Produced by IT Services, Trinity College Dublin

Content Editor: Lee Mills, Head of Central & Distributed Support
Design & Layout: Meagan Bittman, Training & User Communications
We are privileged to work in such a special and unique place - Trinity College Dublin. The location, the campus, the history, the development of learners, the world-changing research. IT Services enable each and every person that chooses to work, to study or undertake research here, not just in every building on campus but by also providing access around the world and around the clock to the services we deliver and enable for Trinity.

Patrick Magee, Director of IT Services

An institution like Trinity is continuously changing and adapting, whether due to demographic, financial, societal, environmental, political, pedagogical, partnership or other developments. We enable much of that evolution to happen and as our world becomes increasingly digital and connected, the role of IT Services is increasingly central and transformative.

We have been working over the past year to advance the digital landscape at Trinity, to ensure effective academic and business operations across the University are supported and to promote technologies that further enhance the Trinity community’s culture of collaboration and innovation.

It has been our goal in 2018-19 to provide an increasingly cohesive digital ecosystem that ensures the successful delivery of Trinity’s Education Project, development of strategy for the new technology platform for Trinity’s Website, Data Management innovations, and delivery of 21st Century cyber security & collaboration improvements for everyone through our Unified Communications Project.

IT Services teams continue to contribute their considerable dedication and expertise to a wide range of capital projects across the University, in addition to the operational maintenance and upgrades of services and the ongoing service improvements that are sponsored and managed locally within IT Services. Over the last year IT Services has been engaged with our colleagues in Estates & Facilities to successfully open the new Trinity Business School, to prepare and plan for the exciting development of E3 (Engineering, Environment and Emerging Technologies), to support the completion of the new accommodation in Printing House Square and creation of additional residential spaces at Dartry & the restoration of our historic Rubrics building.

Looking forward to 2019-2020 the focus is on delivering more benefit to the University through technology enhanced learning services and to focus further on the student experience. I truly believe that data management will increasingly be central to all we do and our ambition remains to make reliable and timely information available to support decision-making across Trinity and to allow us to develop and deliver new digital services.

This annual report provides brief highlights from across the range of activities and projects that we progressed and delivered in 2018-2019. I want to thank and acknowledge the team in IT Services for their contribution to the enablement and engagement of the University community through their experience, expertise, care and dedication.
Research IT provide research computing and data services to Trinity, including High Performance Computing, large scale storage, research data collection management, software development and management of administrative systems that support the research lifecycle. Over 2018-19 we have worked to deliver quality computing services to researchers from a broad base of disciplines throughout the University.

highlights

• Research IT commenced a collaboration with researchers from the School of Biochemistry and Immunology to develop and optimize a High Performance Computing implementation of a pharmacophore based drug delivery and evaluation tool

• A collaboration between the Library and IT Services is underway to migrate the Library Digital Collections onto new software and hardware, enabling the Library to continue its mission to make digital versions of the Library’s treasures discoverable and available to a wide audience in both the research community and the general public

• Research IT developed and deployed a new online Research Ethics Applications system for the Schools of Medicine and Computer Science & Statistics. A total of 162 applications were submitted in 2019

• The Research Support System (RSS) was enhanced so that users can now indicate how their research, projects, collaborations and supervised dissertations align with the University Civic Engagement framework and indicate how they address the UN Sustainable Development Goals. RSS can also now be used to apply for the Registrar’s Civic Engagement award

• The LAENALS Database project, which seeks to determine the incidence of ALS (motor neurone disease) in the Hispanic population in comparison to the Northern European population, was provided with development and hosting services by Research IT. This has enabled Trinity to manage data entry and access to this database from multiple Latin American research institutions

• Research IT staff provided planning and technical services for the High Performance Computing and Simulation (HPCS) conference which was held in Dublin, July 2019

research data management & support

Research IT provisions storage, hosting, compute, bespoke software development and support for research data management. Highlights in this area over 2018/2019 included:

• Research IT designed, developed and are currently hosting the PROgressive Visual DECision-Making in Digital Humanities (PROVIDEDH) website which was launched in September 2018

• Research IT uses the REDCap web application to host data collection projects. A new tool was implemented over 2018-19 to enable migration of longstanding clinical research registers in the School of Medicine to the REDCap application

• Support was provided for researchers who were developing data management plans for the whole research project lifecycle. Research IT now has one of the College’s Health Research Board (HRB) Data Stewards on the team, with a special focus on FAIR data management

• Partnering with the Library, in the promotion of Open Scholarship, Research IT has upgraded and is now hosting several journals using the Open Journal System software (OJS)

service improvements

Work in 2018-19 focused on improvements to the management and monitoring systems for the High Performance Computing clusters and the Research IT private cloud.

