AUTOMATING TRAVEL REIMBURSEMENTS

New software called **Chrome River** automates the process of issuing advances and reimbursements for those traveling on university business. Chrome River lets travelers keep track of expenses online, with features that make it easy, such as the ability to take and store pictures of receipts. Reimbursement approvals are routed automatically through a web-based workflow and then, when finalized, deposits/checks are generated automatically. The system was being developed and tested throughout 2016 and will be piloted on April 1st of 2017, in preparation for a July 2017 go-live date. •

18%

Reduction in copying costs campus-wide after contracting for 120 Xerox copiers. Savings the first month alone were $2,531.54.

PRINT MANAGEMENT

W&M IT took over the management of printing on campus in September 2015. The move, part of the Business Innovation Initiative, consolidated the management of printers with that of copiers, brought them under one contract, and shifted responsibility of managing the new program to IT.

In 2016, we saw growth in the program and now have 225 copiers on the contact (136 Xerox, 89 Ricoh). Continued growth is expected in 2017 as older hardware is retired. The pricing structure is such that as more Xerox machines come on board, the cost per page goes down,* with the potential of producing significant savings for departments.

After we reached the 120-device threshold, copier savings in the first month alone were $2,531.54 across campus, representing an **18%** reduction in cost. •

Per Copy Price Drops

Per Page Copy Costs	Black & White Page	Color Page
Initial Contract Pricing	1.5¢	10.97¢
When 80 devices came on contract	1.41¢	9.83¢
When 120 devices came on contract	1.14¢	8.00¢
When 148 devices come on contract (*expected Sep./Oct. 2017*)	0.93¢	6.5¢

Based on Xerox devices

* There are also 58 printers on contract with an average savings of 1.5¢ for black & white prints and 2.5¢ for color pages.

Reducing Risk

COMPUTER PROTECTION

While traditional anti-virus software is somewhat effective, it is not enough to protect computers from current threats in today's environment. An individual's vigilance is the most effective protection but with drive-by exploits and zero-day attacks, even the most cautious user can become a victim.

Cylance Protect is a new computer security service that analyzes executable files for abnormal behavior in real time. It uses a database of previously analyzed files and artificial intelligence to determine whether an executable file is safe or dangerous for computers. Cylance Protect was configured, tested, and successfully deployed to a pilot group in the second half of 2016. It will be deployed to all computers on the university's SecureNet network (those computers that have access to the university's sensitive data) as well as all Windows servers in 2017. Eventually, Cylance Protect will replace Sophos Anti-Virus as William & Mary's primary form of computer protection. •

TWO-FACTOR AUTHENTICATION

Authentication means verifying an individual is who they say they are. In most cases, this involves a username and password. With phishing and other security risks on the rise, passwords are becoming increasingly vulnerable. Two-factor authentication is used to help protect against unauthorized access to accounts. It requires two methods of authentication to verify identity (such as a password and verification from a mobile phone).

In 2016, W&M IT started using a software system called **Duo** to employ two-factor authentication on the new Virtual Private Network (VPN). Duo will be added to more W&M IT systems in the coming years, but the initial focus has been on systems that access the W&M network remotely. •

W&M IT's Melissa Marshall played a "key" role in the effort to keep the university's master keys safe.

KEEPING MASTER KEYS SAFE

In the fall 2015 semester, a set of William & Mary master keys for residence halls was lost. In response to this incident, the university implemented KeyBox, a new master key storage system using state-of-the-art technology that increased security and accountability for the keys. W&M IT helped in this effort and worked with Residence Life and Facilities Management in the spring of 2016 to implement the new system. •

READ MORE: https://goo.gl/NH8yaJ

SECURING THE CAMPUS

W&M IT continued to assist the W&M Police Department with expanding the technical infrastructure supporting the network-based **security cameras**. Though the security camera system is not new to campus, new cameras were added to renovated and newly constructed buildings as they were opened for public use. The security cameras are intended for public safety and crime deterrence, and are used as an investigative tool when a crime is reported. The newly expanded system includes 17 DVRs with 80 TB of storage, allowing for several weeks of video to be stored. •

