



UNIVERSITY
OF
JOHANNESBURG

20/21

INFORMATION COMMUNICATION SYSTEMS

Annual Report

The Future
Reimagined



20/21 INFORMATION COMMUNICATION SYSTEMS Annual Report

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OVERVIEW

The Information and Communication Systems Division (ICS) is the internal Information and Communication Technology (ICT) Service Provider to the University of Johannesburg (UJ) and the institution's central ICT Division.

ICS provides enterprise ICT systems and services for all UJ staff, students, and partners, through efficient and effective planning, implementation, and support for ICT innovations. ICS has 151 employees consisting of management, professionals and entry-level employees. See the ICS employee profile in terms of gender and race below:

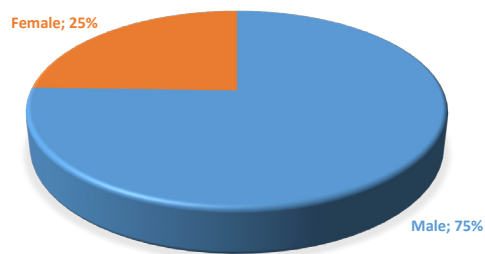


Figure 1: ICS Employees by Gender

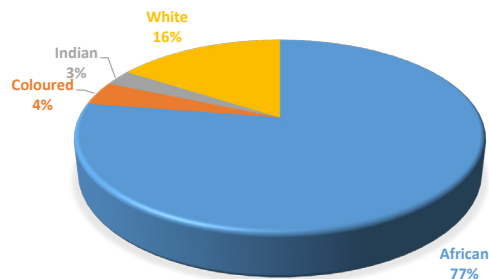


Figure 2: ICS Employees by Race

The ICS Division comprises of the following units:

- Infrastructure and Operations Support;
- Networks and Telephony Services;
- Technology Architecture and Planning;
- Solutions Delivery;
- Enterprise Systems Management;
- ICT Service Delivery;
- ICT Governance and Strategy.

Infrastructure and Operations Support Unit

The Infrastructure and Operations unit ensures an up to date, stable, secure, and dynamic server infrastructure for the University, including Microsoft Windows and

Linux servers consisting of both physical and virtual machines. The environment supports business-critical applications such as:

- Microsoft O365 office application suite and cybersecurity protection with Microsoft Defender Threat protection;
- Azure Cloud services;
- Various business-critical applications across 529 (189 physical and 340 virtual) servers.

This unit's other critical functions include monitoring, securing, backing up, and restoring ICT systems. The team manages the staff lifecycle process, aligned with HR processes, and provides authentication for all student systems, e.g., student email and ULink. The UJ web design, support, monitoring and maintenance is also included in this unit.

Networks and Telephony Services Unit

The Network and Telephony Services unit designs, develops and maintains UJ's network, internet, telephony, VPN services, and network security infrastructure, which spans four campuses and remote offices, providing seamless and secure connectivity to all stakeholders. This unit is also responsible for delivering and supporting Wi-Fi connectivity to all libraries, lecture venues, student residences, student centres, and the Wi-Fi "Hotspot" areas throughout the University. The unit manages the Telephone Management System and the bulk SMS service, a critical communication tool with students.

Technology Architecture and Planning Unit

Technology Architecture and Planning unit is involved in designing and maintaining UJ's ICT blueprint planning and implementing the long-term ICT roadmap. This function is involved in consulting with UJ's communities and critical stakeholders to discuss and recommend fit

for purpose ICT solutions piloting new technology and innovations that arise out of such engagements. The unit is also responsible for managing ICS facilities such as critical data centre infrastructure, Linux, and Open-Source Software support within ICS. The High-Performance Computing Cluster support reside under the unit.

Solutions Delivery Unit

The Solutions Delivery unit develops and integrates new ICT software applications custom-built to UJ's needs while also enhancing and maintaining current ICT applications already in production. It is essential to understand business processes to accomplish this mandate at Faculties and in Support Divisions. Once these processes are understood and analysed, the next step is to identify gaps and enhancements to improve clients' experience (generally students) in interacting with said areas.

This unit is responsible for provisioning new software solutions to the University by either:

- Custom developing or;
- Purchasing off-the-shelf products;
- Enhancing and supporting existing systems.

Enterprise Systems Management Unit

The Enterprise Systems unit is tasked with deploying and maintaining IT systems that support UJ's core mission of Teaching and Learning. The team ensures that systems are operating effectively and actively coordinating across multiple business administrative departments and regularly engaging end-users to improve the experience. These systems include Enterprise Resource Planning (ERP) – The Oracle eBusiness Suite & ITS Student Information System & Perceptive Content & UJ's Business Intelligence (BI) platform and the CELCAT timetable system.