• A hardware refresh was carried on the Research IT storage array which is used by all virtual servers

• Software was implemented to automate analysis workflows of MRI images for the Trinity’s Institute of Neuroscience
research support system (RSS)

Research IT staff continued to develop the University RSS web-based information system in collaboration with the Library. RSS allows members of academic staff to input and update information on their academic interests, research expertise, publications and other research outputs. In 2018/2019:

• Improvements were made to how the School of Nursing and Midwifery Maintenance Grant is calculated based on RSS data.

• Applications for performance review for tenure were made available via RSS. This new functionality was developed in collaboration with HR. A clinical promotion application form for the School of Medicine was also deployed as part of this effort.

digital repository of ireland

The DRI technical team, based in Research IT in Trinity, have continued to develop and enhance the Digital Repository of Ireland’s platform hosted by Research IT. Enhancements have been made to both the software and the hardware and the team participated in several DRI Task Forces over 2018-19:

• As part of the Europeana Common Culture Project a new Europeana National Aggregator service was developed for the DRI platform. This allows Irish Cultural Heritage content in the DRI Repository to be included in the Europeana discovery portal.

• Research IT’s involvement in the Insight project was concluded successfully in August 2019 and delivered improved user experience when accessing and discovering DRI data collections.

• As a leading advocate of FAIR and Open Data in Ireland, the DRI were invited to run an educational event by the Irish Research Council. Research IT were involved in planning and delivering the event.

• Research IT successfully applied for a Europeana Research Grant to run an education event, planned for April 2020, with a focus on the use and creation of research data by Cultural Heritage Institutes.

Research IT supported more than 200 researchers from 17 Schools and 9 Research Centres and completed almost 200,000 computational simulations during 2018-19.

More than 34,000,000 processor core hours were used -- equivalent to a standard laptop working for 1900 years.
delivering IT for education

Colin McCabe, Teaching & Learning IT Manager

Teaching & Learning IT are responsible for the technology used by staff and students in Trinity’s Lecture Theatres and Computer Rooms and for the teaching & learning services in the “virtual world”: In Lecture theatres and seminar rooms we design the Audio-Visual equipment installations, in the IT Services Computer Rooms we specify the machines and deliver the software portfolios and in the virtual world we provision Trinity’s VLE, Blackboard Learn. Teaching & Learning IT also provide video production and photography services to Trinity.

learning spaces development

During 2018-19 Teaching & Learning IT delivered a range of new and improved Audio-Visual technology to Senior Lecturer Area Seminar Rooms in Aras an Phiarasgaigh, the Museum and Arts Buildings and new projection & audio facilities in Lecture Theatres including the Davis, Emmet and JM Synge and Regent House.

Teaching & Learning IT were primarily engaged over the Academic Year in the largest AV installation project in Trinity since the Biomedical Sciences Institute opened in 2012, as they worked on the design and oversight of the installation of all the new Audio Visual technology for the new Trinity Business School.

Audio-Visual design consultation was also provided over 2018-19 for the following projects and areas across Trinity - E3 Learning Foundry, Provost’s Library, Arts Building Refurbishment Project, Humanities and Social Sciences Dean’s Office and Room 2026, Exam Hall, Johnson and Johnson Lab, TRNI Seminar Room & Civil Engineering Seminar Room.

Building on the successful launch of Huddle Spaces in 2017, additional new Huddle Spaces were commissioned and installed on the Hamilton Concourse, close to the Smurfit Institute. The Huddle Spaces provide more collaboration opportunities for small groups of students to work together and share images, videos and presentations.

