IAS | INSTITUTE FOR ADVANCED STUDY

Computing Annual Report

2022-2023 Academic Year

October 20, 2022

https://www.ias.edu/campus/computing/

Introduction

This report outlines the efforts of the IAS Computing team as we endeavored to continue to meet the evolving technological needs of our community this past year. Leveraging a mix of planned upgrades, new services, data integrations and a dedication to exceptional support, the following pages will detail the many successes that provided the platforms for the Institute as it emerged from the pandemic, fully returned to campus, and underwent a change in leadership.

The ability to quickly respond to a changing technological landscape, and more broadly, changing campus needs, is made simpler by a robust information technology planning effort. This forward thinking begets a mature campus infrastructure, which itself serves as the foundation for agile decision-making. At IAS, this process begins with input from faculty, scholars and staff, which is synthesized through the expertise of the Computing team. The Strategic Planning Committee for Computing, with guidance from the Faculty Committee on Information Technology, then works to refine and prioritize these efforts and turn them into actionable projects. From there, the Computing staff work together and alongside any needed partners, vendors or consultants to implement these changes to improve our campus or augment our service offerings.

Although this report touches on many of the initiatives that are underway or recently completed, IAS Computing offers a full range of IT services and support. All campus technology consumers are encouraged to review the full catalog online and familiarize themselves with all of the resources and services available to aid their research and enrich their time on campus. Please visit:

- https://www.ias.edu/computing/services

2021-2022 Year in Review

Organizational Structure, Personnel, and External Resources

The staff of IAS Computing are the key ingredient to the success of the many achievements outlined in this report, as well as those planned for the future. This section outlines the few changes to the team during the past year.

- **Information Technology Group (ITG).** Brian Farkas joined the ITG team as a Computing Support Specialist this past June. In this role, he serves as front-line support for faculty, scholars and staff in the School of Historical Studies and School of Social Science, as well as for the IAS administration.

- **Media Technology Services.** Computing was also pleased to welcome Dayne Lewis into the role of Media Technician this past April. Dayne joins the MTS team, whose responsibilities include supporting audio/visual needs and hybrid conferencing setups for events taking place here at the Institute, as well as recording and editing the videos of lectures, seminars and concerts.

As in past years, the entire IAS community also benefitted from the hard work of several contractors,

interns and summer students that assisted the Computing team. This past year, we are grateful for the contributions made by Dima Bischoff-Hashem, Sylvester Boateng, Gavin Dawson, Josh Goldhammer, Raymond Johnson and Colin McCafferty in service to the efforts discussed below.

Information Security, Business Continuity and Disaster Recovery

- **COVID-19 Response.** Computing continued to be heavily involved in supporting the campus-wide response to the Covid-19 pandemic, and the shifting campus posture as the year evolved. This past year, Computing contributed to new systems used to collect and support the campus' vaccination policies; the support of the CrowdPass and AppointmentsPlus systems; and updates to the Member Onboarding application to ease the arrival of new families during the partial campus closure. In addition, as Computing staff returned to in-person support, this was done abiding by all campus policies, and with the utmost respect for individuals and their pandemic preferences.

- **Passphrase Policy.** In a major step forward for campus protection, a new passphrase policy was adopted this past August. The new policy sets the minimum requirements for passphrases, as well as the rules that govern their administration. All users arriving to the campus following the policy adoption are now compliant and users with legacy passwords have begun the process of updating theirs as well. This process is expected to be completed later this year.

- **Email Security.** Email safety and security continue to be a major focus of our business continuity and information security efforts. This past year, IAS moved to be fully compliant with established email security standards including DMARC, DKIM and SPF. These standards help to ensure that email being sent and received by IAS systems is legitimate and has not been tampered with. In addition, these standards help in the ongoing battle to reduce the number of unsolicited emails and phishing attempts that reach users inboxes.

