Computing Annual Report

2016-2017 Academic Year

November 14, 2016
The purpose of the Computing Annual Report is to provide a concise summary of the major projects and initiatives on which the Computing team worked over the past year, as well as to introduce the areas of focus for the current year. Thank you for spending some time to review this report. Should you have any comments, or any questions or concerns arise, your feedback is always appreciated.

The first section of the report will focus on our accomplishments from the 2015-2016 academic year, which was a banner year for IT improvements. These included the launch of the Institute’s redesigned website, significant upgrades to our network and enterprise data storage infrastructure and also included media technology support for major campus events. These topics and others will be expanded on in the section below.

Following that review, the second section will focus on our priorities and goals for the current academic year, 2016-2017. This year will also undoubtedly be a busy one, involving new administrative computing systems, additional focus on business continuity and information security, continued improvements to the new website, a renewed focus on Computing’s own process for strategic planning and project management, and the introduction of support resources for scholars working in the Digital Humanities.

2015-2016 Year in Review

Organizational Structure, Personnel, and External Resources

In June, Maria Mercedes Tuya was promoted from her position as an Academic Assistant to the new role of Software Support Specialist for the School of Historical Studies. In her new capacity, Maria will be focused on providing additional technology support for SHS scholars with advanced software needs. In addition, she will be working on developing and delivering a new set of support resources for IAS scholars working in the emerging field of Digital Humanities (DH), as well as providing technology support for DH projects being championed by members of the IAS faculty.

Beyond this addition, the Computing department enjoyed a year of stability, with no additional changes to our current staff. Throughout the year, we did benefit from the work of several excellent interns and summer students, including Nicholas Helmstetter, Joshua Deibel, Alex Schear, Krishan Perera, Alex Pinto and Jonathan Bernstein.

Data Security, Business Continuity and Disaster Recovery

- **Lights-Out Datacenter (LODC).** Significant work has been done in the past year in the effort to convert the basement of the Housing Activities Building into a second campus datacenter. At the close of the year, the construction has begun, and we anticipate the space will be online later this Fall. The goal of the space is to provide greater resiliency for Computing’s core systems, including our Internet connectivity and campus networks, as well as critical applications. More detail about the specific plans for these services will be outlined in the section below on our 2016-17 plans.

- **Acquia Hosting for IAS websites.** In connection with the launch of the Institute’s new website, this past year also saw the move to hosting the website using off-premises server resources. After an exhaustive study, Acquia was selected as the partner for this service.
Running the IAS web presence from Acquia ensures the site is reachable even if our campus Internet connection is offline, and also that content sits closer to those people who are attempting to access it, improving the speed and responsiveness of the site.

- **OpenDNS.** In a major improvement related to data security, this past summer Computing enabled the OpenDNS service, which protects campus systems from being in contact with hosts on the Internet that are known to be infected with malware or associated with other activities which might put your data or system security at risk. Working alongside our ongoing efforts to better educate campus users about data security, OpenDNS will prevent inadvertent access to infected sites, including those that might be sent via email phishing attempts.

**Infrastructure**

- **Network Improvements.** As in years past, significant time and resources were dedicated in the last year to network infrastructure improvements. Aimed at ensuring the stability and proper performance of the network, work was conducted across the wired and wireless networks, as well as across member housing and the academic campus. The main switch providing connectivity to servers located in the C4 datacenter was upgraded this past summer. Building-level network switches were upgraded in several locations in member housing, as well as 97 Olden Lane and Marquand House. Wireless network access points continue to be rolled-out and upgraded to ensure pervasive wireless coverage in all areas of the IAS campus.

- **Cable Plant Upgrades.** Beyond the hardware and software upgrades mentioned just prior, much work was also done maintaining and updating the campus data cable plant as well. As part of the LODC work, one of our two Internet connections was relocated to that space, providing geographic diversity for our Internet presence. Cabling upgrades were completed throughout Simonyi Hall, Building A, Building B, West Building and parts of Fuld Hall. Furthermore, fiber optic backbone cabling has been run to several locations to provide for fully redundant links to all academic campus building blocks, as well as to provide future connectivity to construction sites including the Modular Office Space, Faculty Housing and Rubenstein Commons.

- **Enterprise Storage Upgrade.** Another major effort completed this past summer was an upgrade of the campus-wide enterprise data storage environment. This upgrade adds additional capacity, as well as improved performance, reliability and maintainability to the system which provides the back-end disk space for nearly all campus file servers and IT services. Currently, the system has the capacity to store nearly three-quarters of a petabyte (750 TB) of data. As part of the same project, an upgrade was also made to our backup system. Moving away from outdated and potentially insecure tape-based technology, the upgraded backup system uses a combination of spinning disks located both on-campus and securely in the cloud to ensure full data protection. As part of the upgrade, Computing staff ensured that we are able to meet, and will continue to meet, all advertised retention targets for backed up data.