The Apple Macs in the IT Services Computer Rooms across Trinity all benefited from an operating system upgrade to MacOS Mojave in 2018-19 and the 24-hour Mac Room in the Hamilton Building was refurbished with new furniture and layout design.

enhancing teaching & learning through technology

In 2018-19 new technology was delivered across the full range of Teaching & Learning services:

- The Lecture Capture Service (using Panopto technology) was extended to all the Trinity Seminar Rooms and Lectures Theatres which are managed by IT Services.
- Grades Journey was implemented into the VLE, Blackboard Learn. This allows staff to transfer assessment marks and grades directly from Blackboard into SITS and over 2018-19 1766 student marks were transferred using Grade Journey
- Turningpoint, an easy-to-use live polling service which allows lecturers to ask interactive questions, track participant progress and receive instant feedback was also integrated into the VLE. Over 2018-19 1368 Trinity staff have used Turningpoint.
- The Trinity Live App was launched in 2019 and is a student mobile app designed and developed by students for students to access their timetables, exam results, emergency notifications and digital identification.
- The Altiris Project | Over 2018-19 Teaching & Learning IT developed and implemented a new remote management system for the 540 Windows 10 PCs in the IT Services supported Lecture Theatres and Computing Rooms across Trinity. The new remote management system (Symantec Altiris) provides a cost effective, quick and efficient solution to “image” PCs remotely with an operating system, install all the required software applications and provides an effective way to apply Windows and software updates using automated tasks.
**multimedia production**

A range of photographic & film production services including studio portraits, still life photography, and Photoshop support was delivered to Trinity Schools and Departments. Special commissions for 2018-19 included a detailed photographic study of The Rubrics for a new publication and a promotional video for the MPhil courses in the School of Languages, Literatures and Cultural Studies was filmed for their course website.

**representing Trinity**

Over 2018-19 Teaching & Learning IT has undertaken a security review for all the systems and software we provision, our methodology for these reviews has generated much interest from other HE institutions.

We have been privileged to present at both the Irish Learning Technology Association Flagship Annual Conference “EdTech May 2019”, on IT Governance and Data Protection, and at Innovating Apple Device Management in Higher Education at the London School of Economics. We have also participated in the assessment of the Framework for Virtual Learning Environments with HEAnet.

- **Blackboard Learn VLE** 6903 active courses & 12,297 active users & 336,149 views on the busiest day
- **Trinity Live** was downloaded by 5,487 students
- **Panopto Lecture Capture** has 1039 Trinity staff creating content & 151,103 views by Trinity students
- **Mytrinityapps software** has been accessed 66,529 times
Management Services group within IT Services supports business information systems across the central administrative areas of the University and works to improve the quality of information available to aid decision making at Trinity.

Management Services support data integration, software development lifecycle management, reporting and data analytics for Trinity’s business applications. These business applications have been procured commercially or developed in-house and the portfolio of applications that are managed range from Student Administration (SITS), Timetabling (CMIS), Accommodation (Kx), Sports (Gladstone), Health Centre (Helix), Asset Registry, Student Counselling (Titanium), Peoplefinder, Careers (Target Connect) to Estates & Facilities Management (Planon).

**highlights**

**Annual SITS Upgrade**  |  In June 2019, the SITS upgrade went live as Trinity’s SITS student administration system updated to version 9.6. This ensured the continued delivery of the critical IT functionality for Exam Scheduling, Assessment, Progression and Timetabling and also enabled the IT change requirements from the Trinity Education project to be delivered. Minimising downtime and impact on Academic Registry, Schools and the student community was a key consideration in delivering this successful upgrade.

**Trinity Education Programme (TEP)**  |  The Trinity Education Programme (TEP) included two Digital Projects, jointly sponsored by Academic Registry and IT Services, which delivered significant configuration and system changes to the Student Administration system (SITS) as the new Academic Year Structure was implemented in 2018-19.

**Digital Trinity 1: Online Module Enrolment for Trinity Electives Project**  |  This Digital Trinity 1 project delivered the online enrolment and optimised allocation of Trinity Electives modules for students based on their preferences, business rules and constraints. The IT system changes implemented in this project included:
- Changing the Academic Year structure with new integrations across a range of IT systems including a major update to the Timetabling system
- Creation of Semester I & II Exams and removal of Special Exams
- Publication of Semester I & II exam results via the my.tcd.ie portal & Trinity Live App
- Update of Court of Examiners Reports
- Creation of new Assessment Reports
- Creation of new TEP Courses & Modules
- Creation of the Joint Honour Course to replace the current TSM courses
- Update to the Course Application pages to reflect new courses
- Creation of New Progression Rules for Undergraduate Courses
- Update of Assessment rules

Digital Trinity 1 TEP project was successfully completed prior to the start of Academic Year 2019-20.

**Digital Trinity 2: Systems, Process Administration of Learning (SPALE)**  |  This project, initiated in 2019, has the objective to complete out the systems, business process operations, data, reporting and integration work in support of the TEP Academic Year Structure changes and the new program curriculum architectures. This will be achieved by delivering SITS system configurations changes and module manager developments; process enhancements for Academic Registry and Schools, necessary data changes, required system integration work and new reports. This project is due to complete in 2020.