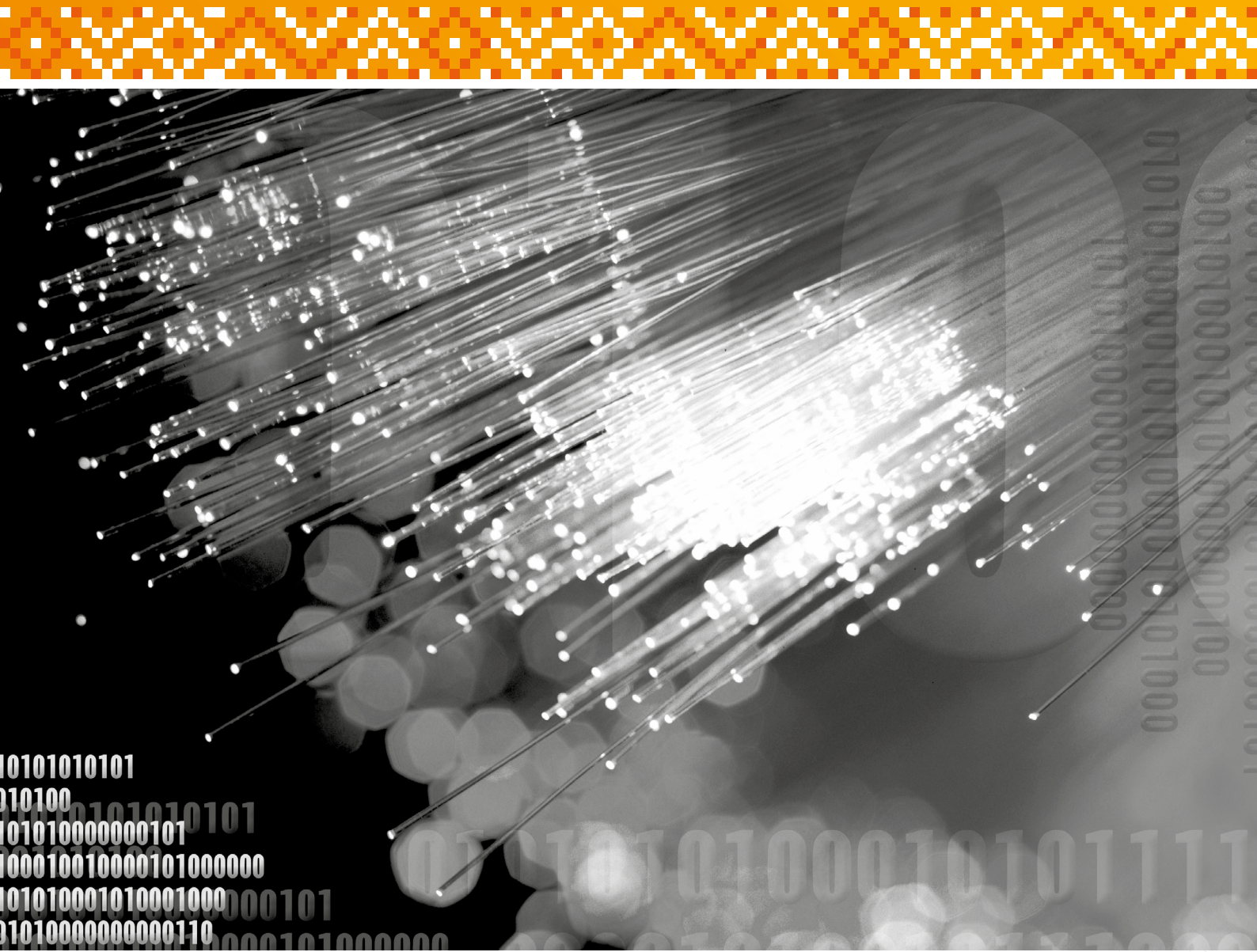
ICT Service Delivery Unit

The ICT Service Delivery unit acts as an interface between ICS and the UJ community. The unit's primary focus is to provide uninterrupted client services and support. ICT Service Delivery provisions the human and technology resources that enable and support UJ's teaching, learning and research, and students and staff members, respectively. The unit's core functions include provisioning and maintaining Audio-Visual Services, Networking and Telephony client services, including Wi-Fi and computing services in all staff and Computer Lab environments. The function comprises multiple teams with various professional support focuses.

ICT Strategy & Governance Unit

The ICT Strategy and Governance unit is responsible for the implementation of the ICT Strategy, Cybersecurity strategy and IT Governance framework for UJ by providing oversight of all ICT projects and ensuring that the Project Management Office is managing

and delivering all ICT Projects in an efficient and effective manner, within budget, at the right time and of the right quality. The unit is also responsible for the IT Disaster Recovery framework and testing activities and scheduling simulations of system failures to test the effectiveness of disaster recovery processes. The services include management and coordination of both internal and external IT audits, management of IT risks as well as documentation and facilitation of ICS Division's policies and procedures, ensuring compliance with policies, rules, and regulations such as the Protection of Personal Information Act (POPIA) and the Electronic and Communications Act.



SUMMARY OF KEY ACHIEVEMENTS

ICS achieved the following critical deliverables in 2021:

IT Risk Management

Risk Management is an effective instrument adopted in ICS to ensure proactive management of all identified risks. Identifying risks is an objective-driven process that assesses the impact,

whether positive or negative, whether occurring or not, that potential risks could have on the achievement of the University's objectives. ICS is governed by principles, related legislation, policies, and guidelines.

The ICS Division conducts monthly management engagement sessions to thoroughly review and update processes that identify, assess, manage and reduce risks to acceptable levels. All identified IT risks are documented and monitored using a risk register

that is updated monthly. Each IT risk has controls to either mitigate or manage the potential loss associated with the risk; where the controls are not fully effective additional action plans are identified, implemented, and monitored.

The risk of cyberattacks continues to be the top risk-managed by ICS. A summary of what was achieved in action plans to mitigate the specified risk is provided.

- A total of 5 critical systems were configured on the Business Intelligence system to provide access review reports to improve governance of access to systems in line with the UJ Systems Access Standard.
- ICS has implemented an ongoing cyber security awareness campaign with regular awareness messages to the UJ community.
- Web Application Firewall (WAF) was implemented to monitor incoming and outgoing traffic to web-based applications, improving application security.

- ICS reviewed and developed secure configuration standards for systems.
- The UJ skill development plan was implemented with training completed in focused IT areas to improve resource skills. An ICS succession plan was developed based on critical functions in line with UJ succession planning guidelines.

Business Continuity

The COVID-19 pandemic has put the spotlight on Business Continuity (BC) and Disaster Recovery (DR) activities at universities. ICS partnered with the Financial Governance and Revenue Division to initiate a Business Impact Analysis (BIA) project to revisit the critical applications required for business continuity. This mitigated the risk of the inability to continue with essential business processes and fully recover critical systems. The project focused on identifying the impacts associated with interruption of business processes and the critical resource dependencies required to support operations. The objectives were to conduct BIA and a Threat Assessment (TA) for:

- Defining the impact of loss within the identified areas of business;
- Identifying the critical services or processes;
- Identifying the Recovery Time Objectives (RTOs) and the Maximum Tolerable Periods of Disruptions (MTPDs) for the critical services or processes;
- Identifying all the resource requirements for each of the critical services or processes

The deliverable for this initiative was a UJ Business Impact Analysis Report outlining critical systems in the organisation. The report is intended to be used by UJ as a living record of the recovery requirements and to inform and prioritise a programme of work designed to manage a business disruption.

Disaster Recovery

ICS recognises the need to have adequate and effective disaster recovery arrangements to ensure the continuity

of critical business processes and the availability of vital client information in the event of a disaster or business disruption. ICS partnered with Deloitte Consulting to conduct an independent review of the current UJ DR capabilities and processes in 2021. Deloitte Consulting commended UJ on their planning and arrangements made in IT disaster recovery and the testing thereof and made recommendations to assist UJ in proactively addressing potential areas of concern and opportunities for improvements for future disaster recovery Tests. The report concluded with Deloitte attesting that UJ has established a DR Programme in which recovery testing and exercise processes have been incorporated.

ICT Governance Implementation

ICS has made significant progress in establishing the committees to implement proper controls over IT assets and governance on IT in the University. IT governance is a critical element of corporate governance aimed at improving the overall management of IT and deriving improved value from investment in information and technology. The focus for 2021 was to complete IT Governance activities by implementing the two outstanding committees defined on the approved IT Governance Framework and improving IT governance maturity. ICS also developed and implemented an IT Policy framework that defines IT policies, procedures and processes required to enhance compliance to the IT Governance Framework.

The operative provisions of the Protection of Personal Information Act (POPIA) were enforced from the 1st of July 2021. UJ initiated compliance activities as the University could face fines, penalties, and other adverse consequences in the future if not compliant. To ensure compliance to POPIA, with the approved IT Policy Framework, key policies and procedures were developed. The compliance to POPIA included the

reviews and updates of the Information Security and Incident Management policies. These policies were approved by the UJ Management Executive Committee (MEC) in November 2021.

