# INFORMATION TECHNOLOGY SERVICES

Information Technology Services
The University of Hong Kong

# TABLE OF CONTENTS

# EXECUTIVE SUMMARY

Information Technology Services (ITS) continued its tradition of providing high-quality support and service during 2014-15. Our efforts across all campuses helped to enhance teaching and learning, advance research and innovation through new computing systems, support knowledge exchange and improve the online student and staff administrative systems. We also worked to maintain and enhance other aspects of the University's infrastructure, always with the goal of ensuring that users experience the best quality IT service in the University.

A notable aspect of our contribution to enhancing the student learning experience during the year was the completion of our role, in cooperation with the Estates Office, in refurbishing and enhancing eight large lecture theatres across the University. We also continued with our commitment to providing students with the latest versions of commonly used software packages, updating the PCs in communal classrooms and the Learning Commons.

With the Moodle learning management system in full operation for three years, our efforts to facilitate teaching and learning was upgrading the system and adding a new assignment deadline notification function. We also upgraded the Panopto lecture capture system and organised the second T&L Showcase Exhibition to highlight the possible uses of technology in education.

Given that use of the University's 12-TFLOP GRIDPOINT high-performance computing facility is approaching saturation, ITS began providing a supplementary high-throughput computer system in 2014, drawing on the unused power of the PCs in the Learning Commons. This system will complement the 100 TFLOP system that was installed during 2015 for use in the 2015-16 academic year.

In support of knowledge exchange, ITS continued to cooperate with the Coordination Group for Department PC and Network Support during the year, and further enhanced the Knowledge Exchange Activities System. We were also very pleased that our efforts in one particular aspect of knowledge exchange were recognised by the Web Accessibility Recognition Scheme 2015, which was co-organised by the Office of the Government Chief Information Officer and the Equal Opportunities Commission. The ITS website received a Gold Award for the second consecutive year, with the eLearning support website also receiving a Gold Award.

Business systems were again a major focus in 2014-2015, with a number of enhancements made to the roadmap for the Student Information System. Key changes to the system included the implementation of a degree audit tool that indicates the fulfilment of degree requirements and a new workflow system for student credit transfer applications.

Our work on the Human Capital Management System involved a number of enhancements to improve its functionality and user-friendliness, and to align with new business needs. These included conformance with the Employment Ordinance, the ability to handle a new benefit plan, the improvement of accuracy related to MPF and gratuity calculations and the addition of the ability to collect emergency contact information, among other things. A major revamp of the Performance Review and Staff Development system for non-academic staff was also conducted, with a new set of evaluation forms and a new performance rating scheme put in place.

In terms of infrastructure enhancement, we continued to contribute heavily to the University's enabling IT platform through our ongoing work on the provision of a campus network, Wi-Fi and IP telephony services to newly renovated offices on Centennial Campus. Across the University, we extended the scope of the uPrint cloud printing solution, upgraded the staff Exchange email platform and consolidated all of the student email systems into the HKU Connect platform.

University-wide network enhancement included the addition of Wi-Fi access points, upgrading floor switches to enable IPv6 connectivity and establishing a test bed that will be used to explore the emerging software defined networking technology. We also took several important steps to enhance information security across the University, and implemented a server compliance solution in response to the proliferation of security incidents.

As part of the University's commitment to unifying its communications, ITS rolled out a new high-definition, multi-party video-conferencing system in January 2014, with 19 departments making use of it throughout 2014-15. We also undertook a pilot test of Skype for Business 2015, with the aim of implementing the system in late 2015.

A critical aspect of all ITS efforts throughout the year was our focus on quality, and that was particularly apparent in our service and process improvement measures. In 2014-15 we continued to support the Information Technology Infrastructure Library, running its service desk and incident and problem management systems, and implementing a Configuration Management module as part of an effort to enhance the configuration management process.

In a broader sense, we established a Quality Management System to formulate ITS policies, rules and practices, and enforce the implementation of professional ITS standards for the user community. This was complemented by Quality Management Documentation for ITS staff to ensure the delivery of quality IT services. Indeed, a hallmark of the year was our increased emphasis on standardised practices, quality work and enhanced customer satisfaction.

# 1 SUMMARY OF MAJOR DEVELOPMENTS

# 1 SUMMARY OF MAJOR DEVELOPMENTS

## 1.1 Enhancing the Student Learning Experience

ITS continues to work closely with colleagues in the University Estates Office to develop and create high-quality, technology-rich learning environments for teaching and learning. In September 2014, eight newly refurbished and enhanced large lecture theatres in the Chong Yuet Ming, KK Leung, Library Extension and Chow Yei Ching buildings became ready for use, and the new features and facilities they offer have proved very popular.

We also continue to help the University to enhance student learning by upgrading the PCs in communal classrooms and the Learning Commons with the latest versions of commonly used software packages.



## 1.2 Advancing Research and Innovation

With demand for computing power to support research continuing to grow apace, the annual CPU processing time of the GRIDPOINT system has increased slightly but its capacity is already approaching saturation.

A high-throughput computing (HTC) system that utilises the unused power of Learning Commons PCs for research computing was established in March 2014, and has since been providing valuable additional computing power to support select research projects.

With support from professors and researchers in various faculties and departments, the University has also approved a University Development Fund proposal to establish a new high-performance computing (HPC) cluster system making use of the latest technology. The 11-year-old HPCPOWER system was decommissioned in August 2014. The new system is currently under installation, and will be available in the 2015-16 academic year

## 1.3 Promoting Knowledge Exchange

ITS continues to promote IT knowledge exchange through cooperation with the Coordination Group for Department PC and Network Support. We also provide technical support to the Communications and Public Affairs Office (CPAO) to maintain the University's website. The ITS website and eLearning support website received Gold Awards from the Web Accessibility Recognition Scheme 2015 co-organised by the Office of the Government Chief Information Officer (OGCIO) and Equal Opportunities Commission (EOC). That was the second year for ITS to receive the honour. Moreover, through enhancement of the Knowledge Exchange Activities System (KEAS), we are helping to facilitate knowledge exchange activities across the University more effectively.

## 1.4 Enabling IT Platform (Business Systems)

The 2014-15 academic year was the second year of implementation of the "SIS Roadmap 2013-16". We have made a number of enhancements to the Student Information Systems (SIS) to better serve the growing demand for IT support for the University. A degree audit tool has been adopted to aid faculties in checking and advising students on fulfilling their degree requirements. A new workflow system for credit transfer applications has also been established to support student exchange study internationally.

The Human Capital Management System (HCMS) has undergone several enhancements this year to further improve its functionality and user-friendliness. The Personal and Family Data Form has been enhanced to allow the addition of mobile phone numbers and alternate email addresses for emergency contact purposes. Alterations have also been made to the

# 1 SUMMARY OF MAJOR DEVELOPMENTS

Letter of Appointment, Workforce Administration, Financial Clearance and Staff Commitment and Global Payroll functions to allow the automated handling of a new benefit plan across the whole employment cycle. Further, the Performance Review and Staff Development (PRSD) system for non-academic staff has been revamped with new evaluation forms and new rating scheme.

In other business areas, there have been a number of new developments and upgrades to administrative systems for user departments, for example, the Research Administration, Estates Services and Financial Systems, to increase their efficiency and usability to allow them to better cope with the University's needs.

## 1.5 Enabling IT Platform (Underlying Infrastructure)

Beginning with the establishment of a new computer room on the Centennial Campus in 2012, major system infrastructure expansions have been rolled out across the new campus to improve the infrastructure's overall resilience and capacity. With the help of cloud development and underlying virtualisation technologies, we have enabled the failover of critical services between the computer rooms on the Main Campus and those on Centennial Campus. The uPrint cloud printing solution replaced the traditional printing system in August 2013, thereby unifying printing services for users, with support extended to Mac OS and iOS devices in November 2013 and to Android devices in August 2014. An upgrade to the staff exchange email platform is in progress, with ongoing consolidation of the departmental email systems to a central one and all in-house student email systems consolidated onto the HKU Connect platform.