Management Services team received **over 6,250 requests for Business Applications support** in 2018-19.
service excellence

Lee Mills, Head of Central and Distributed Support

We are always looking to improve the way we provide IT services to Trinity and this might be achieved by delivering new technology but is also often achieved through improving the way we support, and communicate about, our services.

cataloguing our services

IT Service Delivery Management actively maintains the IT Service Catalogue, which was updated in 2018-19. The IT Service Catalogue is a practical list of the services we deliver but, most importantly, is organised in a way that we hope everyone can understand and shows how the information technology components we manage work as “customer experienced services” available to the staff and students at Trinity.

The IT Service Catalogue is accompanied by a corporate level service agreement, which was also updated over the Academic Year. This agreement provides a view of each service we manage, includes contact details and key information, and it applies to the IT services that are available to everybody in every department across Trinity.

Over 2018-19 we continued to create new Service Level Agreements for specific departments or technology including new agreements with Commercial Revenue Unit, Public Affairs & Communications and the School of Nursing.

The IT Service Catalogue is also the basis for us to set targets and measure performance. A Service Level Achievements Matrix (SLAM) Report is compiled and published monthly for Trinity and details the performance achieved for the 10 service areas of the corporate service level agreement.

supporting our services

Delivering excellent customer services remains central to our ethos and we continue to work hard to ensure that the Trinity community can rely on the IT Service Desk to provide quality resolutions in response to their queries. As we operate a Technical Service Desk with a dedicated, highly-skilled and knowledgeable staff, over 80% of all IT queries were resolved within the IT Service Desk.

We are also very proud to celebrate our 10th year of working with our team of Network Access Advisors, who we recruit annually from our own student community. Over the past decade the students who have worked alongside our Service Desk team have unfailingly proved to be enthusiastic and motivated and have enabled us to deliver excellent support in assisting students to connect to the Trinity Network.

We delivered significant improvement in the process for connecting to the Trinity network over 2018-19 with the introduction of an automated connection service for staff, that is available 24/7, which sees connection requests completed within 30 minutes. We also improved the connection experience for students by making the student Wi-Fi (TCDwifi) visible to be simply selected from the list of nearby Wi-Fi networks when on campus.

The IT Service Desk introduced support for new operating systems, Windows 10 v1809, macOS Mojave (10.14) & iOS 13, and continued work to depreciate the Windows 7 estate at Trinity as well as updating the tools we use to deliver remote support and anti-virus protection to over 5000 Trinity Desktops and Laptops.
communicating our services

IT Services Training and User Communications has endeavoured over the year to help Trinity staff and postgraduate students to improve IT skills, through both face-to-face and online training opportunities, and to ensure that open lines of communication are available between IT Services and the Trinity community.

We ran over 65 IT training courses with the most popular being Planning Thesis Production, Data Processing and Effective Presentations courses. We also organised special events and released new online modules as we recognise that Trinity community awareness, knowledge and behaviour are vital in our protection against IT security threats.

As communication is so incredibly important it remains vital that we continue to invest our energy into clearly and regularly communicating what is happening in IT to the Trinity community. So over 2018-19 we continued to provide a news and alerts service on our website with all the latest information, to tweet regularly about our services and to meet representatives from across Trinity at the IT Services User Group and IT Support Staff Forums.

Over 51,000 calls answered by the IT Service Desk
Over 750,000 views of the IT Services website
Over 1250 Trinity staff and Postgraduate students attended an IT Services Training Course
12 Service Level Agreements were signed and actively managed with Trinity Departments

In our survey of those with a current Service Level Agreements with IT Services - 100% said they would want to work with us again to put an SLA in place for new future services.
our year in numbers

- 28,773 student devices on network
- 60 TB provisioned in Cloud storage
- 212,437,676 SPAM blocked
- 159M emails delivered to staff and students
- 6M visitors to www.tcd.ie
- 180K devices seen on network
- 5.5K downloads of Trinity Live App
- 3.9PB total internet data handled (petabytes)
- 2.5Gbps internet speed during teaching (gigabytes per second)
- 100% Internet connection uptime
- 100% availability of core authentication services
- 100% availability of the core network at Trinity
- 100% Internet connection uptime
- 100% Internet connection uptime
Sara McAneney, Information Security Manager

The Information Security Team in IT Services provides professional guidance to staff and students on relevant cyber-security risks impacting the higher education sector. It also provides information and assistance to ensure that all University IT Services, computers and data are adequately protected in compliance with best practice and relevant legislation such as the General Data Protection Regulation (GDPR).

highlights

In the 2018-19 academic year the University was exposed to cyber security threats with the potential to impact University data and computing equipment. 22 serious Information Security Incidents required detailed investigation and remediation by the IT Security team. These included incidents of malware, ransomware infections, phishing attacks and account breaches.