In terms of governance structures, the Supplier Management Committee operates at a Divisional level and was implemented to provide a structured way of managing IT suppliers, managing supplier performance, and identifying and forming sustainable relationships with strategic suppliers. The IT Steering Committee operates strategically and is chaired by the Chief Operating Officer. The committee guides the effective management of Information and Communication Technology within the University. In this committee, major IT planning and decision-making at the university level are recommended, and guidelines are set in IT priorities in alignment with UJ's strategic goals and mission.

IT Security Operations and Threat Management

The vulnerability management tool (Qualys) was optimised to improve asset categorisation, reports, and escalations. This was done to align with the revised vulnerability process, roles, and relationships across teams.

Cybersecurity is an ever-escalating risk that affects all institutions. The university also experienced heightened phishing emails, including impersonation and targeted attacks. Regular cybersecurity awareness messages were sent out, aligned with the university's risk appetite, addressing priorities such

as Phishing E-mails and compliance with the Protection of Personal Information Act. The ICS Division plans to continue with the cybersecurity awareness campaigns to ensure that users stay informed.

The Security Scorecard shown in Figure 3 is a security rating service that uses an easy-to-understand A-F grading system to rate universities on their overall security across ten major risk factors. This scorecard consists of participating universities.

UJ has shown improvement across all months, from an overall score of 71 in January 2021 to 81 in December 2021. Figure 3 shows the rating and a comparison of UJ in relation to its peer learning institutions:

Figure 3 shows that Endpoint Security and Application Security are the areas where UJ needs improvement, and these are the areas where most ICS cybersecurity efforts are focused. These ratings are designed to indicate an organisation's cybersecurity health. In contrast, the data that informs the ratings are designed to provide detailed information so that security operations teams can address findings.

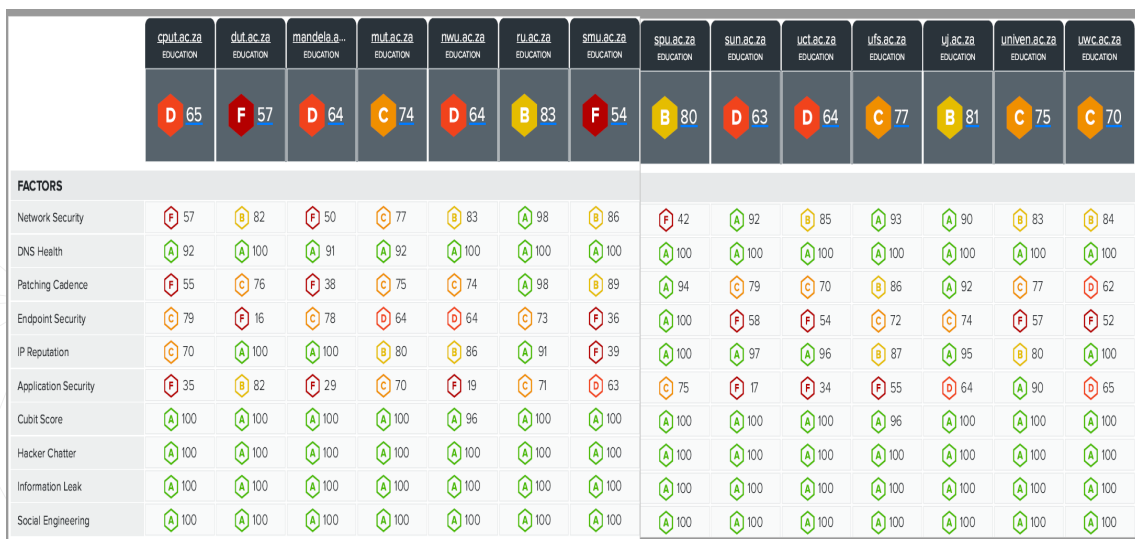
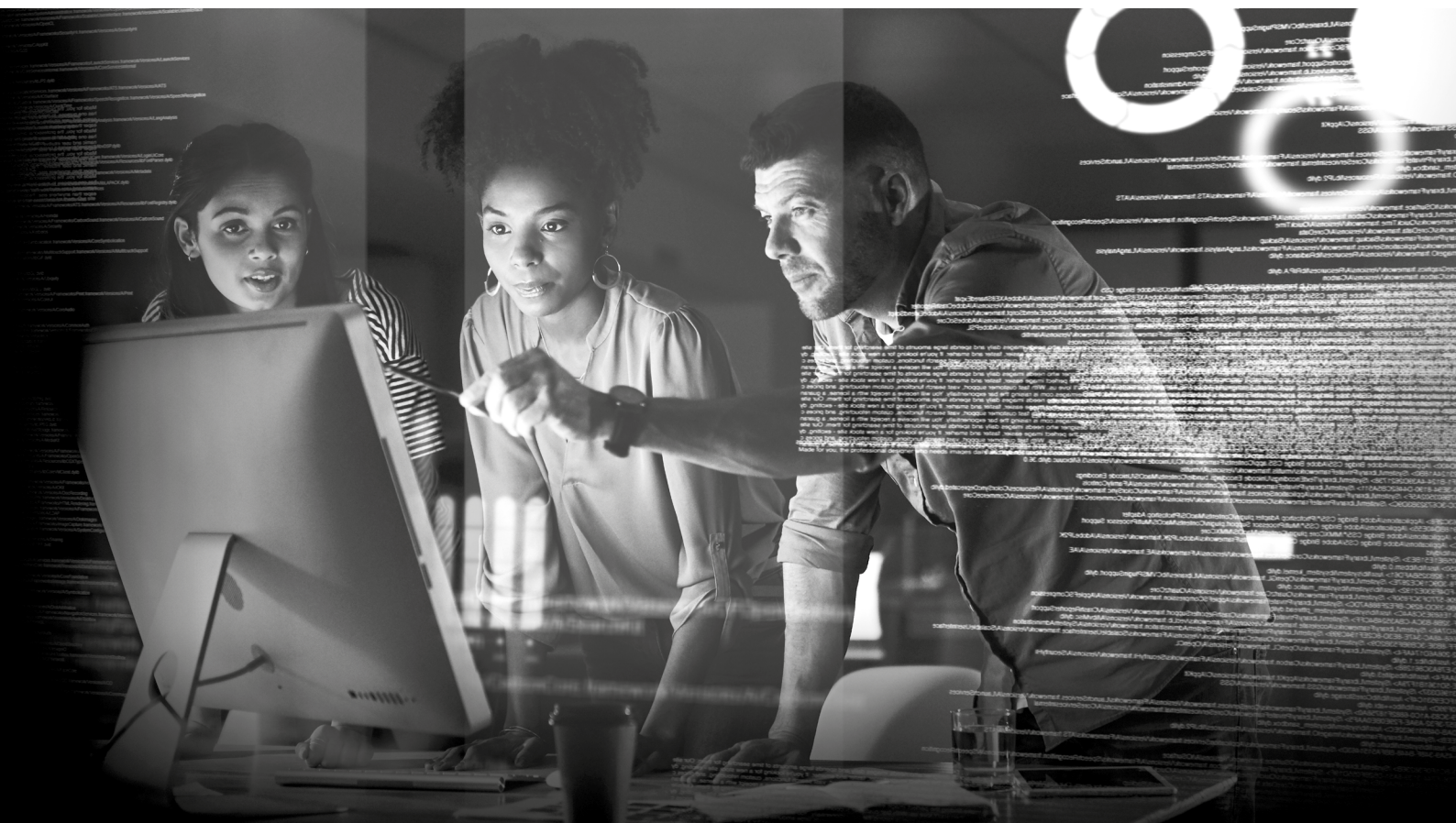