- **Other Infrastructure Improvements.** Several additional infrastructure projects were completed in this past year. These include:
  - **Princeton Library Gateway Upgrade.** An upgrade to the PULibGateway service,
which links IAS users to Princeton University library content and e-journals, was completed this past year. This upgrade added support for journal access over secure or non-standard connections, and also simplified management of this important resource.

- **Campus Telephone System Update.** This past summer also saw an update to the campus telephone system, adding upgraded hardware, bringing the switch to the latest operating system revision, and increasing the capacity to host voice-over-IP (VoIP) connections in addition to traditional analog lines. These new VoIP connections will be used to outfit the Modular Office Space later this fall.

- **Directory Services.** Underpinning several other initiatives discussed in this report, Computing continued to upgrade and evolve our campus directory services. This year saw improvements to both the LDAP and Active Directory environments, as well as continued growth in the number of services utilizing these resources. In related work, an upgrade was also done to the Central Authentication Service (CAS).

### World Wide Web, Campus Databases and Data Integration (D&I)

- **Institute Website Redesign.** The culmination of a nearly two-year effort, and in collaboration with the Communications group, the Institute’s redesigned website launched this past April. The redesigned site provides a significantly more user-friendly experience, and fast and easy access to dynamic content about the Institute and its academic output. It improves readability on mobile devices, and has tighter connections to our social media feeds. The new site, based on the Drupal content management system, utilizes a host of new technologies and data integrations, as well. Included in this effort was also the move to hosting IAS video content on YouTube, which was also completed this past year.

- **Administrative Computing.** This past year also saw a continuation of the efforts to expand and modernize the Institute’s administrative computing platform. Work this year focused on identifying and evaluating systems to improve two areas: HR/payroll and also Facilities Management. These efforts were fruitful in the selection of SyncHR and SchoolDude, respectively. More information on the future plans and impact of these systems will be covered later in this report.

- **Online Application Enhancements.** Major improvements were made to the system which manages the application process for prospective members. For the schools of Mathematics and Natural Sciences, this work took the form of a data integration effort with Duke University (host of MathJobs.org and AcademicJobsOnline.org). In this new configuration, the front-end of our application for these two schools is hosted on those sites, and data is then aggregated by the IAS system for processing and member selection.

  For the schools of Historical Studies and Social Science, the application front-end is still hosted on our local system. Nonetheless, a major change was made this year which modernizes the collection of reference letters, dramatically reducing manual effort and inadvertent errors, while also giving applicants better control over their own information.

  For all schools, an upgraded version of the application processing system ties all of these
changes together, as well as providing an updated look and feel.

- **UpdateMe.** In conjunction with the redesigned website, a redesign has also been completed for UpdateMe, our self-service data collection tool for members of the IAS community. Via UpdateMe, users can provide information to be used by the campus emergency notification system, update their online scholar profiles, register their family members for authenticated network access, and more. The service is online at https://updateme.ias.edu.

- **AMIAS Email.** Since this past summer, through UpdateMe, members of the AMIAS community are also able to sign up for perpetual email forwarding service, as well as manage their target mailbox. These accounts, taking the form of firstname.lastname@amias.ias.edu, will provide a permanent network identity to those scholars to whom this might be beneficial.

### High Performance Computing (HPC)

Continuing our fruitful partnership with the Princeton Institute for Computational Science and Engineering (PICSciE), this past year IAS contributed towards the purchase of a new high-performance computing cluster hosted at Princeton University. This contribution went to fund part of the Perseus cluster, a 320-node Beowulf cluster. More information on Perseus can be found online at [https://www.princeton.edu/researchcomputing/computational-hardware/perseus/](https://www.princeton.edu/researchcomputing/computational-hardware/perseus/).

In addition to our on-premises HPC resources ([http://www.sns.ias.edu/computing/hyperion_cluster](http://www.sns.ias.edu/computing/hyperion_cluster)), IAS scholars also have access to all computing resources offered by PICSciE. If you are interested in utilizing any of these systems for your research, please contact your helpdesk for further information.

### Media Technology Services (MTS)

- **Wolfensohn Hall Updates.** This past summer major improvements were made to the audio/visual setup of Wolfensohn Hall. These improvements included a new high-definition projection screen, a new digital video distribution system and the installation of updated controls for the hall lighting system.