Trinity staff and student email accounts continued to be significant targets for phishing attacks in 2018-19. Phishing is the fraudulent practice of sending emails purporting to be from reputable companies in order to induce individuals to reveal personal information, such as passwords and credit card numbers.

Trinity staff and students were targeted by phishing scams attempting to gain access to their Trinity username and password and Office365 accounts as well as other University services such as Library e-journals. In 2018-19 IT Services continued to run regular Phishing Awareness and Education Campaigns to reduce risk and inform staff. This involved IT Services sending “phishing” messages to all staff. Any staff member who provided their credentials in response to the phishing email was provided with training on how to avoid future phishing scams.

The Information Security Team held its annual IT Security week (21st - 25th January 2019) to raise awareness of IT Security issues affecting staff and students in the University.

During IT Security week staff were provided with guidance on how to protect their sensitive University data and computing devices from threats including spam, malware and phishing. Many interesting news items that offered tips and guidance on the latest IT Security developments were posted daily to the IT Services website including a popular post on how to prepare for and what action to take in the event of a data security breach.

To mark International Data Protection Day on the 24th January 2019 IT Services collaborated with Information Compliance and the Science Gallery to run a number of interesting and successful events. These included a drop-in data protection clinic which offered staff and students an opportunity for one-to-one advice on a wide range of data protection and IT security issues.

In the evening a panel discussion entitled ‘Your protection v your privacy’ took place discussing the importance of striking a balance between public protection and personal privacy with regards to data.
The Unified Communications project phase II is a program of work, which commenced in 2018 and is project managed by the Information Security Manager. Unified Communications II has two broad and complementary aims. Firstly, the project aims to decrease risk to the University by introducing new IT Security controls, such as computer encryption and two-step sign in, and secondly it aims to provide access to a suite of collaboration and storage products which will facilitate the secure storage and sharing of University data.

**PROJECT ACHIEVEMENTS: THREE NEW SERVICES WERE RELEASED**

Two-Step-Sign-In | Two-Step-Sign-in provides an extra layer of security verification through a combination of your user name, your password, and a mobile device, phone or App. Two Step Sign-In helps to combat cyber-threats such as Phishing as it stops malicious hackers from accessing valuable University data.

Microsoft SharePoint | Microsoft SharePoint is a secure and central place to store, organise, share and access information amongst colleagues and external partners.

Microsoft Teams | Microsoft Teams is a collaboration app available through Office 365 which has been designed for smaller groups of people who work together regularly; its largest benefit is instant communication amongst a small group and the ability to share information and files easily, all in one centralised place.

**PROJECT ACHIEVEMENTS: SITE VISITS TO ENSURE THE SECURITY OF STAFF COMPUTERS AND ACCOUNTS**

In academic year 2018-19 the project team successfully visited 30 areas (Schools/Professional Areas) covering 2885 staff members. In each area all staff computing devices were checked to ensure that they were protected by anti-virus software, receiving software security updates and staff were assisted in configuring Two Step Sign-in to protect their accounts from phishing and hacking attempts.

**PROJECT ACHIEVEMENTS: MICROSOFT SHAREPOINT AND MICROSOFT TEAMS**

46 staff members attended a one-day training course, facilitated by the project, on how to set up and manage Microsoft SharePoint and Microsoft Team sites. This resulted in the creation of 173 new SharePoint Sites and 105 Microsoft Teams in Trinity’s Office365.

**PROJECT ACHIEVEMENTS: ENCRYPTION**

A tender process was successfully completed for the purchase of 6000 encryption licences for staff devices to ensure the protection of University data and GDPR compliance. These will be rolled out to staff automatically before the completion of the project.