Several network improvement works were undertaken in 2014-15 to enhance the performance and capacity of the campus network. For example, City-Wide Wi-Fi (Wi-Fi.HK via HKU) was launched at HKU to support the HKSAR Government's "City-wide Wi-Fi for the Public and Visitors" initiative. A number of network services (ACENET, HKUVPN1 and WiFi 802.11b) were retired to consolidate network resources and strengthen overall network efficiency. As part of ITS's continued efforts to upgrade and expand HKU Wi-Fi network coverage and performance, additional Wi-Fi access points were installed at various campus locations, e.g. Centennial Garden. Some floor switches for the staff network were also upgraded in various campus locations to ensure better performance and security and enable IPv6 connectivity. A test bed for exploring emerging software defined networking (SDN) technology was established, with testing carried out on standard OpenDaylight controller software. Network links connecting remote campuses (Admiralty Centre, Ap Lei Chau Clinic, Hing Wai Centre and Tsan Yuk Hospital) have been upgraded to 100 Mbps with enhanced resilience.

ITS took several measures in 2014-15 to improve information security across the University, including engaging an independent consultant to perform security assessment services for 10 selected academic and administrative departments, organising information security awareness promotion activities such as seminars and exhibitions, and actively participating in the Joint Universities Computer Centre (JUCC) Information Security Task Force (ISTF). In response to the growing proliferation of security incidents, a server compliance solution was introduced to align the configuration of servers to a good baseline configuration connected to the campus network. System implementation is in progress, and compliance checks are expected to begin with the Windows and Linux operating systems in the first phase of deployment at the end of 2015.

## 1.6 Enabling IT Platform (Consequential Movements Project and Other Developments)

ITS has worked with the Estates Office on the Consequential Movements Project since the opening of the Centennial Campus. Our role is the provision of a campus network, Wi-Fi and Internet Protocol (IP) telephony services to newly renovated offices. Over the past 12 months, ITS has supported the Estates Office in the timely completion of the renovation of a number of buildings, including the Meng Wah Complex, Eliot Hall and May Hall. We have also worked closely with the Estates Office for the cabling and installation of network, Wi-Fi and IP phone equipment for the new auditorium in the Chong Yuet Ming Amenities Complex.

# 1 SUMMARY OF MAJOR DEVELOPMENTS

With regard to the University's other major development projects, including Phase I of the Queen Mary Hospital Redevelopment Project (involving the conversion of senior staff quarters into office space and clinical facilities), a new hospital block for Queen Mary Hospital, and a new children's hospital at Kai Tak, ITS has provided consultants with the requirements of HKU's Campus Network services for incorporation into their building design and cost estimates.

## 1.7 Enabling IT Platform
### (Unified Communications)

Following the success of the IP telephony system's roll-out on the Main Campus, the system has been extended to the LKS Faculty of Medicine to replace its ageing PABX system. More than 1,100 IP phones have now been deployed, taking the total number University-wide to 4,400.

We have also deployed a new video-based multi-control unit (MCU) to support high-definition multi-party video conferencing. The MCU can support up to seven meeting parties at full high definition (1080 p), 15 at high definition (720 p 30 fps) or 60 at standard definition (360 p). Users can join a meeting with room-based video-conferencing endpoints, a PC, Mac, iOS or Android device, or an ordinary telephone. The system also supports recordings and webcasting to up to 600 viewers simultaneously.

## 1.8 Enabling IT Platform
### (Service and Process Improvement)

We continue to support the Information Technology Infrastructure Library (ITIL) in running its service desk and incident and problem management systems to support professional ITS operations. Internally, we have established a Quality Management System (QMS) to formulate ITS policies, rules and practices and to enforce the implementation of professional ITS standards for the user community. The Quality Management Committee (QMC), chaired by the Director of ITS, was set up to guide and oversee QMS implementation. In addition, Quality Management Documentation has been compiled to provide clear guidance to ITS staff in delivering quality IT services. With the establishment of ITS Project Management Methodology (PMM) and the QMS, ITS has gained greater awareness of quality in the past year, and is increasingly emphasising the standardisation of IT practices, good work quality and customer satisfaction.

# 2
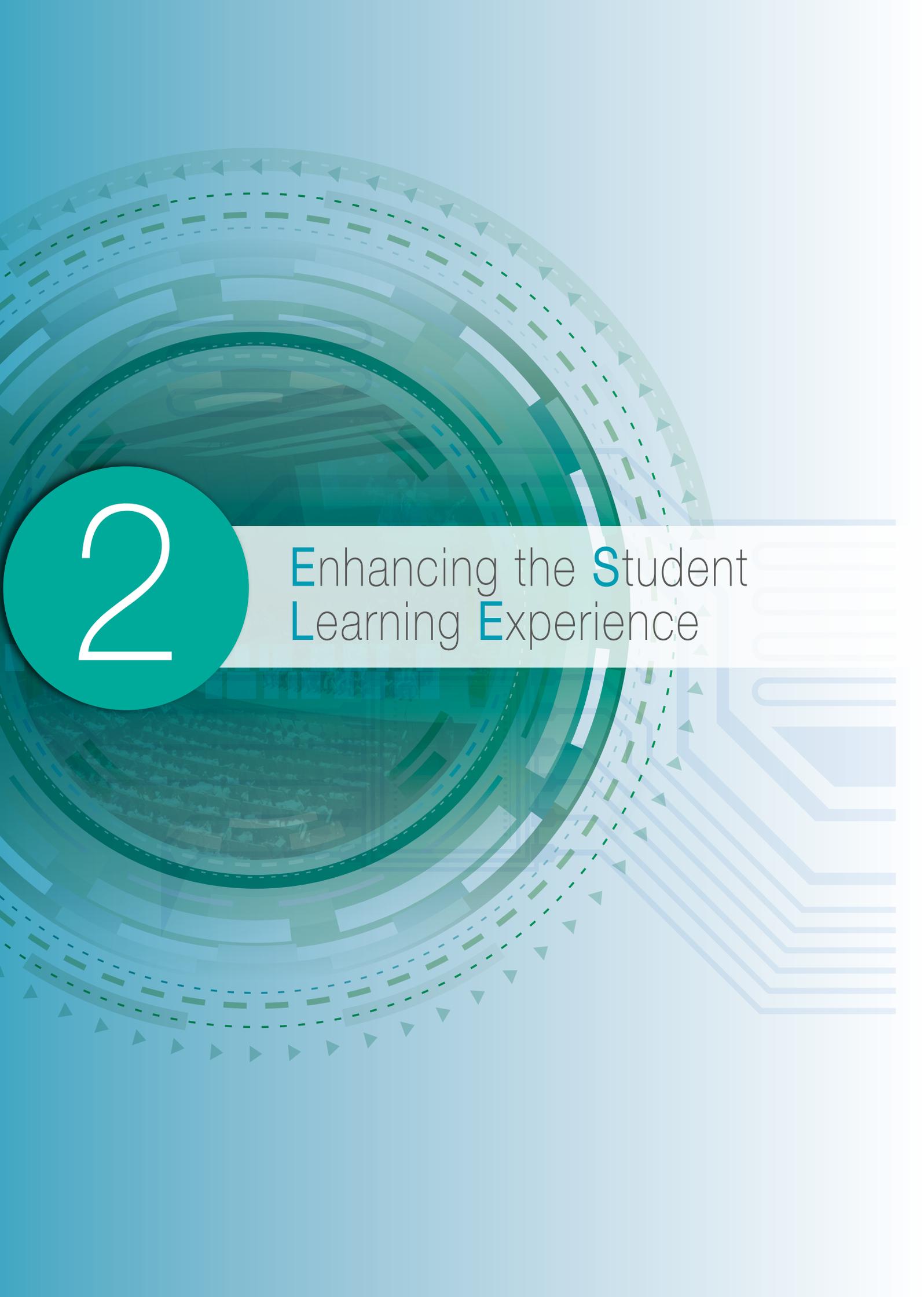
## Enhancing the Student Learning Experience

# 2 Enhancing the Student Learning Experience

**Moodle**

## 2.1 eLearning Services

### 2.1.1 Learning Management System (LMS) – Moodle System

In 2014-15, Moodle entered its third year of full implementation as the University's only centrally supported learning management system (LMS). Consistent efforts have been made to ensure Moodle's smooth operation to support learning through the use of technology. All courses registered in SIS were pre-created in Moodle to encourage teachers to post courseware in Moodle. Of the 5,241 Moodle courses, 3,925 (75%) have been activated by teaching staff, compared with 70% activation in 2013-14, when 3,725 courses were activated out of the 5,351 created.