Figure 3: Security Scorecard



IT Project Management

In 2021, significant improvements were achieved in project management practices and compliance to the project management framework defined in 2020. A web-based project management tool that enabled improved reporting, document management and interaction was implemented in 2021. The ICS Project Management Office (PMO) actively played the role of compliance

management, embedding project management and governance processes through the decentralised project management model with other ICS units. At the end of December 2021, the total number of ICS projects registered with the PMO office was 63, and 38 projects were completed. The plan is to complete the remaining 25 projects before June 2022.

Network and Wi-Fi Infrastructure Upgrades

ICS continued with projects to upgrade the network and Wi-Fi infrastructure across all campuses by installing cabling and new network equipment such as switches, controllers, and Wi-Fi access points. The upgrade aims to increase Wi-Fi coverage and improve performance in both indoor and outdoor areas. Office area Wi-Fi coverage was increased as well as network bandwidth. For example, wired connections were improved from 100 megabits per second to 1000 megabits per second, and extensive outdoor coverage upgrades were undertaken for congregation areas such as gardens, bus stops and parking lots.

Re-cabling projects were also undertaken and completed to address ageing cabling infrastructure in certain places. The focus areas were the John Orr Building and second-floor West Wing on Doornfontein Campus, and the Soweto Campus Library. The benefit derived from the projects is that the installations were certified by the cabling vendor, and 25-year warranties were issued. ICS also initiated more network and Wi-Fi upgrade projects for the student residences. These projects will be concluded in 2022.

Network Security Upgrades

To further strengthen the security and increase the University's Network Security infrastructure capacity, ICS upgraded to new Firewall devices for the APK (Auckland Park Kingsway) Campus. These devices help prevent unauthorised access to the University's network; the firewalls also help detect and protect against network threats within the UJ networks. The new Firewalls brought about a noticeable increase/enhancement in the following areas:

- Significant increase in performance;
- Greater accuracy in applying custom security profiles;
- Increase in handling traffic load, especially within the student Wi-Fi environment;
- Increased capacity and storage of logs.

The Network Security upgrade also included upgrading the central logging systems (FortiAnalyzer) for the University's Perimeter Firewalls. This upgrade came with

added benefits such as:

- Faster generation of reports (includes web activity, network threats, VPN traffic and stats, bandwidth usage etc);
- Bigger storage for the collected logs;
- Increased logs retention period.

Table 1 is just an example of stats with regards to threats that the firewalls managed to detect and prevent on the UJ network:

Table 1 shows all the types of intrusions detected and prevented, the kinds of Malwares, types of malicious sites and high-risk applications. These stats are from October 2021 until December 2021.

In addition to the prevention devices installed, a central Firewall management device was upgraded as well as the central logging system for the perimeter firewalls to cater for the increase of Firewalls we have and to ensure that configurations are similar across all campuses to provide a user experience on the University's network is the

Table 1: Security and Threat Prevention

SECURITY AND THREAT PREVENTION	
IPS attack Detected	250 457
High-Risk applications used	109
Malware/Botnets detected	117
Malicious websites detected	5 145

same regardless of which campus they are at. These devices aid the Firewall engineers in centrally managing all Firewall devices that control access to and from the internet.

A Firewall Assurance tool called Skybox was implemented successfully. This device functions as a Firewall management tool. The benefits are listed below:

- The tool can identify Firewall rule utilisation from unused rule to the most used rule.
- The tool can identify rule conflicts or shadowed rules.
- The tool can Identify misconfigurations and provide international standard mitigation steps.
- The tool can also analyse the Firewall settings and configurations and provide a compliance report.
- It gives rule usage analysis and tracks Firewall changes.

Telephone Service Provider

A new telephone service provider was appointed

to handle all incoming and outgoing calls. The Caller Line Identifier (CLI) feature was implemented for all outgoing calls. As fibre exists on all four campuses, this infrastructure was leveraged to provide the university's telephone services, bringing down the monthly rentals from additional service providers.

Table 2: The number of calls from January to December 2021

TYPE OF CALLS	NUMBER OF CALLS
Incoming answered calls	1 790 188
Internal calls	1 426 198
Outgoing local calls	98 290
Outgoing national calls	68 057
Outgoing cellular calls	957 406
Outgoing international calls	3 200

Architecture Governance and Content Framework

The Architecture team ran a project to develop and operationalise relevant structures, principles, standards, processes, templates, and architecture roadmaps. This will be used as a base for operationalising enterprise architecture in 2022. This project provided the base for expanding architecture within ICS and the University and enabled the organisation to take full advantage of its information, infrastructure, and hardware and software assets. The framework also allows ICS to mitigate risks within the organisation regarding duplication of effort and systems.

UJ Business and ICT Operational Alignment

The team started with mapping business capabilities, process models, and value streams for a small number of departments within UJ. During the EBS assessment, the team also captured and documented all interfaces



between EBS and external systems. The department has had engagements with CAA and HR and will expand the program during 2022.

Virtual Architecture Team

The team continued its work in 2020 and produced business, process, and technology architectures for a small set of systems. This enabled them to expand their skillset and familiarity with the different aspects of Architecture.

UJ Wayfinder for Auckland Park Kingsway Campus

The UJ Wayfinder application was published in the Apple and Google app stores and provides wayfinding on the APK campus. This will allow the UJ community and visitors to navigate the APK campus to specific points of interest and venues such as the Madibeng and

Library venues and SEC and Student Finance. By the end of February 2022, APB, DFC, and SWC will also have been onboarded. By the end of March 2022, the APB, DFC, and SWC will have been onboarded.

Stress Testing

The ITS system is put under severe strain during the annual registration period due to the number of students using the system for registration purposes and back-end processes to support the registration

effort. ICS performs yearly stress tests of the registration and late application process to identify any issues on the system that can slow down or stop the registration process. The stress testing for the registration process showed a substantial improvement in the system's responsiveness during load testing. The time needed to complete the registration process was reduced during the stress test.

Web Application Firewall deployment

A new Web Application Firewall (WAF) was deployed to provide additional security to internet-facing websites. A WAF protects UJ's web applications by filtering, monitoring, and blocking any malicious HTTP/S traffic travelling to the web application. With cyber threats becoming more sophisticated, UJ will provide an extra layer of protection for UJ's internet-facing applications. The application coverage will be expanded in 2022

User account automation on Active Directory (AD) enhancements

ICS have been using Microsoft Identity Management (MIM) to synchronise biographical user data such as name, surname, office contact details and designation, from the HR Oracle system to the Outlook Address Book (residing in Active Directory). MIM also disable the accounts if an employee resigns and leaves the university's employment.