- **Single Sign-on (SSO)/Multifactor Authentication (MFA).** Another on-going effort is the proliferation of services which have been brought under the umbrella of our SSO and MFA platform, Duo. The use of multi-factor authentication provides for increased security for these systems, and the single sign-on allows for easier access for users who authenticate to more than one system in a given session. This past year, a project also began to upgrade the platform to offer even greater compatibility and ease-of-use to the campus community.

- **Crashplan Cloud.** An upgrade was also completed which moved the Institute's personal device backup system, Crashplan, to its latest version and also shifted the storage of our backups to secure, encrypted off-site storage. Most Computing-provided devices come pre-configured to leverage Crashplan, but users who are using their own devices should inquire about setting up the system with their IT Helpdesk.

Infrastructure

- **Rubenstein Commons.** The most significant addition to the campus infrastructure this year has been the completion of Rubenstein Commons. The building has been fully connected to the campus wired and wireless data networks, equipped with hybrid conferencing systems and

modern audio/visual tools, and serves as a pilot for a campus-wide roll-out of digital signage. More details on some of these systems will be included in following sections of this report.

- **Network Upgrades.** Beyond the connection of the Commons, other portions of the data network also underwent planned maintenance and replacement. In addition to life-cycle replacement of networking for several campus buildings, the particular focus of this year's refresh was the Institute's wide-area networking. All of the systems that are used to connect IAS to the outside world were upgraded, providing faster connectivity and clearing the way for future expansion of our network bandwidth as needs progress.

- **Lights-out Datacenter (LODC) Power Upgrade.** To ensure uninterrupted campus connectivity to critical services, including email and the Internet, the battery backup system for the LODC was replaced this summer. The new batteries, working in tandem with the emergency generator that powers the space, ensures that the LODC-hosted services will be available regardless of the circumstances surrounding the rest of the campus.

- **Network Registration System Upgrade.** Networking staff also completed an upgrade of the IP Address Management database system. This system serves as the backend database for managing all network addressing on the campus, as well as the network self-registration tool that allows visitors and scholars to use their devices on our wireless network. The upgrade offers additional tools for network managers, improved performance, and increased compliance with newer devices and network registration protocols.

- **Digital Signage.** As noted above, the Rubenstein Commons is serving as the first location to receive digital signage technology on the campus. To facilitate this, IAS selected the Spectrio platform to manage these displays. Additional signage is planned for the coming year in both Simonyi Hall and Fuld Hall, and additional locations, and content, will be added thereafter.

World Wide Web, Campus Databases and Data Integration

- **StarRez Housing Management.** The StarRez platform went into full production, as a new cloud-based administrative environment for managing the Institute's housing resources. All housing assignments for the present academic year were programmed in the StarRez platform, in addition to the necessary reporting for schools and the Comptroller's Office. In the coming months, additional features are planned for the StarRez system, including broadened access to its functionality.

- **P3 Database Integrations.** The P3 database continued to be updated to meet the changing needs of the Institute, and integrated with other core information systems on the campus. Foremost, a bi-directional integration between P3 and StarRez is now operational, ensuring that housing data now assigned in StarRez remains available to all other platforms that depend on it. Furthermore, to assist the administrators in various schools, a new P3 Import Tool was added to aid with the integration of new scholar data for the administrators in the various schools. Lastly, the project to modernize P3's codebase was also active, leading to new, standardized forms management and easier reporting of information.

- **ITG/Security Websites.** With the migration of the ITG and Information Security websites, the Software Engineering team completed the migration of all IAS websites to the Drupal 9 platform. Alternate site hosting was also identified for the Crossroads Nursery School site as part of this project.

High Performance Computing (HPC)

On behalf of the Institute's computational users, the SNS Computing team operated three HPC clusters this past year. This included the new Typhon 64-node Beowulf cluster, the Apollo GPU nodes, and the older Helios system as well. As part of this effort, new queueing and job submission rules were put into place, and the Globus high-performance data transfer node was upgraded. Scholars also continue to have access for testing cloud-based high-performance computation, in particular through an existing arrangement with Google Cloud Platform.