In addition to supporting the Moodle system in production runs and helping users to make best use of the system, the eLearning Team continually enhances system functionalities by adding new plugins and features, upgrading new versions of the system, improving the user experience and developing better integration with SIS.

**Newly installed or updated Moodle plugins** – New Moodle plugins are recommended by teachers from various faculties. Thanks to assistance from members of the eLearning Enhancement Task Force (EETF) in evaluating and testing those recommendations, the following plugins were installed or updated on the Moodle production system and made available for use in 2014-15.
- Turnitin plugin update – a commercial anti-plagiarism checking tool
- Virtual programming lab – online editing of programming assignment
- Flexible sections format – flexible organisation of sections on a course page

**System upgrade of Moodle** – Moodle was updated to versions 2.6 and 2.8.6 in August 2014 and July 2015, respectively. After Moodle.org released the latest version at the beginning of the year, the eLearning Team installed it for internal functionality testing and interfaced it with HKU systems for regression tests. Then, following an acceptance test by EEFT members, the production system will be released in summer, to be ready for the creation of Moodle courses for the new academic year.

# 2 Enhancing the Student Learning Experience

**Assignment deadline notification system** – Assignments are a common learning activity in Moodle. The Moodle system does not send any notifications automatically after an assignment has been created by a teacher or when a deadline is near. To address this deficiency, the eLearning Team developed a new function, "Moodle assignment deadline notification", and released it in March 2015. The new function enables a student to subscribe to receive deadline notifications for Moodle assignments. A notification message will be sent automatically to subscribing students three days before the assignment deadline, and it will also be displayed at the top of the one-stop eLearning hub until the assignment deadline has passed.

**Course outline plugin and reading list for Moodle courses** – The Course Information Template/Learning Outcome (CITLO) subsystem of SIS allows teachers to update course-related information, including course outlines and reading lists. The eLearning team developed a Moodle plugin to display course outline information, if available from CITLO, in Moodle courses, and released it in August 2014.

**Input of reading lists for course information in SIS** – A new interface, suggested by the Academic Development and Quality Assurance section, was released in August 2014 to allow teachers to input reading lists into Moodle for synchronisation with the CITLO subsystem.

### 2.1.2 Lecture Capture Service (LCS) – Panopto System

The central Lecture Capture Service (LCS) is powered by a Panopto lecture capture system installed in HKU, and its use is increasing. PCs in all classrooms now have Panopto Recorder software installed. A synchronised audio/video recording, PowerPoint presentation and PC screen image is called a pancast. In 2014-15, 163 teachers made 956 pancast recordings (1440 hours) in 174 Moodle courses for student viewing, a big increase from 2013-14 when 55 teachers made 368 pancast recordings (676 hours) in 62 Moodle courses.

**Lecture Capture Services**

# 2 Enhancing the Student Learning Experience

**Panopto Unison for editing and sharing existing video files** – Panopto's Unison module enables the uploading of existing video files in various formats to the Panopto system, and permits teachers to edit them with other pancasts and share with students in Moodle courses. After implementing and testing Unison on our local platform, we released it into service in June 2015. Training for teachers on its use has already begun. We hope to see more teachers integrating video from other sources with captured lecture pancasts.

**Systems upgrade to Panopto 4.9** – Released in June 2015, the latest Panopto version (version 4.9) boasts a range of system fixes, functional enhancements and system performance improvements. The eLearning Team performed functional tests on the testing server and integration tests with the Moodle platform, and then invited EETF members to perform acceptance tests. The Panopto production system and Recorder software on classroom PCs were successfully upgraded to version 4.9 on 20 July 2015.

## 2.1.3 Other Enhancements in eLearning Services

**One stop eLearning hub** – A new-look "My eLearning" tab was launched on the HKU Portal at the end of August 2014, and was then subsequently enhanced with new functionalities in January and August 2015. The new user interface features three zones of information: Moodle courses, specific information on a chosen course and eLearning resources provided by services departments. The "Moodle courses" zone gives users easy access to current and past Moodle courses. Once a course is chosen, the "chosen course" zone then displays the course outline, reading list, gradebook, and any past exam papers and electronic materials reserved for the course in the University Libraries. Finally, the "eLearning resources" zone provides links to frequently used eLearning resources, including news updates, the eLearning support website, examination timetables, communal PC availability around the campus, and helpdesk information provided by ITS.

**Integrated eLearning statistical report** – Moodle and Panopto both provide a report function enabling teachers to query the usage statistics of a Moodle course. Such data are useful, informing teachers about student performance, e.g. the percentage of students who have submitted assignments and the number of viewings a Panopto lecture capture has received. However, these statistics pages were rather difficult to find. Hence, we developed a new function called "Integrated eLearning statistics report", released in January 2015, which enables teachers to conveniently view the reports for their courses by clicking a single link in the one-stop eLearning hub.

**Moodle in HKU App** – It is common today to access Moodle via smart phones and tablets in addition to desktop or laptop PCs. Since Moodle version 2.4, Moodle.org had released several mobile user interface "look-and-feel" features (called themes) for the browsers of mobile devices with different screen sizes and resolutions. However, their performance was not satisfactory until version 2.6. After upgrading to that version in August 2014, a new Moodle icon was also added to the HKU App for easy and convenient access.

## 2.1.4 User Training and Promotion for LMS and LCS

### User Support and Training

The use of LMS and LCS is on the rise. In 2014-15, more than 2,500 user support cases were handled via email, the helpdesk incident system, face-to-face personal assistance and on-site support. Compared with last year, we received more enquires about the use of Panopto for lecture capturing and Moodle access from mobile devices.

The eLearning Team organises hands-on eLearning training workshops each month. In addition to the six workshops on the Moodle LMS and four on the Panopto LCS, a new training workshop on Panopto Unison will be organised from summer 2015 to train teaching staff in uploading their existing video files to the Panopto system for further editing and distribution. In the reporting period, 35 regular eLearning courses were held, with 193 teaching staff attending.

# 2 Enhancing the Student Learning Experience

Short online video tutorials are also considered to constitute an effective and flexible self-paced learning resource. We added videos to the areas of Moodle assessments and advanced functions to the existing pool of video tutorials to help students and teaching staff learn how to use Moodle and Panopto.

**Teaching and Learning Showcase Exhibition**

To provide staff and students with a better understanding of how teaching and learning (T&L) can be supported by the use of technologies, ITS organised the second T&L Showcase Exhibition on 14 and 15 October 2014. More than 130 colleagues and students visited the two booths on the Centennial Campus and Main Campus and made enquiries.