In 2021 we embarked on the MIM enhancements project. The MIM system now caters for complete automation of staff AD accounts, namely creating new accounts, adding and creating email addresses, and automatically managing these accounts throughout the staff members' lifecycle at UJ. We tweaked the system to disable accounts according to the user access management standard. MIM was further customised to manage general and non-staff AD accounts to ensure that access is terminated for unused accounts.

Reducing Server Hardware Footprint in the Data Centres

Servers and Storage

The strategy for 2021 is to further reduce the server hardware footprint in the datacentres. It was more challenging to visit the various data centres during the COVID-19 lockdown period because most of the ICS employees and service providers were working remotely, which delayed the implementation progress significantly. Table 3 reflects the hardware footprint for 2021.

Table 3: Hardware Footprint

DESCRIPTION	PRE-2021	DEC-2021	DIFFERENCE
Servers (Physical)	201	189	-12
Tape Libraries	11	10	-1
Storage Arrays	14	9	-5

The number of Storage Arrays reduced from 14 to 9, significantly impacting electricity usage. The current Azure cloud backup usage is:

- 671 instances stored within Azure (SQL databases, Virtual Servers, System State);
- 24 Terabytes (TBs) of storage usage. (Local Redundant Storage)

The reduction in hardware resulted in a saving in energy consumption in the data centres with respect to the power and cooling of the devices.

Microsoft Azure Cloud Services

In 2021, ICS completed the project to architecturally design and secure the Microsoft Azure platform for production workloads. The ICS cloud strategy supports the viewpoint to utilise cloud services only where cloud services make sense. Cloud services are closely monitored, maintained, and supported, and new service requests are handled on a case-by-case basis.

An increase in cloud expenditure is also noticeable when comparing costs from the previous report with the current costs.

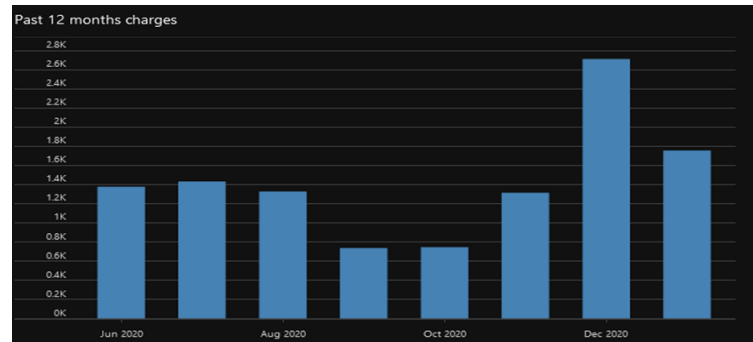


Figure 4: 2020 Cost for Azure



Figure 5: 2021 Cost for Azure

Microsoft Defender Threat Protection (ATP)

In 2021 the team has optimised the ATP policies and implemented the reporting on end-users targeted by phishing and malware attacks. This enabled ICS to be more proactive in response to threats received via email. ATP is configured to use the default email rules implemented by Microsoft Security which triggers relevant actions to prevent specific email threats, e.g., spam, spyware or ransomware. An alert email is sent to the email administrators for investigation. ATP also enables the blocking of suspicious web links, and when the UJ end user is at home or the office, they will receive a warning page that the site they are trying to visit is suspicious and should not continue.

The main threat protection statistics are on URLs received via email, Excel, Word or PowerPoint documents. This is followed by Email Malware threats found before email delivery and stopped successfully. Compromised users come last, and these are users who were blocked from sending emails because their computer equipment was compromised, as shown in Table 4:

Table 4: Threat Protection Statistics

UNIFORM RESOURCE LOCATORS	EMAIL MALWARE	COMPROMISED USERS
Allowed: 1 135 904	Email Malware: 2432	Compromised users: 25
Blocked: 2970	Email Phish: 24 453 Email Spam blocked: 58 5041	Suspicious user activities: 15

Every month, reporting is done to the UJ ICS Information Security Steering Committee on spoofed domains, spam, and phishing attacks. Monitoring and implementation of mature processes continue and assist in increasing the university's cybersecurity posture.

Successful implementation of the Web strategy

A web strategy formulated in 2020 proposed developing a new and improved UJ public-facing website that supports responsive design. The newly built website has been successfully delivered, and users have been boarded. The improvement of search engine optimisation (SEO) ensures that UJ is found on Google searches, requiring that web page content be well written. Quality content is significant for higher rankings; the capability to host conferences (with RSVP functionality and online payments included) and to update faculty/departmental webpages with integrated videos and other multimedia is much easier. The website offers the UJ community, researchers, and potential students a dynamic, engaging, and exquisite fast and

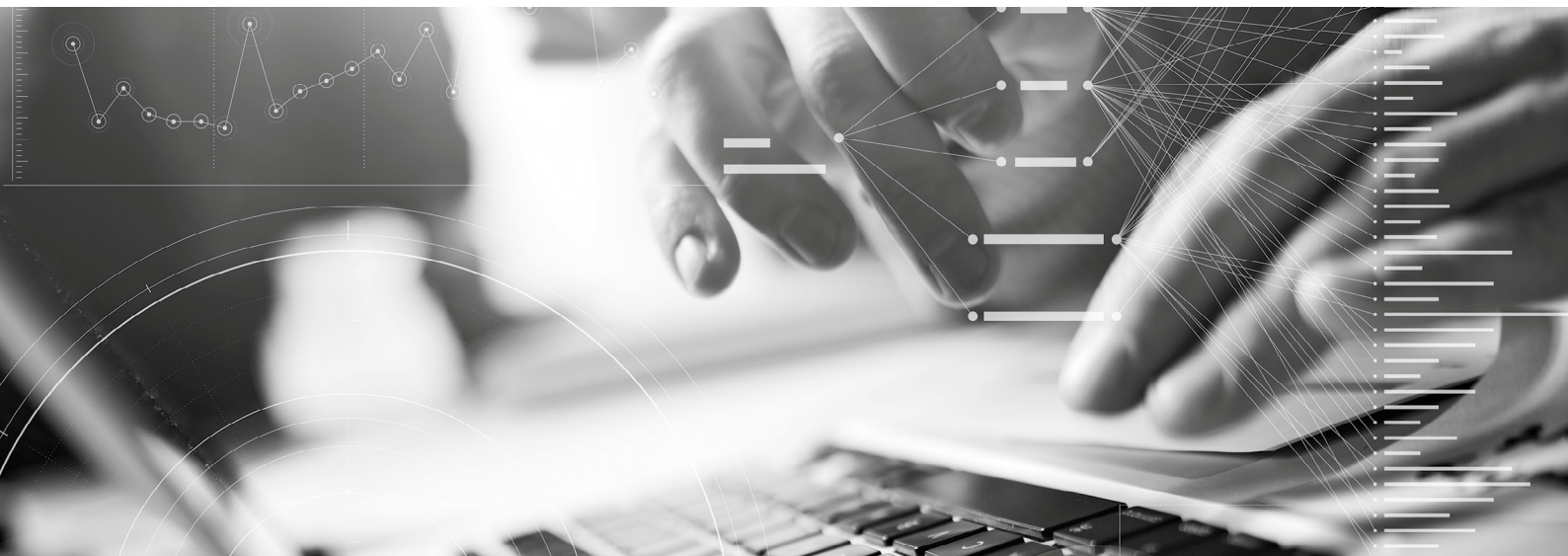
reliable platform with improved user experience and navigation of relevant information.