The Unified Communications II project is on target to complete successfully on scope and within budget in Q1 2020.
web design & development

Maura Horan, Head of Web Design & Development

Web design and development is responsible for the Trinity website and support digital communications and marketing activities in alignment with the University’s strategic plan. In 2018-19 Web Design and Development joined IT Services.

web transformation

One of the Digital Trinity initiatives is focusing on web transformation and the implementation of a new web content management system (Web CMS) for the University. The Digital Trinity 3: Web Transformation project key objectives are to eliminate risk to Trinity’s website, the university’s main communications and marketing platform, and to deliver a robust, scalable and easy-to-use Content Management System for the university so improving the information on our website. The Web CMS will also integrate with the planned Customer Relationship Management (CRM) system, which is being delivered under Digital Trinity 4: Data Transformation – The Enterprise CRM project. This integration of IT systems is being designed to specifically improve the analytics that we use to assess Trinity’s global presence.

web governance

A new Web Governance group was setup in 2018-19, managed by IT Services, and has worked on a comprehensive update to Trinity’s Web Policies. These new policies will be reviewed by the Library and Information Policy Committee and approved in 2019-20.

highlights

Over 2018-19 Web Design & Development designed 40 new websites for areas across the University to help meet strategic goals and deliver on new initiatives for Trinity. These new websites were updated to the latest look and feel for www.tcd.ie, along with making the sites responsive so that they will display correctly across a range of different types of devices and screen sizes from large monitors to mobile phones. The new websites designed and delivered included:

• The Trinity Campaign – Inspiring Generations (www.tcd.ie/campaign/) which was designed to raise support for transformative projects across Trinity to ensure the University continues to make an impact on Ireland and the world.

• Working with the Dean of Research, we redesigned and streamlines the research website (www.tcd.ie/research), making it easier for site visitors to navigate and find research topics. An online magazine #researchmatters was created to help communicate the latest news and developments in Trinity Research.

• Working with the Trinity Education Project (TEP), new sections of www.tcd.ie were designed and delivered to support the fundamental renewal of Trinity’s undergraduate education. This included the creation of new websites for Trinity Electives (www.tcd.ie/trinity-electives/) and Your Trinity Education (www.tcd.ie/courses/undergraduate/your-trinity-education/).

• Working closely with colleagues across the University, and especially Public Affairs & Communications, Trinity’s homepage, news and events were kept up-to-date.

• Work was also completed with Schools, Marketing, Student Recruitment and Academic Registry to improve the design and content of the School websites and the Courses website (www.tcd.ie/courses).

Working with Trinity Web Authors we increased the average website quality assurance score by 6%.

The Trinity website received 155,857,872 views. Top pages that received most views during 2018-19 were the Trinity Homepage, the Library, Courses and Academic Registry.

Trinity YouTube now has 14.7K subscribers, with 3.4K new subscribers in 2018-19. Over 200 videos were published including new video content for Trinity Electives and Courses.
delivering change & improvement

Katrina McCall, Project Office Manager

IT Services Projects Office supported the delivery of a programme of 52 IT projects over the Academic Year. The project portfolio, of current and pipeline projects, includes projects delivering new services for Trinity and projects that are upgrading and enhancing existing services, but every project is aligned with the University’s strategic business goals. The IT Services Projects Office support and optimise the delivery of projects by ensuring professional project management, governance and quality assurance standards are in operation across the programme.

Over 2018-19 the Unified Communications II project continued its successful delivery of new IT Security controls across Trinity’s Desktops and Laptop estate and enabling access to a suite of collaboration and storage products which will facilitate the secure storage and sharing of University data.

The Trinity Education Programme (TEP) Projects, Digital Trinity 1: Online Module Enrolment for Trinity Electives Project and Digital Trinity 2: Systems, Process Administration of Learning (SPALE), both jointly sponsored by Academic Registry and IT Services, were initiated to make configuration and system changes to SITS to support the introduction of new business processes for the new Academic Year Structure (AYR), implemented in 2018/2019.

Digital Trinity 1 specifically delivered the online enrolment and optimised allocation for Trinity Electives modules for students and Digital Trinity 2, initiated in 2019, will complete out the systems, business process operations, data, reporting and integration work in support of TEP and the new program curriculum architectures.

Digital Trinity 3: Web Transformation project (WEBCMS), was initiated in 2019, this project’s objective is to deliver a scalable and easy-to-use Content Management System (CMS) for Trinity’s website.

Digital Trinity 4: Data Transformation – The Enterprise Customer Relationship (CRM) project, also initiated in 2019, will deliver an Enterprise CRM for College and develop a new Data Architecture and data management strategy for Trinity.