The following services were exhibited at the booths.
- Access Moodle and lecture capture recordings using smart phones or laptops
- Live demonstration of LCS – using Panopto recorder software on a laptop to make recordings
- High-definition video conferencing system linking the two booths to showcase presentations or lectures using high-quality video, with users invited to join the conference using their smart phones or laptops
- One-stop eLearning hub to access e-courses and information on T&L services

In addition to the exhibition, a two-hour T&L seminar was organised on 15 October 2014, with the five following speakers giving talks, including two teachers who discussed their experiences using the central LMS and LCS. All talks were well-received by the audience.

| Titles of talks in T&L seminar session | Speakers |
|---|---|
| • ITS Support for Teaching and Learning | Dr Danny Tang, Director, ITS |
| • Learning & Teaching Spaces in HKU | Mrs Toni Kelly, Associate Director (Learning Environments), ITS |
| • HKU teachers' experience of using:<br>  (a) Moodle LMS<br><br>  (b) Panopto LCS | Dr Feng Yibin, Associate Professor, School of Chinese Medicine<br>Dr. Winnie S. C. Leung, Assistant Professor, School of Business |
| • Panopto - Transforming the student learning experience | Mr Bertrand Lee, Technical Director, Panopto APAC Ltd |

**Enhancing the Moodle Resources Website**

The Moodle Resources website (http://moodle-support.hku.hk) plays a central role in providing online support resources and training information on the LMS Moodle and LCS Panopto systems to users. The website has undergone a number of major re-hauls, evolving from the age of a simple static HTML website to its current version, a more complexly structured website using the Drupal content management system.

A new version of the website was released in August 2014 with an enhanced layout and enriched set of materials, including texts, images, video tutorials, user guides and FAQs, with web accessibility compliant features such as changing colour contrasts and font sizes.

The Moodle Resources website won a Gold Award in the 2015 Web Accessibility Recognition Scheme organised by the OGCIO and EOC.

# 2 Enhancing the Student Learning Experience

## 2.2 Learning Environment Services

The Learning Environment Services (LES) team was formed in July 2012 by bringing together the Classroom Services Unit of the Registry with additional staff appointed to provide support and services to the Centennial Campus, which opened in September 2012. The LES team provides support to the University's physical learning environments, including teaching rooms (classrooms, lecture theatres and innovative classrooms), the Learning Commons and PC Laboratories. The team also provides support for audio-visual (AV) facilities at University events.

This multidisciplinary team undertakes a wide range of tasks during an extended working day that lasts from 8.00 am to 8.00 pm and "out of hours" when required. The LES offices can be found in two locations, the Knowles Building on the Main Campus and the Chi Wah Learning Commons (CWLC) on the Centennial Campus. The team provides support via two hotlines.

To enhance our support through technology and training, the LES team focused on three key areas in 2014-15. The first was the continued provision and enhancement of traditional support services to staff and students using both formal and informal learning spaces on both the Main and Centennial Campuses.

The second was to continue examining in detail the expectations of staff and students through the recent online learning and teaching space surveys. A large number of responses were received for both surveys, providing LES with a very clear idea of where to target appropriate resources and investment within the teaching and learning environments. As a result of the extensive feedback received, a comprehensive summer programme was created to make improvements to room layouts, classroom technologies, projection facilities and support. Changes and upgrades will continue to be made during the Autumn 2015 semester, and user feedback will be monitored. Also, as a result of the valuable information they provide, these surveys will now be carried out annually.

The third key area was LES staff development and training. Providing support to classrooms and open-access learning spaces requires the ongoing development and enhancement of core staff skills. During the year, all members of the LES team attended a comprehensive five-day customer service training programme, and all technical staff completed an "AV Essentials" online training course before attending a three-day intensive "Certified Technology Specialist" training programme led by "InfoComm", the world's largest AV training provider. These qualifications are well established in the AV industry, and will ensure that LES staff are, and continue to be, up-to-date with the latest developments in technology and able to provide expert support, advice and assistance to users.

# 2 Enhancing the Student Learning Experience

## 2.2.1 Classroom Support

In 2014, almost 200,000 class hours were scheduled in central classrooms, which required AV/IT equipment to be fully operational at all times. LES manages two hotlines offering staff a rapid response in the event of a problem. The majority of calls are answered immediately, and problems are usually resolved satisfactorily over the phone or online or by a technician attending the venue within 10 minutes. Equipment failure sometimes means that problems take a little longer to resolve, but temporary facilities are provided when necessary until equipment can be repaired or replaced.

A total of 1,474 and 1,558 hotline calls were received for classrooms on the Main and Centennial Campuses, respectively, in 2014-15, an overall reduction of 12% compared with calls received in 2013-14 and continuing the ongoing downward trend in helpline calls (2012-13 saw a 17% reduction). The reduction is in part due to the deployment of a new remote monitoring system that allows the team to "see" classrooms and monitor the status and condition of AV equipment over the network, therefore being alerted to potential problems before they arise. Charts 1a and 1b show a breakdown of the calls' content.

*Chart 1a: Hotline Calls 2014-15 – Centennial Campus*
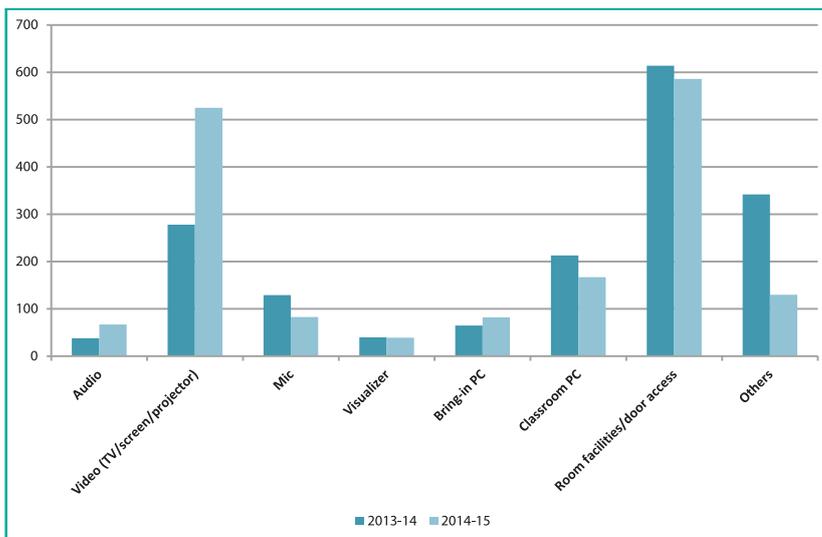


*Chart 1b: Hotline Calls 2014-15 – Main Campus*
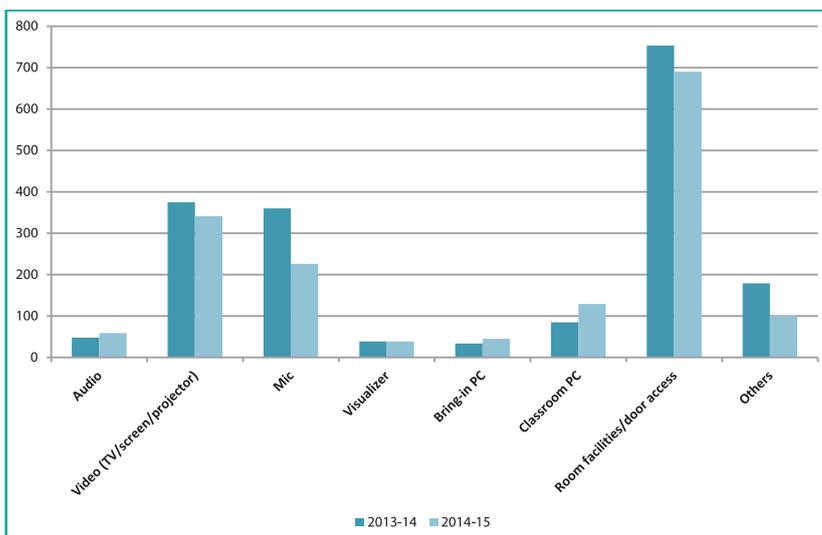
# 2 Enhancing the Student Learning Experience

## 2.2.2 Open-access Study Spaces

### Service Desks

LES staffs a number of service desks in the CWLC and The Oval to provide technical support to staff and students.