All of the Institute's HPC systems are available for all IAS scholars to utilize. Full documentation on leveraging these new systems is available on the SNS Computing website, at:

- https://www.ias.edu/sns/computing/advanced

Digital Scholarship at IAS (DS)

Support for scholars working in the field of digital scholarship, and efforts to grow awareness of these activities, also continued in the 2021-2022 academic year. Some of those highlights include:

- **Albert Open-Access Repository Upgrade.** After much delay, the planned upgrade of the Albert system is finally underway. For guidance and support in the process, IAS has again partnered with 4Science in this effort. As part of the process, Albert will be upgraded from DSpace 6.0 to a new repository based on the DSpace-CRIS 7.3 software. In addition, to support some of the Institute's more archival-focused collections, aspects of DSpace-GLAM will also be configured into the system. The upgrade is underway as this report is written, with completion targeted for the late Fall.

- **DS Conversations.** Computing again curated the Digital Scholarship Conversations webinar series, which this year it again included The Author's Voice series presented by the School of Historical Studies. The DS Conversations series aims to highlight innovative projects leveraging DS technologies, to both raise awareness of these emerging technologies and to begin a dialog about how similar concepts can be used in the ongoing research here at IAS.

Media Technology Services (MTS)

- **Hybrid Conferencing.** As expected, hybrid videoconferencing remained a high priority for the MTS team this past year. To continue to facilitate high-resolution meetings and seminars, hybrid spaces were created, updated and managed in nearly every building on the academic campus. In addition, six new hybrid spaces were added in the Rubenstein Commons. Each of these spaces offers state-of-the-art video conferencing, lecture capture, live streaming and

traditional audio/visual support.

- **Zoom Administration.** MTS staff also continued to oversee all of the events taking place across IAS on the Zoom platform. This included management of several high-profile events, large hybrid conferences and seminars, and regular seminars and group meetings. As part of this effort, the team oversaw Zoom account management for the campus, ensured Zoom installations were kept up to date, oversaw management of the Zoom cloud resources and recordings, and provided meeting administration and security when needed.

Training Highlights

Computing works with both internal and external partners to curate information technology-based training opportunities for the community throughout the year. Some highlights from last year included:

- **Information Security Awareness.** Brian Epstein, the Institute's Chief Information Security Officer, again curated a rich curriculum of information security trainings for the IAS community throughout the year. This included the traditional training sessions held each October for scholars and staff, as well as members of our extended community. In addition, throughout the year, helpful training and blog postings are published on current events on the IAS Security website:

    - https://security.ias.edu

- **ORCID, Albert and Digital Scholarship at IAS.** Chief Information Officer Jeff Berliner offered a training session this past spring for scholars interested in learning more about the ORCID system, and how to create and manage their own ORCID Ids. The session also provided an introduction into the Albert open-access repository, and the upcoming strategy for supporting digital projects.

- **LinkedIn Learning.** Through an enterprise licensing agreement, the Institute offers all users access to the full library of online training courses available on LinkedIn Learning (formerly Lynda.com). For access, please visit:

    - https://www.linkedin.com/learning/login-ent

The Computing team's commitment is to provide a complete set of IT services and high-quality support to the Institute's scholars and staff. The work described above represents the best efforts to meet this commitment in the 2021-2022 academic year. This included continuing to balance and respond to changing needs that resulted from the pandemic, as well as a return to more traditional needs and services in support of in-person activities.

2022-2023 Goals and Objectives

While much was accomplished last year, there is no shortage of projects planned for the current year as well. This section of the report will highlight the major initiatives that will serve as the focus of the

IAS Computing team in the upcoming months. Our IT planning efforts benefit enormously from the involvement of the IAS community. If the projects identified do not address a need or concern of yours, it is strongly encouraged that you raise this with your IT Helpdesk. Computing endeavors to be a responsive and agile partner for the campus community, and will respond accordingly if IT needs are not being met sufficiently.