- **S-101 Video.** Digital video distribution was also updated in Simonyi Hall’s S-101 seminar room, providing improved compatibility to laptops and other devices.

- **GR@100.** The MTS group also provided audio/visual support and live streaming for the General Relativity@100 conference, which took place on campus in November 2015.

### School-Specific Projects

As always, the school Computing teams are primarily focused on the day-to-day support of their faculty and members. In addition, those team also play key roles in many of the projects identified above. This year, all of the school teams were active participants in the enterprise storage migration, which was successfully completed, as noted earlier. Beyond all of this, the groups also completed the following:

- **Information Technology Group.** Closing out another busy year, ITG completed a series of upgrades to their infrastructure, including their virtual servers and the Zimbra email system. In addition, they contributed to the planning and execution of the Modular Office Space, as well as support for the SchoolDude rollout and the BoardEffect system.

- **School of Natural Sciences.** NS Computing also performed a number of key upgrades to their
servers, including new web and email servers, as well as rolling out new tools for configuration management. They remain heavily involved in Computing’s storage and virtualization initiatives, as well as managing the Crashplan backup service, among others. This year, they also were active in supporting their school’s move to AcademicJobsOnline.

- **School of Mathematics.** Math Computing also conducted a number of system upgrades to their infrastructure and office systems. They serve as crucial contributors to campus directory services projects. They were also very active on the software development front, supporting their school’s move to MathJobs, developing a new application system for the Women and Mathematics program, and working to integrate the Institute’s library of video-recorded math lecture into the NSF’s Math Institute.org video library (mathinstitutes.org).

Although it is by no means an exhaustive account of all projects completed, the above list represents the important areas on which the Computing staff focused the majority of their project-based efforts in the past year. As in all years, our paramount objective is to support the IT needs of scholars, scientists and staff of the Institute. We feel the projects identified above and their focus on improved operational efficiency and manageability directly increase our ability to provide the necessary resources to meet this over-arching goal.

### 2016-2017 Goals and Objectives

For the 2016-2017 academic year, Computing will continue to identify the changing and evolving needs of our community and work to ensure that our systems and services are able to meet these new goals. To this end, our large-scale project efforts for the coming year will include a continued focus on the Lights-Out Datacenter and administrative computing upgrades. In addition, work will continue on network improvements, data security enhancements and data integrations. Further details of these initiatives and others are outlined in this section.

#### Infrastructure

- **Lights-Out Datacenter.** With the completion of the construction phase expected this fall, Computing will begin to re-engineer our critical services to take advantage of this new resource. Within this year, we anticipate the LODC providing increased business continuity protection of all critical network services, authentication and authorization systems, data backup and restore, and many other core services. In addition, the groundwork will begin on the using the LODC space to add resiliency to campus email and user file servers.

- **Upgrade to Campus-wide Virtual Private Network (VPN).** As part of the ongoing equipment life-cycle process, this year Computing will be investigating a replacement for the current campus VPN server. The upgrade will aim to address the known limitations in the current service, including connection stability and mobile device compatibility. A goal of this upgrade is to identify a tool that utilizes modern and open standards, and works across all supported platforms including Linux, Android and iOS, in addition to Windows and MacOS.

- **Upgrades to Campus Cable Plant.** Continuing the work of the past two years on modernizing the campus data cabling plant, this year the project will aim to upgrade cabling in all remaining
areas of Fuld Hall, namely the 3<sup>rd</sup> and 4<sup>th</sup> floors as well as the Director’s Office. In addition, cabling work and planning will continue in relation to construction sites, including Member Housing, Simons Hall, the Modular Office Space, Faculty Housing and Rubenstein Commons.

**High Performance Computing**

- **Hyperion Cluster Replacement Planning.** This year, the HPC team will be focused on planning for the replacement of the Hyperion cluster, as it approaches the end of its 4-year lifecycle. This effort will begin in early 2017 and will aim to identify a vendor and configuration in time for an installation ahead of the start of the 2017-18 academic year.

- **HPC Consortium.** In addition to maintaining our on-premises installation, we will also continue our participation in an HPC consortium with Princeton University and Princeton Plasma Physics Laboratory, among others. As is always the case, we seek through these arrangements to provide access to HPC resources beyond the capability of our on-campus resources.