From September 2014 to July 2015, 17,037 enquiries were made at the service desks in the CWLC and 2,784 in The Oval, which is a smaller venue. The busiest months were September, October and November. Many enquiries were from new students, who needed directions to teaching and learning venues and instructions for accessing the wireless network, amongst other matters. As both staff and students became more familiar with the facilities, the number of enquiries tailed off significantly, as shown in the monthly breakdown in Charts 1c and 1d.

*Chart 1c: Chi Wah Learning Commons – Service Desk Enquiries 2014-15*
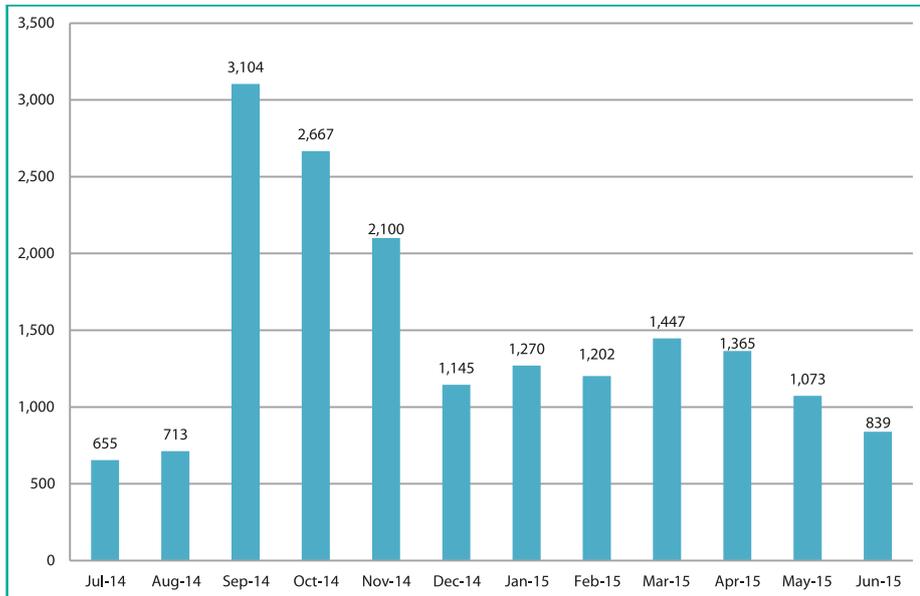


*Chart 1d: The Oval – Service Desk Enquiries 2014-15*
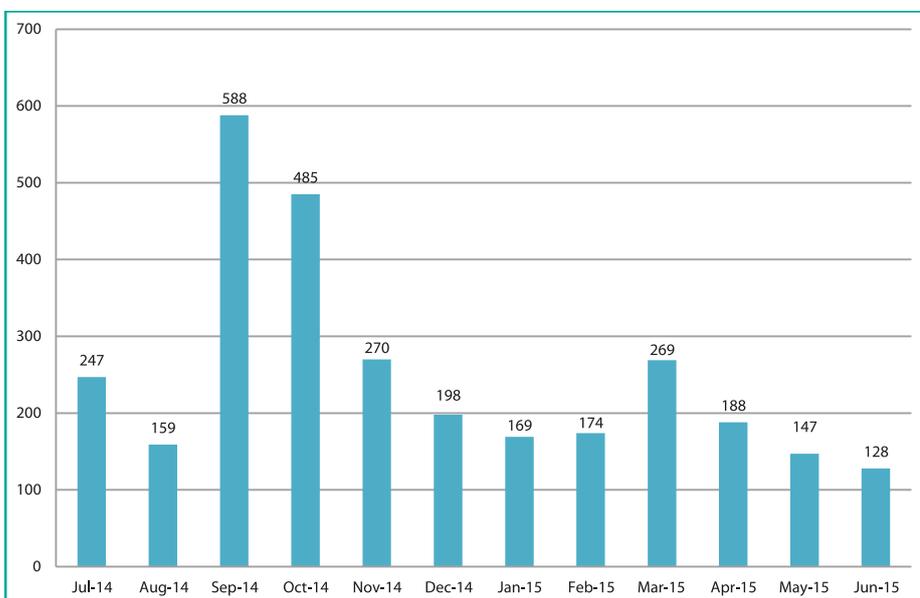
# 2 Enhancing the Student Learning Experience

## Usage Figures

The CWLC continues to be a popular study venue for students. Usage figures taken from the access control system show that occupancy numbers have increased significantly over the past year, partly as a result of the implementation of extended opening hours seven days per week, as shown in Charts 1e and 1f.

*Chart 1e: Chi Wah Learning Commons – Daily Occupancy 2014-15*
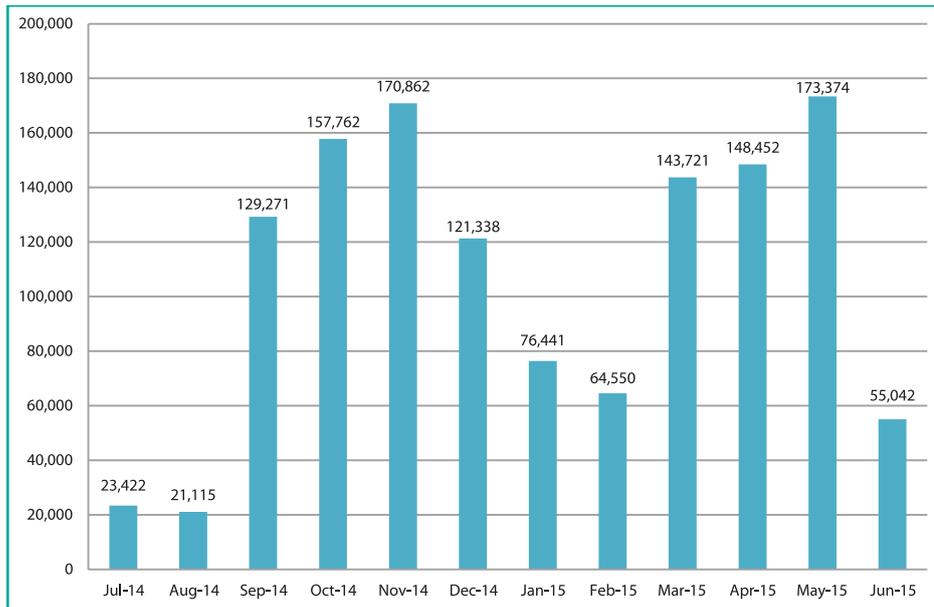


Student headcounts are taken hourly. From October 2014 to June 2015, the number of student hours spent in the CWLC between 8 am and 11 pm reached 1,111,542, a greater than 33% increase over the 833,956 recorded during the same period of 2013-14. However, over the 12-month period shown in Chart 1e, the overall number of student hours recorded was 1,332,002. The busiest time, unsurprisingly, was during the examination and revision period, when the opening hours were extended to 6 am to 11 pm.