Information Security, Business Continuity and Disaster Recovery

- **Directory Service Migration.** Early this year, Computing will achieve its long-standing goal of integrating and migrating its directory services infrastructure to the Active Directory platform. While this project remains largely invisible for users, it represents the culmination of several large-scale projects being managed by Computing over the past two years. The work, once completed, provides a modern and flexible foundation for improvements to authentication, authorization and identity management services and clears the path for needed advancement of the technology supporting many other critical services including, for instance, the management of campus mailing lists.

- **Passphrase Management System/Passphrase Change Required.** At the completion of the directory migration, many campus users will be required to upgrade their current password to a passphrase that is compliant with the new campus passphrase policy, discussed in the previous section. To aide in this effort, Computing will be introducing new tools for self-service management of passphrases by the user, including those forgotten or lost. More will be communicated about these efforts as the timeline solidifies later this fall.

- **Multifactor Authentication for Email.** Following on the great progress made to require MFA for most IT services, this year will see the same for campus email. The impending move to MFA for email, carefully orchestrated and communicated by the IT Helpdesks, will address our largest IT risk. This step will lessen the threat of phishing attacks on the campus, and reduce the likelihood that as a result we find ourselves being denied the ability to send email freely across the Internet.

- **OpenVPN Upgrade.** The OpenVPN system, used to make secure connections to IAS services from insecure networks, will be upgraded to its latest version. The upgrade will offer compatibility for additional devices, and integrate the service more completely with the new directory platform discussed above.

Infrastructure

- **Power Generator for C4 Datacenter.** Though timing is uncertain due to "supply chain challenges", a project is underway to install an emergency power generator to provide backup power to the main campus datacenter, as well as to key network infrastructure space in Fuld Hall. This work is being done in partnership with IAS Facilities and Princeton Engineering Group. The new generator will provide continuity for additional IT services during power outages, ensuring access to file storage and academic computing resources. Any service disruptions that may be required as part of this project will be announced to the campus in a timely manner.

- **Enterprise Storage System Upgrade.** The Institute's enterprise storage platform will also receive a series of software upgrades scheduled throughout the next several months. These updates resolve known bugs, increase performance and improve compatibility. These upgrades are not expected to cause any disruption of service to the system while they are completed.

- **Network Improvements.** As in all years, a portion of the IAS network will be upgraded. The focus this year will be on rolling out new and improved wireless access points, as well as upgrading portions of the network core to support higher bandwidth and faster throughput. The wireless network upgrades ensure that the campus remains current with changing protocols and compatible with the widest array of devices possible.

- **5G Cellular Planning.** IAS continues working with several local entities including Princeton University, the Princeton Theological Seminary and the Township of Princeton to investigate the options for addressing 5G connectivity for the entire area. This planning work is already underway, and is expected to result in an RFP for telecommunications vendors later this fall. The actual implementation of any such improvements would be scheduled following this vendor selection process.

High Performance Computing

- **Datacenter Capacity Planning.** In preparation for future generations of the HPC project, work is planned this year to guarantee that sufficient power and cooling resources are available within the campus datacenter, and to further ensure that these resources are being used as efficiently as possible. This work coincides with the power generator project described earlier, as well as future planning being done with HPC users on campus.

Administrative Computing Environment

Providing the best support for our scholars across the Institute, not just within IT, requires an investment in designing and managing efficient business processes and information workflows. To this end, Computing has invested a significant amount of time into modernizing and supporting the Institute's administrative computing environment. As with all IT work, this is an ongoing task. The projects planned for this year include:

- **Member Onboarding.** Continued improvements are planned for the member onboarding platform, including continued progress on integrating data across all relevant databases and systems, as well as continuing to simplify the experience for scholars, and address all situations in which visitors may be accessing the platform.

- **Housing Management.** Work will also continue on the roll-out of the StarRez platform for housing management. Now in full production for Housing staff, access to the system will be rolled out to additional administrators across campus. As well, the implementation team will consider the impact of adding additional modules and how these might further benefit the management of our housing resources.