External Webhosting

UJ web utilises external hosting to supplement any external domains that form part of the UJ web portfolio. The service rendered allows users to create a unique brand identity about the corporate branding strategy.

Oracle E-business Suite System (EBS)

The Oracle E-Business Suite is one of the critical systems used for the functionality of Human Resource Management, Payroll, Financial modules, Procurement and Inventory. The ICS Division appointed Accenture SA as an independent accredited ERP Service Provider to conduct due diligence of the existing Oracle applications modules, namely HR, Payroll, Finance and Supply Chain Management. The project's outcomes were a Business Case for the upgrade to the new Oracle R12.2.9



version roadmap for future Oracle Cloud applications and suggested alternative ERP systems. After the Oracle due diligence and in keeping with the Business Case outcomes, the Oracle system was successfully upgraded to a new version of Oracle 12.2.9.

PwC was appointed to conduct a data completeness and accuracy review to ensure data accuracy before and after the Oracle upgrade. Any data anomalies discovered during going live are exposed and remedied.

ITS Student Management System

ITS is used as the Student Management System for UJ. The system is used to manage the Academic Structure, Student Applications and Registration, Class and Examination Timetable Publication, Student Finance, Study Record Maintenance, Graduations, Marketing and Student Communication.

ICS embarked on a Request for Information (RFI) process to test the market for a suitable alternative Student Management System (SMS).

The respondents had to demonstrate their solution to the different faculties, where the systems were evaluated.

The conclusion that was reached after the RFI process concluded, was that the current ITS system still meets the University of Johannesburg's overall objectives, and that the University will continue to use the Adapt IT Student Management System.

Oracle Business Intelligence (BI) System Projects

The BI system has been integrated with 23 sources within the UJ environment and other external systems. The is to ensure that the UJ BI system provides better reporting and analytics.

BI GES 4.0 project was one of the BI environment's significant projects and was completed in November 2021. The project was an initiative from the Research and Innovations Department to build BI dashboards from multiple streams to track KPIs related to GES students, GES Distinguished Professors, and GES funding.

Enterprise Systems Availability Report

The below diagrams are the systems availability stats for 31 December 2020 to 31 December 2021. The target for the system availability is 98%.

ITS Total Up Time: 99,97%

From Dec 31, 2020 12:59:59 PM To Dec 31, 2021 12:59:59 PM

Availability Summary

Starting Status	Under Blackout
Ending Status	Up
Availability Percentage	99.97

Availability Status (Total Time Hrs)

Up	3810.56
Down	0.48
Blackout	8.77
Unmonitored	0.61

Availability Status (% Time)

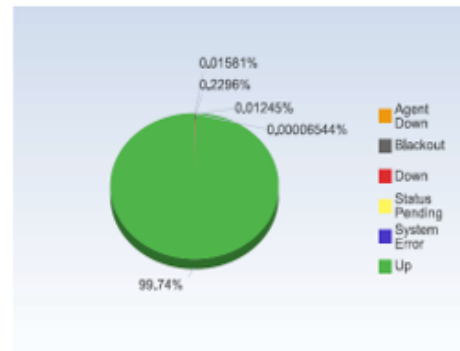


Figure 6: Student Management System – ITS availability statistics

Figure 6 shows that the ITS System achieved 99.74% availability, with a total uptime of 3810.56 hours for 2021. A total of 8.77 hours of the blackout was due to the maintenance conducted on the system, and a total of 0.48 hours of downtime was experienced due to system-related issues. The unmonitored 0.61 hours refers to problems that the monitoring system could not detect, and the system was not down.

Oracle EBS Total Up Time: 83,78%

From Dec 31, 2020 12:59:59 PM To Dec 31, 2021 12:59:59 PM

Availability Summary

Starting Status	Down
Ending Status	Up
Availability Percentage	83.78

Availability Status (Total Time Hrs)

Up	3083.64
Down	597.08
Blackout	2.08
Unmonitored	0.02

Availability Status (% Time)

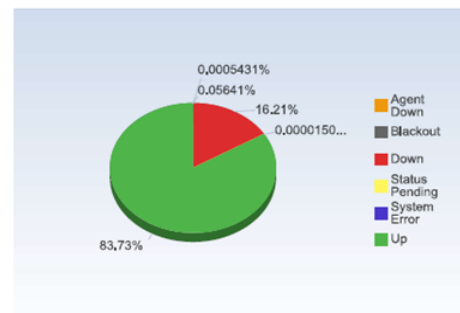


Figure 7: Oracle EBS availability statistics

Figure 7 shows that the Oracle EBS had a high amount of downtime due to the backup process scheduled to shut down the system every night between 02h00 and 06h00. Oracle EBS achieved 83.78% availability with a total uptime of 3083.64 hours for 2021. A total of 2.08 hours of the blackout was due to the maintenance conducted on the system. A downtime of 597.08 hours was experienced due to system-related issues. The unmonitored 0.02 hours refers to problems that the monitoring system could not detect, and the system was not down.

Business Intelligence Up Time: 99,97%

From Dec 31, 2020 12:59:59 PM To Dec 31, 2021 12:59:59 PM

Availability Summary

Starting Status	Under Blackout
Ending Status	Up
Availability Percentage	99.98

Availability Status (Total Time Hrs)

Up	3809.65
Down	0.56
Blackout	9.92
Unmonitored	0.32

Availability Status (% Time)

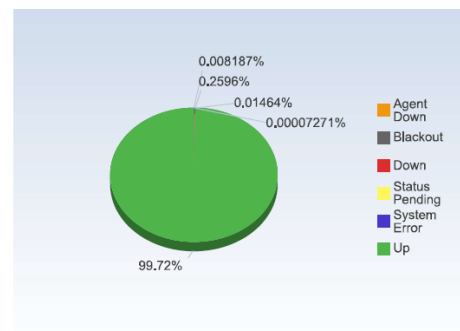


Figure: 8 Business Intelligence System – availability statistics

Figure 8 shows that the Business Intelligence System achieved 99.72% system availability, with a total uptime of 3809.65 hours for 2021. A total of 9.92 hours of the blackout was due to the maintenance conducted on the system, and a total of 0.56 hours of downtime was experienced due to system-related issues. The unmonitored 0.32 hours refers to problems that the monitoring system could not detect, and the system was not down.