*Chart 1f: Chi Wah Learning Commons – Overall Student Count for Different Periods during the Day 2014-15*
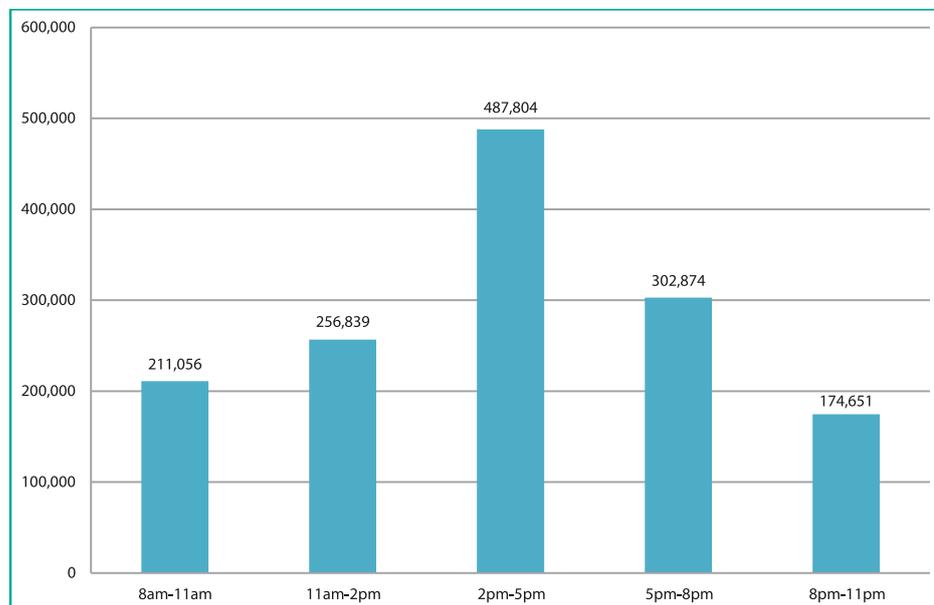
# 2 Enhancing the Student Learning Experience

### Student Feedback – Extended Opening Hours

In last year's report, we noted that the results of the online Student Learning Space Experience survey indicated that students required the CWLC and other study spaces to have longer opening hours and need 24/7 access to computers.

As a result of this feedback, the CWLC is now open seven days per week. In addition, The Oval, which includes a 36-seat classroom with computers, and The Lounge@Main Building are open 24/7 with the exception of several public holidays. The extended opening hours have been welcomed by students and are working very well.

### 2.3 PC Availability Website and Mobile App

The PC Availability website and mobile app launched in 2013-14 help staff and students to locate communal PCs available for their use around the campus. They list the following venues.

- Chi Wah Learning Commons Level 1
- Chi Wah Learning Commons Level 2
- The Oval  Room KB110, Knowles Building
- Faculty of Business and Economics PC Lab at K. K. Leung Building Room 610
- Faculty of Business and Economics PC Lab at K. K. Leung Building Room 1009
- Faculty of Business and Economics PC Lab at K. K. Leung Building Room 1104
- Faculty of Education PC Lab at Runme Shaw Building Room 301(a)
- Faculty of Education PC Lab at Runme Shaw Building Room 324
- Faculty of Engineering PC Lab at Composite Building LG202
- Faculty of Science PC Lab at Chong Yuet Ming Physics Building Room 312(b)

Note: (a) removed on 31 August 2015;  (b) added on 16 September 2014.
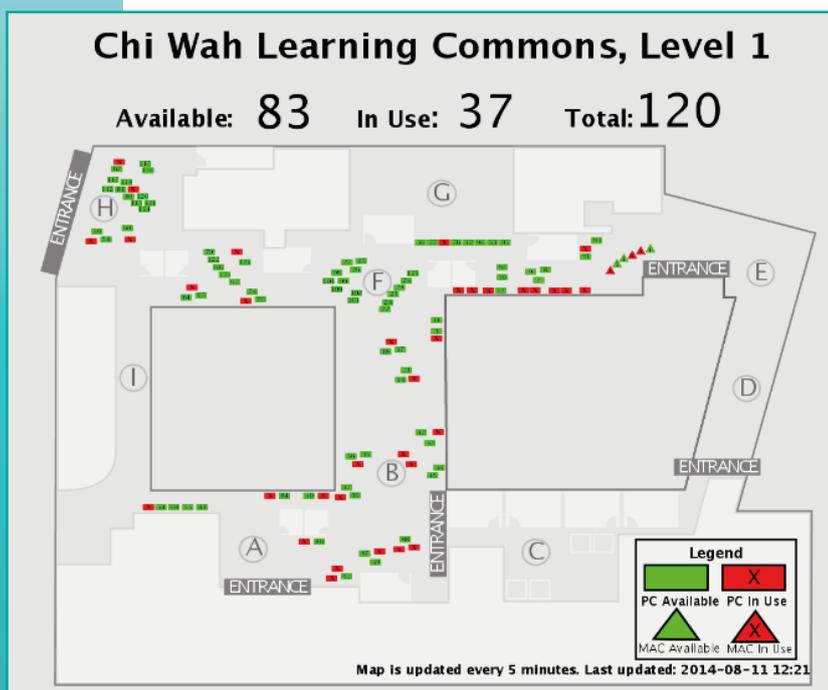


The mobile version of the PC Availability application is available from **HKU App -> Staff corner** or **Student corner -> Learning Facilities -> PC Availability**. The HKU App is available for both Android and Apple iOS devices, and is downloadable from Google Play and the iTunes App Store.

The web version of the PC Availability application is accessible from the **ITS website (http://www.its.hku.hk) -> Help -> PC Availability**.

*Screen dump of PC Availability webpage for Chi Wah Learning Commons Level 1*

# 3

Advancing Research and
Innovation

# 3 Advancing Research and Innovation

## 3 Advancing Research and Innovation

### 3.1 High-performance Computing (HPC) and Grid Computing Infrastructure

The 12-TFLOP GRIDPOINT system continued to be the primary HPC facility supporting the University's multidisciplinary research throughout the year. Annual CPU utilisation of the GRIDPOINT system increased slightly from 67.2% in 2013-14 to 68.4% in 2014-15.

The 2.3-TFLOPS HPCPOWER2 system is the basic HPC facility supporting research studies in Chemistry, Physics, Statistics and Actuarial Science, Engineering, and Medical Sciences. It also serves as a platform for the development of applications/programs before they are run on a large scale on the GRIDPOINT system. Because increasing numbers of computer-intensive research projects have migrated their programs to allow them to run on the GRIDPOINT system or newly launched HTC service (discussed in detail in Section 3.2), annual CPU utilisation of the HPCPOWER2 system declined further from 56.39% to 42.94% over the course of 2014-15.

The 11-year-old 32-bit HPCPOWER system was decommissioned in August 2014. A new system, which will provide aggregate computing capacity of more than 100 TFLOPS and comprise computer nodes powered by the latest multi-core CPUs, MIC co-processors, GPUs and a huge amount of memory, is under installation and will be available in the new 2015-16 academic year. The system will give HKU researchers access to the latest HPC resources and technologies to meet their need for computationally intensive research.

### 3.2 High-Throughput Computing (HTC)

ITS began offering a new HTC service to support research developments in March 2014. The HKU HTC service employs HTCondor, a job-scheduling system developed by the University of Wisconsin that is capable of delivering a research computing workload to computer nodes at distant locations. The HTC service is particularly useful for problems that are embarrassingly parallel, i.e. those that can be easily divided into smaller, independent sub-problems, each of which can be solved within a reasonable timeframe and with limited resources.

The current setup of the HKU HTC service comprises a Linux backend server and 235 Windows-based PCs located in the Learning Commons as computer nodes that run HTC jobs only when the Learning Commons is closed. More facilities will be added to the HTC service this year.