Over 2018-19 IT Services worked with 16 different Schools, Corporate Services, Financial Services and Academic Services departments to deliver on a diverse range of IT projects:

- Extensive consultancy & support was provided by IT Services to deliver on 19 capital Estates & Facilities projects across 2018-19 including E3, the new Business School, Printing House Square and the Arts Building refurbishment.
• IT Services also worked with Estates & Facilities to implement an Integrated Work Management Solution (IWMS). This project completed in Q1 2019 and ensured a “single source of truth” for all University space.

• IT Services collaborated successfully with HR to upgrade Trinity’s Core HR service, this project completed at the end of Q1 2019 and delivered robust infrastructure that will continue to meet the Human Resources management needs of the University into the future.

• In 2018-19 IT Services assisted the Library with a capital project to upgrade and enhance the Library Management system. This project completed in Q1 2019 and delivered a new resilient infrastructure and an upgrade to the Library software. IT and Library Projects were also undertaken to deliver on Library RFID and the Library Digitised Projects.

• IT Services Project Office also oversaw projects that delivered new IT services and service enhancements over 2018-19 including audio visual equipment replacement and upgrades for teaching rooms across Trinity, a new mobile phone management service, new Business School Accreditation System, upgrade of Research Proposal System (RPAMS), a new central Projects Portfolio Management Tool (PPM) and for projects within Trinity’s Student Services areas, including Sports, Student Health, Counselling and Disability.
enterprise architecture

Andrew Watson, Enterprise Architecture Manager

During 2018-19 the Enterprise Architecture (EA) continued to ensure a robust IT architecture for the University. The two main service objectives of EA were:

• the provision of guidance on the purchase and deployment of technology within Trinity, ensuring standardised IT technical requirements underpin new business system implementations and assisting the College community in evaluating and refining proposed solutions.

• enabling innovation for IT Services through proactive research and development of technology roadmaps that support the delivery of IT Strategy and maximise return value from Trinity’s IT investments.

highlights


EA provided Identity Management & Database Management consultancy and completed a proof of concept in Automated Testing software.

EA took on technical leadership roles in the delivery of both SITS re-architecture and Unified Communications II projects.

Digital Trinity 4: Data Transformation – The Enterprise Customer Relationship (CRM) project

A key piece of work for EA during 2018-19 was leading out on the initiation of a Digital Trinity 4: Data Transformation – The Enterprise CRM project, its initial focus on delivering Enterprise Customer Relationship Management (CRM) for College, and on the delivery of a Data as a Service Solution, a Data Management Strategy and the development of a new Data Architecture for Trinity. This is a major multiyear program of work to harness the potential of Trinity’s data assets. EA successfully completed a business case for Digital Trinity 4, with colleagues in Global Relations and the Trinity Business School, for the delivery of a shared enterprise CRM platform. The CRM is designed to fulfill all future CRM requirements for Trinity on a new single unified platform, allowing greater collaboration between business units and reducing the cost of ongoing support and implementation.

The second key element of Digital Trinity 4 is to redesign Trinity’s data integration architecture to allow application data to be processed and managed using industry standard best practices. This will reduce complexity, time to delivery for new integrations and the ongoing cost of integration support and management. EA did extensive work producing the optimal architecture design options for positioning the University to better exploit its data assets in the future.

Digital Trinity 4 is an exciting program of work that will help to grow Trinity’s research and teaching capabilities, support cost reduction, and enable better and faster decision making and communication across the organisation as it develops.

In 2020, EA look forward to building on this work, continuing to engage with stakeholders and providing high quality IT architectures that meet the objectives of the University.
Infrastructure

Paul Jones, Infrastructure & Operations Manager

Infrastructure and Operations in IT Services has responsibility for systems management and the delivery of a diverse portfolio of mission critical services and technologies such as Trinity’s Network, WiFi and network services management, storage and cloud solutions, Directory and Identity services, database administration and communication & collaboration services.

programme of operational upgrades, maintenance and improvements

The annual programme of maintenance, upgrades and service improvements to the infrastructural equipment, hardware and services is a cornerstone of the work undertaken by this team and ensures that there is a stable, reliable and robust IT infrastructure underpinning all of Trinity’s IT systems and business applications.

Over 2018-19 the programme included:

• Network Admission Control System (FortiNAC) – this is the system that manages TCDconnect, the network access system that allows students to connect to the Trinity Network. The system underwent a complete platform rebuild in early 2019 to update the operating system to the latest Linux version and a full application upgrade of the FortiNAC software was completed over the summer of 2019.