Implementation of the Service Delivery Strategy

Service Delivery focuses on the four critical principles defined in the IT Service Strategy adopted in 2021. These principles are:

- Enhanced Capability and Competency.
- Service Orientated Processes.
- Improved Quality of Service.
- Digital Enablement.

The implementation of the Service Strategy progressed well in 2021, with 39% of the 3-year implementation plan (2021-2023) being completed. The completed initiatives include establishing the IT Stakeholder Liaison Forum, expanding access

to collaborative tools like OneDrive for Business and Microsoft Teams, Improving Customer Service and First-line Resolution by using Remote Support tools, and Implementing an IT Asset Management system.

ICS continues implementing the IT Service Strategy, ensuring cost-effective and efficient ICT services to all UJ stakeholders, aligning with the institution's 4IR mandate.

Archibus Operations Mobile Web Applications

ICS investigated implementing a CRM system for the University in terms of a requirement for staff and students to have the ability to report issues from a mobile device; a plan was developed to meet this requirement. This system allows users to log a call from their mobile device requesting services from maintenance, auxiliary services, and limited ICS services. Once the call is logged, the system routes the request to the responsible support team to attend to the reported problem.

IT Asset Management

The procurement of an asset management system was finalised and implemented during 2021. The goal was to improve the management of IT assets, allow for easier reporting and assist relevant stakeholders in making data-driven decisions regarding IT acquisitions. The system implemented is Manage Engine's Asset Explorer, which automates several IT asset management processes within the University.

Laptop Tracking Tool

Due to the number of stolen laptops, a strategic decision was taken to procure and implement a system that allows the university to track the laptops. If a laptop is reported stolen, this system gives the university the ability to track, freeze, delete data or wipe the machine that cannot be recovered remotely.

Student Computing desktop replacement – Students Labs

ICS has replaced 942 computers in the Student Computing Labs across all four campuses. 502 of these computers were replacements in the Faculty of Engineering and Built Environment (FEBE) labs at the DFC campus. This is a continuous improvement process for the student computing environment in order to equip the computer labs with modern computers that meet students' expectations. This project ensured that old computers in the ICS Student Computing and FEBE labs were replaced to provide faster and more reliable computers, improve classroom experience, and support research, teaching, and learning objectives.

Comparison of Service Request and Incidents between 2020 and 2021

The ICS Division provisions support for all IT services through the Incident and

Service Request Management processes. The Incident Management process is responsible for restoring IT services that have failed or been interrupted from normal operations. The Service Request Management process accepts, approves, and delivers user requests for new equipment or standard IT services.

Below are the statistics for Incidents and Service Requests for 2020 and 2021 as serviced by the ICS Division.

In 2021, 31494 Incidents were logged with ICS where users reported a problem and required ICS's services to resolve their issues being experienced. Figure 9. shows the comparison of the number of incidents logged in 2021 and 2020 with an 8.9% increase for 2021.



Figure 9: Incidents 2020 and 2021 Comparison

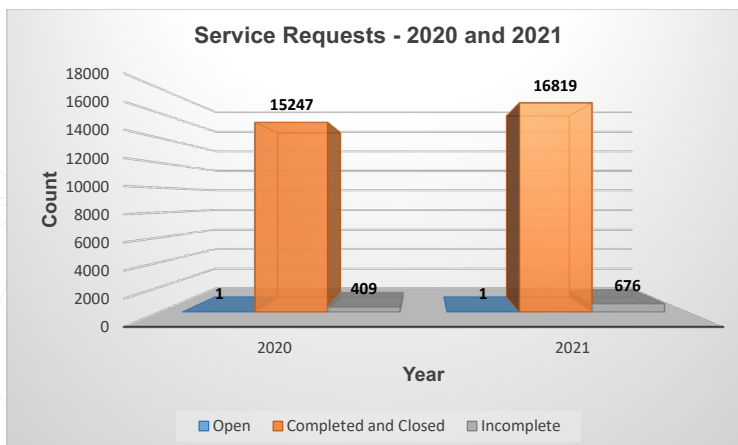


Figure 10: Service Requests 2020 and 2021 Comparison

The total number of requests for service from ICS for 2021 was 17496. Figure 10 shows the comparison between 2021 and the previous year, with 2021 having an 11.7% increase in requests for services to be rendered.

Solution Delivery Operating model

The unit uses the agile software development methodology, allowing the development team to incrementally deliver valuable software to the University in manageable chunks while ensuring that the final system is built and delivered in an agile manner. The main benefit of this delivery method is that ICS can be dynamic and evolve with the business within the development process as the methodology allows for changes during the development process. The methodology enables the technology used, operationalised using the Microsoft DevOps technology platform, fully aligned with the University ICT Strategy and UJ Strategic objectives.

The information below highlights UJ Strategic objectives and the systems that ICS developed and enhanced during the 2021 fiscal year.

Excellence in Teaching and Learning

ICS partnered with the Central Academic Administration (CAA) Division to enhance the Management of Marks System (MAMS) and the Submission of Assessment Papers Secured System (SAPSS). ICS developed MAMS to enable enhanced governance of student assessment and exam marks. In 2021, ICS was requested to make enhancements following the merger of Schools in the College of Business and Economics (CBE) faculty and allow for matching these merged Schools into existing records. More work was done to enhance the backend calculation of student summative marks. Finally, given that MAMS is linked to the SAPSS system, work was done to align these two systems

with the recent changes. This created efficiencies for the automated processing of marks by the faculties.

An Enriching Student-friendly learning and living experience

The F7 Appeal and Sick Exam Application allows students to apply for sick exams online and appeal decisions to exclude them from the University in terms of the F7 process. Administration staff are also able to use this system to process such applications. In 2021, ease of application features and enhancements to improve turnaround times were introduced. Further enhancements assisted Faculties to operate the system independently of ICS. These enhancements gave the administrative staff greater flexibility and control of the processes.

In partnership with Student Affairs, enhancements by ICS to the Student Representative Council (SRC) Trust Fund and Meal Grant Application system resolved risks identified during an audit. This system allows students to apply for SRC trust fund funding and meal assistance. One of the innovative and socially aware features added to this system is that members of the UJ community can refer a needy student for sponsorship. Business rules such as the exclusion of NSFAS grant holders and students with F7 global results were applied. This minimised the unnecessary administration of applications that did not qualify.

Excellence in Research and Innovation

ICS partnered with the Research and Innovation Division to introduce efficiencies in the administration processes around research as follows:

- **University Research Council (URC)** – this system allows the processing of research funding applications. Enhancements were made to amend business rules in order to create efficiencies for Research and Innovation Department.
- **University Capacity Development Grant (UCDG)** –

With respect to research development, the UCDG grant aims to enhance the research capacity of universities and improve research productivity by focusing on developing the research capabilities of academic staff. A new system was designed to enable the management of funding requests online.

- **Online Research Output System (OROSS)** is the system to submit research output online. Enhancements were requested to align the system with DHET requirements. The aim is to phase out the old OROSS and roll out this latest version.