### 3.3 International Grid Collaboration and eResearch Facilities

HKU has long been a pioneer in grid computing development in support of advanced research and innovation in Hong Kong. ITS plays an active role in coordinating and promoting research collaboration with a range of international grid computing organisations, including the China National Grid (CNGrid), European Grid Infrastructure (EGI), Pacific Rim Application and Grid Middleware Assembly (PRAGMA), Institute of High Energy Physics and Chinese Academy of Sciences (IHEP CAS). In relation to such collaboration, it participated in the EGI Grid, CNGrid and PRAGMA Grid/Cloud consortia in 2014-15.
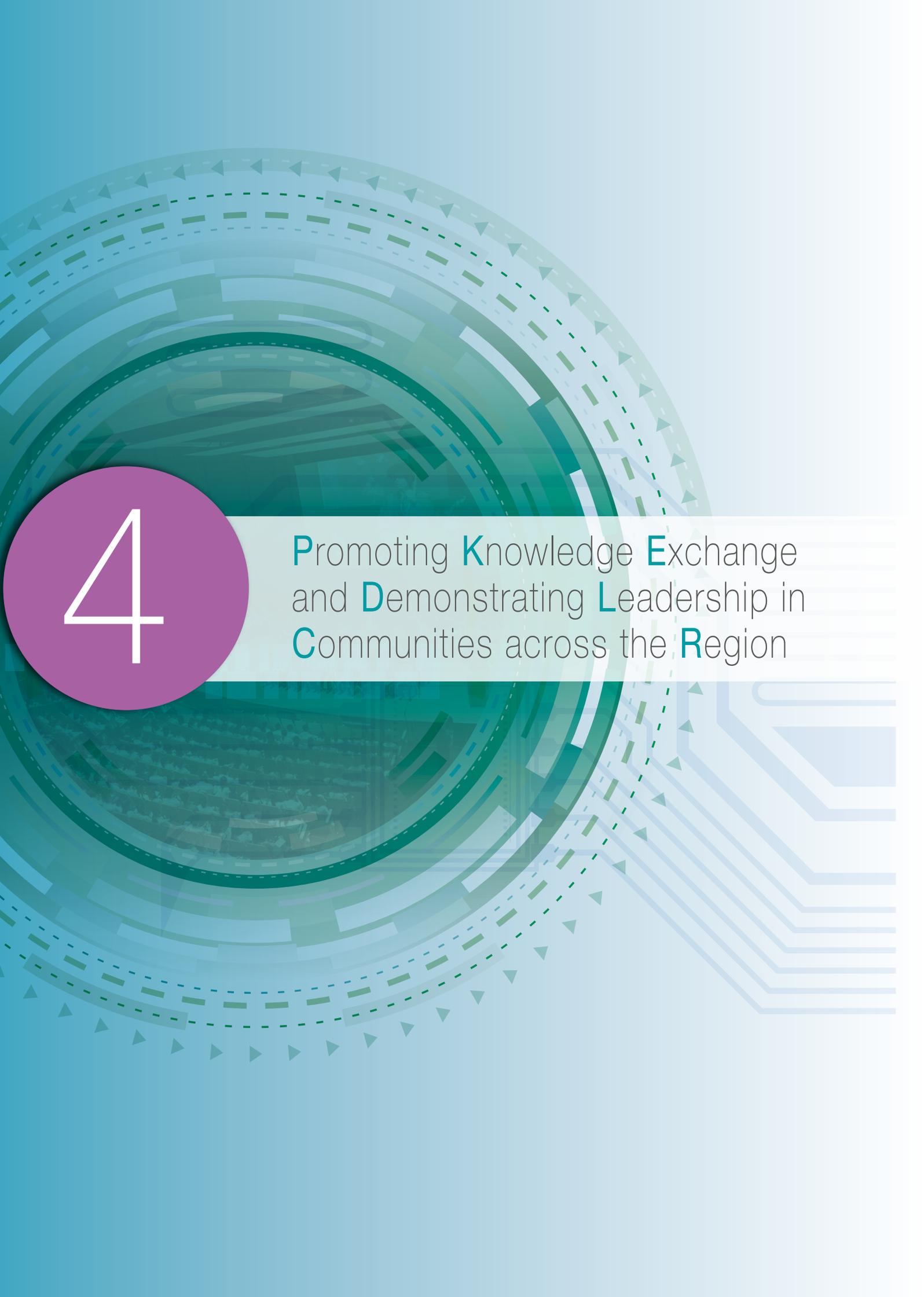
4

Promoting Knowledge Exchange and Demonstrating Leadership in Communities across the Region

# 4

# Promoting Knowledge Exchange and Demonstrating Leadership in Communities across the Region

## 4.1 Information on Use of Central IT Services

ITS maintains various channels to inform users of the latest news and developments concerning HKU's central IT services:

- ITS website (http://www.its.hku.hk)
- Bimonthly IT Services News (http://www.its.hku.hk/its-news)
- IT Services Guide – updated every year to provide a quick overview of our services and contact details (http://www.its.hku.hk/documentation/handbook/its-guide/2015-2016).



## 4.2 Technical Support for University's Website and Central Web Server

ITS provides ongoing technical support to the CPAO, which maintains the University's website, and also offers advice to the departments maintaining their own websites on the ITS Cloud platform.

In November 2014, ITS also presented a Web Accessibility seminar during the HKU Equal Opportunity Festival to refresh departmental web administrators' understanding of best practice in the design of barrier-free accessible websites.

## 4.3 ITS Wins Gold Awards in 2015 Web Accessibility Recognition Scheme

This is the second year that the ITS website (www.its.hku.hk) has won a Gold Award in the Web Accessibility Recognition Scheme co-organised by the HKSAR Government's OGCIO and EOC. In 2015, the eLearning Resources website (moodle-support.hku.hk), another website developed and maintained by ITS, also won a Gold Award.

The Scheme's aim is to show appreciation for organisations that have made their websites and mobile applications accessible, thereby encouraging the community-wide adoption of accessibility designs that facilitate access to online information and services by all segments of the community, including persons with disabilities.

Our websites satisfy the web accessibility requirements to enable persons with disabilities to read the information thereon easily. They were among the 13 Gold Awards received by various University departments during the reporting year. The University's gold awardees more than doubled from last year's total of five.

# 4

# Promoting Knowledge Exchange and Demonstrating Leadership in Communities across the Region

## 4.4 Coordination Group for Departmental PC/Network Support

The Coordination Group for Departmental PC/Network Support is a collaborative channel of 179 PC support staff from various departments and ITS through which members share knowledge and experiences of PC and network support at the departmental level. ITS acts as the group coordinator, and disseminates useful and sometimes urgent information to members concerning security, software updates, alerts of computer virus attacks, and security vulnerabilities and associated precautionary actions.

Seminars on PC/network technologies and service support, some delivered by external speakers, are regularly organised throughout the year to inform group members of best practice in PC/network support and the latest trends in IT technology. A list of the seminars held in 2014-15 is given in Table 1.

*Table 1: Seminars Held for Departmental PC/Network Support Coordination Group*

| Date | Title | Speaker |
| --- | --- | --- |
| 21 Nov 2014 | HKU Server Compliance Project Progress | Mr. Charles Y.W. Cheung Information Technology Services, HKU |
| 21 Nov 2014 | Microsoft Windows XP End of Life and Migration to Newer Version | Mr. Steven Lau Account Technology Strategist Microsoft Hong Kong Limited |
| 19 Dec 2014 | Microsoft Windows Server 2003 End of Life | Mr. Steven Lau Account Technology Strategist Microsoft Hong Kong Limited |
| 16 Jan 2015 | Fundamentals of Application Centric Infrastructure (ACI) and it's innovations | Mr. Philip Wong Technical Solutions Architect Cisco Systems (HK) Ltd |
| 16 Jan 2015 | Network Printer Security | Mr. Ken C.K. Ng Information Technology Services, HKU |
| 27 Feb 2015 | Update on the HKU Wi Fi Services | Mr. Tony F.K. Lai Information Technology Services, HKU |
| 20 Mar 2015 | Progress of HKU Server Compliance Project on March 2015 | Mr. Charles Y.W. Cheung Information Technology Services, HKU |
| 22 May 2015 | Information Security Assessment 2015 | Mr. Justin H.M. Law Information Technology Services, HKU |
| 19 Jun 2015 | Mobile Security 123 | Mr. Frankie Leung Program Director PISA and ISC2 Hong Kong |