World Wide Web, Campus Databases and Data Integration

- **Community of Scholars.** Working with IAS Communications, this coming year will see changes made to the algorithms used to display scholar profiles on the IAS website. These changes will make the site operate more dynamically, and reflect more accurately the scholars in residence at any given moment.

- **Video Findability.** A team of Computing staff from Software Engineering, Math Computing and Media Technology Services are working to continue to identify and implement enhancements for searching and filtering the library of academic videos the Institute has recorded and that are available online. These improvements are expected to be added incrementally throughout the course of this academic year, as they are developed and fully tested.

- **Application Hosting Environment Upgrades.** The Network Administration and Software Engineering teams are nearing the completion of a project to modernize and upgrade the platform that hosts our custom software applications. These changes, while not visible to system users, will better protect our resources by employing the latest in information security best practices, provide more precise control and configuration of individual applications, and ensure improved system availability.

Digital Scholarship at IAS

- **Digital Object Identifiers (DOIs).** Earlier this year, IAS issued its first DOIs for documents stored in the Albert repository. A DOI is a globally unique string of numbers and letters used to identify a digital work, and provide it with a permanent URL. Through a membership in the Lyrasis DataCite community, IAS now has the capability to issue these identifiers for all digital works. Those interested in obtaining DOIs for their work should contact a member of the Digital Scholarship Working Group, or their IT Helpdesk.

- **Albert, the IAS Digital Repository.** As noted earlier, the upgrade of the Albert repository is now underway, in partnership with 4Science. Once the upgrade is completed, anticipated later this fall, the Albert Administration team will work closely to begin making use of the new functionality available, as well as to improve the overall information architecture of the system, and to continue onboarding additional scholars and works. Albert can be found online at:

    - https://albert.ias.edu

- **Digital Scholarship Conversations Series.** The Digital Scholarship Conversations seminar series will continue again this academic year, in a virtual fashion. The curriculum will include both training sessions related to DS-concepts and tools, as well as the typical presentation of DS projects by faculty and visiting scholars. The schedule for this year's talks can be found online, at:

    - https://www.ias.edu/digital-scholarship/events_ias

- **Scholarly Correspondences among Orientalists during the Early and Late Modern Period as a Historical Source**. Digital Scholarship at IAS will co-convene these lectures this coming year along with Prof. Sabine Schmidtke. The lecture series aims to include case studies, general papers on correspondence as a historical source, digital tools and methods to map and study epistolary exchanges.

Media Technology Services

- **Hybrid Conferencing Spaces.** Building spaces to support hybrid events will continue to the be the primary focus of the MTS team's projects this coming year. In addition to beginning to leverage the new spaces in Rubenstein Commons, the team will also continue evolving existing spaces, including those in the West Building, Bloomberg Hall and Wolfensohn Hall.

- **Digital Signage.** Following on the pilot project currently in use in Rubenstein Commons, MTS will play a leading role in the further expansion of the digital signage platform across the campus. Working with group administrators, this will involve identifying applicable locations, developing new content layouts and implementing these within the Spectrio platform. Look for additional signage to begin being installed in late Fall, and continuing throughout the year.

Conclusion

A major goal of the IAS Computing team over the past many years has been to build an environment at the Institute which makes the building and provisioning of IT services a fairly routine and even boring event for campus users. In order to achieve this, investments must be made constantly in maintaining and updating the critical networks and platforms on which these services are run. That work itself while often unnoticeable and even uninteresting to the campus community, is nonetheless critical. It is for that reason that this Annual Report is published each year, detailing the efforts both underway and planned to ensure that these important platforms are properly cared for and maintained.

It is our goal to encourage conversation about technology at the Institute. As always, if there are projects or services that are not mentioned in this report, but which you feel should be a focus of the Computing group this coming year, please make your voice heard and speak with a member of the Computing staff about your concern.