**World Wide Web, Campus Databases and Data Integration**

- **Administrative Computing Environment.**
  - **Upgraded HR and Payroll System.** The first major upgrade of the new HR and Payroll system will be implemented this year, in several phases. As part of this upgrade, we will be shifting to a new system, known as SyncHR. The upgrade will commence with the processing of payroll through the new system beginning in early 2017. In addition, these changes will also mean an upgraded look and feel for the employee time card system and the Institute’s recruiting system.
  
  - **Comprehensive Maintenance Management System (SchoolDude).** Computing will also be working to support the Facilities group in the further implementation of the SchoolDude system. This will include infrastructure support for technicians working with the Maintenance Direct work-order engine, as well as IT support and project management for the implementation of the Capital Forecasting, Event Management and Planned Maintenance modules of the system.

- **Identity Management/Incoming Member Credentialing.** In coordination with the goals of the Academic Operation Working Group, a focus for this coming year will be on improving the new member onboarding process. This effort will provide an opportunity for Computing to focus on the broader subject of campus identity management, as well. To this end, we anticipate further integration between the various components of the campus data environment, from the application process, through employment, and on into the future.

- **IAS Website Redesign.** Following its successful launch this past April, the D&I staff and our external partners will aim to continuously add new features and functionality across our various websites, in addition to improving the interoperability thereof. Changes planned for this year include a better integration of the IAS Video website into the main site, as well as rolling more
of the new main site functionality out to the school-specific sites.

Data Security, Business Continuity and Disaster Recovery

- **Improved Security Analytics.** Working with local and regional partners, the office of Information Security aims this year to improve their use of analytics to better inform and guide our network security and data protection efforts. This initiative will identify key performance indicators for the campus environment, and use those to best allocate our security resources, while remaining fully aware of our commitment to user privacy and academic freedom.

- **Pilot Implementation of Two-Factor Authentication (2FA).** Also this year, a team of Computing staff will be evaluating ways that IAS can begin to embrace two-factor authentication within our environment. 2FA technologies improve security over traditional password-based access controls by basing the authorization for access not just on knowing a password, but also being able to provide an additional means of identification.

Digital Humanities

- **DigitalScholarship@IAS Website.** The Digital Scholarship team was proud to launch the DigitalScholarship@IAS website at the start of this academic year. The site, found online at [https://www.ias.edu/digital-scholarship](https://www.ias.edu/digital-scholarship) provides a host of resources for scholars working in this area. In particular it includes several discipline-specific toolkits, as well as up-to-date links to news and training opportunities in the local area.

- **Digital Scholarship Conversations Series.** In addition to the website, this year also saw the launch of the Digital Scholarship Conversations colloquia, organized by the Digital Scholarship Working Group, and funded by the office of Academic Affairs. The goal of the series is to bring 6-7 speakers to campus annually to participate in discussions about current issues and interesting projects, and raise awareness and coordination of this emerging field.

- **Support for IAS-Sponsored Projects in Digital Humanities.** As noted in the first section, new staff resources have been dedicated to providing support for efforts in the Digital Humanities. This includes support for projects being undertaken under the direction of the permanent faculty. This year, these projects include planning for the digitization of the Institute’s collection of over 23,000 squeezes and The Zaydi Manuscript Tradition: A Digital Portal, in collaboration with the Hill Museum and Manuscript Library. Also, work will begin on planning and possibly implementing an open-access institutional repository for the Institute.

Media Technology Services

- **Videoconferencing Expansion.** Over the course of this year, MTS staff will be working to upgrade and expand the availability of enterprise video conferencing to additional meeting locations and seminar rooms around campus. This also includes expanding the use of Vidyo for smaller-scale conferencing needs.
• **Support for Campus Events.** In addition, the full breadth of the Audio/Visual infrastructure will be on display during large campus events this year, including Natifest and Avi Is 60, among others. These include the hosting of several days of talks, online streaming, campus overflow, video recording, and more.

• **Rubenstein Commons Planning.** As plans continue to emerge for the new meeting and presentation spaces in the Rubenstein Commons building, MTS staff will be actively guiding the efforts around the technologies selected for audio/visual presentation and digital signage in the new space.

**Conclusion**

The projects identified above are not a complete listing of all work that will take place, but rather an attempt to highlight the most meaningful areas on which we will be focused in the coming months.

Thank you again for spending a few moments to familiarize yourself with the past activity and upcoming projects in Computing. If there are any areas that you feel should also receive attention that were not addressed by this listing, please reach out to a member of the Computing staff, and we will work with you to incorporate your needs into this roadmap. All of these projects are identified and prioritized to help address our ultimate goal, ensuring that Institute members, faculty and staff have the information technology resources and services they need in order to complete their own work.