• Trinity WiFi – A major upgrade of all the infrastructure that provides Trinity’s WiFi service was completed and this included upgrades to the central wireless controller appliances, the WiFi management system and a firmware upgrade of the 2050 Wireless Access Points located across Trinity.

• Infrastructure as a Service Upgrade - A major upgrade of the Data Centre network, hosting equipment and components was delivered over 2018-19 across all three of Trinity’s Data Centres.

• Replacement for end of life Infrastructure – replacement equipment was purchased during 2018-19 for both the Virtual Private Network (VPN), a service allows Trinity staff to make a secure, encrypted connection to the Trinity data network from a remote location, and the Guest WiFi service, which allows for conference visitors to connect their personal computer to the internet via the Trinity Wi-Fi network.

• Server replacement – 80 Windows 2008R2 servers were upgraded or replaced with Windows Server 2016 and 50 new Linux servers and Virtual Machines appliances were commissioned within Trinity’s Private Cloud.

• Additional storage and hosting infrastructure was installed in the Trinity Data Centres to support both general operational expansion of IT systems at Trinity and specifically to provision the necessary resources for the Library’s Digital Repository Project.

• A full programme of Oracle and SQL database patching and upgrades was undertaken to support key business systems, such as SITS.

high availability of IT

With our intensive and ongoing programme of planned upgrades and service improvement work taking place throughout the Academic Year we are rightly proud that we maintained 100% availability of Trinity’s Network, Web and Identity Management services over 2018-19.

We have focussed over the recent years in minimising interruption to IT services, and we have purposefully designed all of Trinity’s critical IT infrastructural components with “High-Availability” (HA). From the equipment used to provide Trinity’s network, internet and WiFi services to the equipment that runs our Data Centres, our Identity Management services that process user logins, and the databases that underpin key business systems we have built-in redundancy. It is this redundancy that ensures continued operation of IT services even in the event of hardware or equipment failure or a power outage and also allows us to deliver on maintenance and upgrade programmes where the Trinity community will experience zero downtime or interruption to our services.

IT Services investment in High Availability was driven by our understanding of the dependency on mission critical IT services to Trinity. We have invested in building primary and secondary systems for service continuity in the event of any failure and our High Availability clusters are hosted in physically diverse Communications Rooms and Data Centres around campus to provide service continuity in the event of a local power outage. All of Trinity’s Data Centres have been equipped with Uninterrupted Power Supply units and generators as backup power systems.
## financial elements

The following table shows pay and non-pay expenditure from 2009 / 2010 to 2018 / 2019.

<table>
<thead>
<tr>
<th>Year</th>
<th>Non-Pay</th>
<th>Pay</th>
<th>Non-Pay</th>
<th>Pay</th>
<th>Change since 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009 / 2010</td>
<td>€4,539,002</td>
<td>€5,434,391</td>
<td>-21%</td>
<td>-1%</td>
<td></td>
</tr>
<tr>
<td>2010 / 2011</td>
<td>€3,450,101</td>
<td>€5,102,482</td>
<td>-40%</td>
<td>-7%</td>
<td></td>
</tr>
<tr>
<td>2011 / 2012</td>
<td>€5,223,885</td>
<td>€5,092,622</td>
<td>-9%</td>
<td>-7%</td>
<td></td>
</tr>
<tr>
<td>2012 / 2013</td>
<td>€3,996,606</td>
<td>€4,926,710</td>
<td>-31%</td>
<td>-10%</td>
<td></td>
</tr>
<tr>
<td>2013 / 2014</td>
<td>€4,757,762</td>
<td>€6,076,614</td>
<td>-17%</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>2014 / 2015</td>
<td>€2,639,635</td>
<td>€6,767,462</td>
<td>-54%</td>
<td>23%</td>
<td></td>
</tr>
<tr>
<td>2015 / 2016</td>
<td>€3,242,439</td>
<td>€6,477,348</td>
<td>-44%</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>2016 / 2017</td>
<td>€3,750,386</td>
<td>€6,419,099</td>
<td>-35%</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>2017 / 2018</td>
<td>€4,360,947</td>
<td>€6,624,427</td>
<td>-24%</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>2018 / 2019</td>
<td>€4,775,354</td>
<td>€6,860,619</td>
<td>-17%</td>
<td>25%</td>
<td></td>
</tr>
</tbody>
</table>

The following table shows IT Services, FTE 2009 / 2019.