IDENTITY MANAGEMENT

To manage the needs of William & Mary's ever-growing population, W&M IT is preparing to modernize our current home-grown identity and access management systems. Supporting the dynamic and multifaceted roles of the Tribe community is a complex process and requires a focused effort. In light of that, IT created a new position

dedicated to identity and access management. **Eric Myers** (previously a W&M Windows engineer) was appointed and in 2017 he will lead the selection process for the ID Management system and start preparing for the upcoming transition. •
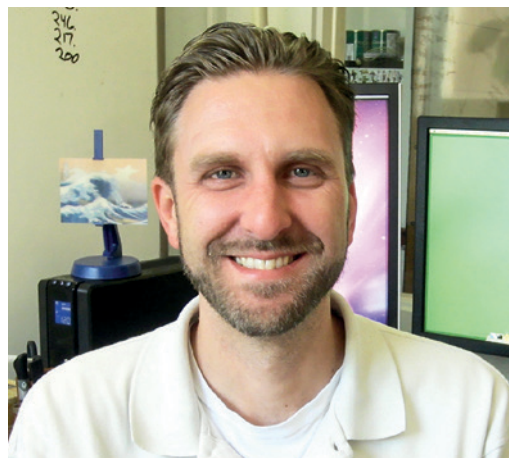
Eric Myers is now leading identity and access management efforts at William & Mary.

MICROSOFT OFFICE 365 ///

Now that the Office 365 cloud-based email system has been chosen to replace William & Mary's on-premise Exchange servers, the work begins of migrating email to the new system and implementing the remaining suite of Office 365 applications. The email migration is expected to be completed by the end of the fall 2017 semester.

DIGITAL TV & CONTOUR ///

Cable TV at William & Mary will be going digital in early 2017. The upgrade to digital will include Cox high-definition programming and an expanded channel line-up. Campus Contour, a new service from Cox that streams live cable TV to computers, smartphones, and tablets, will also become available to W&M students in Spring 2017.

BANNER 9 IS COMING! ///

W&M IT has been laying the foundation for the move to Banner 9. Necessary infrastructure work took place in 2016 to begin the transition, which involved retiring aging Solaris hardware and transitioning to Linux machines. Additional preparations included evaluating the scope of the project and securing the resources needed for the implementation. Moving in phases, the Student, HR, and Finance processes will go live in 2017 and 2018. New web apps, like a faculty grading app, will also become available with Banner 9.

EXPANSION OF VPN ///

GlobalProtect is William & Mary's new VPN software. The current Juniper VPN will soon be retiring and Global Protect will be implemented for the entire W&M community. The expansion will allow access to W&M resources and services securely while away from campus. GlobalProtect will also employ Duo two-factor authentication. We are in process of procuring the infrastructure needed for the expansion and anticipate full implementation during the summer of 2017.

SCHOOL OF ED ONLINE ED.D. PROGRAM ///

W&M IT is assisting the School of Education in a new online learning venture. The program will begin in the spring 2017 semester, with the first cohort being a group from Miami-Dade County, Florida, taking courses in a partially synchronous distance-learning format. IT has helped by evaluating synchronous learning tools, selecting a video conferencing product called Zoom, and integrating it with single sign on (SSO) authentication and Blackboard for ease of use in synchronous classes and meetings.

THE TSC IS MOVING TO JONES 201 ///

The Technology Support Center (TSC) will have a new service area in Jones 201. The new space will provide easier accommodation for walk-in clients. It will include a walk-up counter, a waiting area with comfortable seating, additional seating at each of the five technician work spaces, and an area with ready-to-use computers for clients with account issues.

EXPANDED ROLE FOR TICKET SYSTEM ///

The Cherwell support ticket system has provided service management to W&M IT for six years. To take full advantage of the system, W&M IT will start developing and expanding additional Cherwell features such as a self-service portal, a knowledge base, a service catalog, and will weave them into our existing workflows and processes.

DOCUSIGN ///

DocuSign is bringing electronic signatures to W&M. With DocuSign, documents can be signed securely online from anywhere with an Internet connection. Data entered in the fields on the forms will be downloaded and pulled into Banner, removing the need for manual data entry. A pilot program will take place in 2017, in anticipation of a limited release later in the year. •

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