An International Profile for Global Excellence and Stature (GES)

To enable the Internalisation department to manage the UJ Student Exchange program, ICS made enhancements to the Study Abroad Outbound Student Mobility Application. More than 30 new features were introduced to this system.

National and Global Reputation Management

Event Management System – With Protection Services, ICS did the second development phase to enhance the Events management system. The 2021 round introduced a process to make appeals through the system and features surrounding that. Another critical element of the 2021 delivery was transitioning the system to modern technology. This system enables the management of significant events in the University and has not been used given the gathering restrictions due to COVID-19.

Temporary Employees Application (TempEmp) – As a custodian of the recruitment processes Human Capital Management (HCM) Division, in conjunction with ICS, enhanced the system that manages the onboarding of temporary employees. New features like international banking codes, income tax numbers, and international addresses were added.

ICS Skills Development Plan

ICS embarked on a skills assessment of their staff in 2020 and invested in LinkedIn Learning and Pluralsight platforms to address the skills gaps and requirements to support the ICS strategy and skills demand from the technology industry.

In 2021, 168 ICS staff members, including ICS interns, logged into the LinkedIn Learning platform, with 6431-course views, of which 2 196 courses were completed. In addition to the courses, 65 012 videos were viewed. The most popular general courses were:

- Managing Stress for Positive Change
- Time Management: Working from Home
- Holding your Team Accountable
- Improving Employee Performance
- Improve your Problem-Solving Skills
- Building Accountable and Becoming Result Oriented.



On a technical skills level, the following courses were at the top of the list:

- Putting ITIL into Practice: Applying ITIL 3 Foundation Concepts
- Project Management Foundations
- Phone-Based Customer Service
- Customer Service: Problem Solving and troubleshooting
- Data Analysis and Analytical Skills
- Become a Junior WordPress Developer

Upskilling of employees will continue to be a priority as technical skills are always necessary within the environment. ICS will continue with LinkedIn Learning and Pluralsight platform to ensure staff are informed about the latest technology trends and acquire new or enhanced skills.

KEY RISKS AND CHALLENGES

RISKS

- **Funding constraints** – High costs associated with the implementation and maintenance of infrastructure.
- **Scarce skills set** – Regular upskilling of staff in hardware on various platforms, as new technologies are developed frequently.
- **Human capital constraints** – The staff and infrastructure costs needed to meet the university's strategic objectives and reduce the reliance of ICS on external consultants and service providers.

CHALLENGES

- **Multi-Vendor Environment** – More time is needed to deploy solutions that are compatible with all technology partners; the following areas are mostly affected:
 - Delivery of network infrastructure (including Wi-Fi) projects due to the changes faced in the compatibility of technologies.
- Consultation services tend to be expensive since it is rare to find technical resources within ICS who are experts in all the technologies.
- **Wi-Fi stability** – Since a new Wi-Fi technology partner has been appointed, Wi-Fi stability has become challenging and complex to resolve. This is due to Wi-Fi signal interference from old and new technologies
- **Global Chip Shortage** – the global chip shortage affects the delivery dates of computers and audio-visual equipment and, in some cases, delays projects by more than six months.
- **Internal skills Development** – Building internal skills capacity including knowledge transfer from service providers.
- **Staff Retention** – Inability to retain critical resources which leads to a high attrition rate.
- **Enterprise Architecture** – Embedding Enterprise Architecture principles and governance processes within ICS and the organisation.
- **Cloud technologies adoption** – Cloud technologies still pose high costs in specific environments and planning, and analysis are essential before any service migration is attempted.

THE FUTURE

ICS endeavours to be at the forefront of technology and strive to maintain high service levels to the UJ community. The focus will be on improving the maturity of implemented baseline policies, structures, processes, guidelines and standards in ICT Governance Implementation cybersecurity operations. POPIA compliance requirements that have been identified in the POPIA assessment conducted in 2021 will be implemented to mitigate security and compliance risks.

ICS will prioritise business-critical systems as identified in the Business Impact Assessment (BIA) conducted to ensure that ICS is prepared before, during and after a disaster has happened. The focus will be on disaster recovery principles and processes, backups, and then testing the ability to restore IT systems and ensure business continuity.

ICS will continue operationalising and embedding the Enterprise Architecture function within ICS to upskill and develop the virtual architecture team. Network security will be increased and enhanced as the security landscape is continually changing as more threats become prevalent. The following initiatives will be taken to enhance the Network Security infrastructure within the University:

- Enhancing LAN security by expanding NAC (Network Access Control) implementation.
- Implementing Onboarding and On-guard on the Staff-Wi-Fi environment.
- Benchmarking with other Universities to ensure that our network security measures are of a certain standard.

Regarding Advanced Threat Protection (ATP), further enhancement and analysis of the Microsoft Defender Threat protection tool in O365 will be prioritised to ensure maturity in UJ's cybersecurity. ICS will continue to provision, upgrade, and maintain the server

infrastructure lifecycle to provide highly available applications and services.

The redesigned UJ website provisions the UJ community with a word class, dynamic and competitive site. ICS will continue with the upgrade of Audio Visual (AV) equipment in lecture venues, the implementation of an IT Service Management system and replacing out of warranty computers in the Student Computing environment while maturing the management, tracking and reporting of IT assets.

The stress testing for the Student Management System – ITS will also be expanded to include the UJ Vote system and other processes used by UJ on ITS during the registration period. For the Student Management System, the technology roadmap by the Service provider to move to Integrator Five as the NextGen system with improved new features and a more user-friendly look and feel. On Oracle Business Intelligence (BI)

System, ICS aims to expand the BI internal support team to maximise BI support visibility and grow the BI analytics space. ICS will use 2022 to review and explore solutions before making a final decision to move Payroll, Finance and Supplier Chain Management (SCM), and Human Capital Management (HCM) modules operational on Oracle EBusiness Suite.

CONCLUSION

Information and communications technology has enabled people worldwide to continue activities online throughout the COVID-19 pandemic. This is a watershed moment in ICT, and we must harness optimised data to improve society and create value. The advancement of ICT has released society from the constraints of “place” and “time” and made it possible to create value – as seen in remote work, remote healthcare, and remote education – particularly from the perspective of inclusivity. Moreover, ICT is a driving force with the potential to shape the future of work and the ability to bridge the digital divide.

ICS has seen an unprecedented demand for flexibility, affordability, and accessibility of ICT services and systems, and this continues to rise. At the same time, there is a persistent need for greater computing power and cybersecurity. ICS needs to leverage innovative opportunities and identify forces shaping the future of the ICT industry, along with the key trends and technologies such as:

- The future of work;
- The global chip shortage;
- Digitisation demands;
- The shift to hybrid cloud.

ICS plans to pick up on this and continue to drive the use of technology. This has pushed ICS to develop new technologies, products, and services at an unprecedented pace while attracting funding for new technologies and acquiring talented resources to respond to the university's needs.



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