# 5

# Enabling IT Platform (Business Systems)

# 5 Enabling IT Platform (Business Systems)

## 5.1 Student Information System (SIS)

With the establishment of the "SIS Roadmap 2013-16" in 2013, and the first year of implementation in the 2013-14 academic year, the second year of implementation in the 2014-15 academic year was a crucial year. A number of essential functional modules, specifically built in support of the new 4-year curricula, have been implemented in preparation for the 2015-16 academic year.
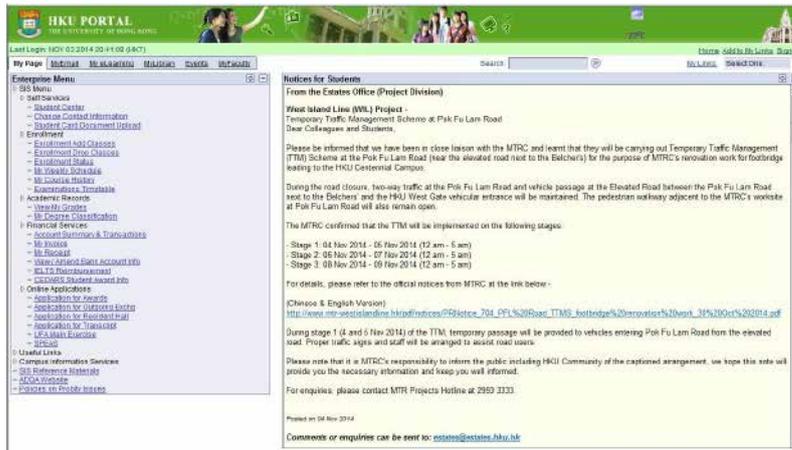


### a. Degree Audit Tool

The new 4-year curricula afford students much broader academic exposure and experience. Student can now take majors from both their home and non-home faculties, and, with the capacity for a maximum of 24 credit units to double-count across two majors, students can spare credit units to take minors or other elective courses.

The traditional semi-manual graduation requirement checking by faculties has become quite difficult (if not impossible) without the support of a practical degree audit facility. Accordingly, the SIS Project Team has deliberated and adopted a degree audit tool (the u.achieve package) to assist faculties in checking and advising students on fulfilling their degree requirements. The tool has been available for faculties' use since July 2015.

### b. Workflow for Credit Transfer Applications

The University encourages all undergraduates (UGs) to participate in exchange study programmes at overseas universities to broaden their horizons, and allows credit transfers to their home degrees for any exchange studies undertaken. Students need to apply for and obtain approval from their faculty prior to the exchange study, for which proper course mapping between HKU and the destination university is vital. On completion of the exchange study, the proper recording of successfully completed courses is equally important.

To support this lengthy, multi-party process, the SIS Project Team has designed and developed a workflow system comprising all application and approval interfaces for students, teachers and faculty administrators. The development work has been completed, and was thoroughly tested by various stakeholders in early 2015, and thus the system is ready for students applying for overseas exchange studies in the 2015-16 academic year.

### c. Additional Mapping information in Course Enrolment

In addition to regular enrolment records for courses taken at HKU, there are three other common types of enrolment records, namely, advanced standing (credit equivalents taken before a student's admission to degree programme), credit transfers (credit equivalents taken elsewhere during the degree period) and course exemption (courses from which the student is exempted which are otherwise mandatory degree requirements). These three types of enrolment records were previously recorded in a less structured and less detailed manner than the current system.

# 5 Enabling IT Platform (Business Systems)

With the need for degree audits and the sub-requirement checking of the new 4-year curricula, three enrolment subsystems were built in 2014-15 to facilitate the articulation of detailed course mapping information by faculties, enabling degree audits, enhanced transcripts and an Academic Attainment Profile (AAP) comprising all types of enrolments. The new transcript contents and layout will be applicable to the 2012-cohort UG students when they graduate in 2016.

## d. Academic Attainment Profile (AAP)

A new academic report (the AAP) has been developed in addition to students' standard transcripts to highlight students' additional areas of achievement to potential employers and support student applications for further studies. The AAP contains, for example, students' relative performance with respect to major GPA percentiles and the percentage of their peers attaining higher classes of honours. The new AAP reports will be available to the 2012-cohort undergraduate students when they graduate in 2016.

## e. Integrated and Enhanced Fee system

The current fee calculations for UG, research postgraduate (RPG) and taught postgraduate (TPG) programmes run on three different platforms, with different data structures and configuration arrangements. This system is unsatisfactory, causing extra administrative work in fee calculations. Also, the fee schedules lack sufficient flexibility to charge different amounts for the same programme in the same academic year, depending on the year of admission. To correct these deficiencies, an integrated fee system that supports a flexible charging model has been developed, and will be fully deployed in the first semester of 2015-16.

## 5.2 Human Capital Management System (HCMS)

### 5.2.1 PeopleSoft HCMS Services

During the reporting period, a number of enhancements were made to the HCMS to improve its functionalities and user-friendliness, and to align it with new business needs. The major enhancements made are as follows.



a. The Personal and Family Data Form was enhanced in January 2015 to allow staff to input their mobile phone numbers and alternate email addresses for emergency contact purposes.

b. The Professional Leave application workflow was enhanced to allow the establishment of a two-level approval process such that applications can be routed to the first-level approver before reaching the Dean or Department Head. In addition, the calculation mechanism for the professional leave balance has been improved, with the changes launched in June 2015.

c. To conform to the Employment (Amendment) Ordinance 2014 on statutory paternity leave, additional system checking and modification were applied to the Paternity Leave module in April 2015.

d. Following the introduction of a Clinical Monthly Allowance for clinical professoriate staff, several HCMS modules were enhanced. In addition to the Base Benefits module, enhancements were made to the Letter of Appointment, Workforce Administration, Financial Clearance and Staff Commitment and Global Payroll modules to allow the automated handling of the new benefit plan across the whole employment cycle. These enhancements were completed in June 2015.

# 5

## Enabling IT Platform (Business Systems)

e.  For the Global Payroll enhancement, the logic of MPF and gratuity calculations for odd cases was adjusted. The payroll process was also refined to improve the automatic selection of employees for off-cycle payroll calculation.

f.  The Reimbursement of Medical Claims function was enhanced in May 2015 to incorporate a new type of reimbursement for catastrophic insurance claims.

g.  The Financial Clearance and Staff Commitment enhancement was made in November 2014, and generates annual opening balances for Project-To-Date Accounts, thereby greatly reducing the system processing time for accounting functions.

h.  Major exercises held during the year include the Cost of Living Adjustment (COLA) exercise for eligible staff members and postgraduate scholarship holders and the annual tax return exercise. The COLA process was enhanced to improve its processing performance. As decisions for the 2014 COLA were made late, different plans were prepared and rehearsed to maximise confidence in the success of the final production run.

i.  As HCMS data are growing quickly, system performance is likely to become an issue. The system is thus reviewed from time to time, with modifications made where appropriate to improve the system response time. For example, the Global Payroll departmental claim submission and approval functions were modified to speed up the online response, and Payroll calculations were enhanced to reduce the calculation time for back-dated Human Resources (HR) events.

### 5.2.2 HR and Related Services

a.  In late 2014, initiatives were taken to revamp the PRSD system for non-academic staff, with a new set of review forms and performance rating schemes put in place. Through prototyping and continuous discussions with Human Resource Section (HRS), the new system design was finalised in early March 2015. Time was thus limited for development and testing. However, with the concerted efforts of HRS and ITS, the revamped system was successfully launched in May 2015.

# 5 Enabling IT Platform (Business Systems)

b. In addition to developing the revamped PRSD system, enhancements were also made in the PRSD and Performance Review and Development (PRD) systems to support the reward allocation exercises.

c. To improve user convenience, a new mobile service was added to the HKU App platform in August 2014 to allow the public to search for HKU job offers.

d. To expand system capacity and power, the main administrative server hosting the in-house systems developed was upgraded in June 2015. Preparation work was planned carefully, with extensive testing carried out to ensure a smooth migration.

e. To ensure that all systems using central HCMS data are ready to cope with the expanded employee ID numbers, extensive integration testing was arranged within ITS and also with other departments. Testing data with 8-digit employee IDs were created, and the testing results were positive.

## 5.3 Research Services

Throughout the year, ITS provided a range of professional services to the Research Services of the Registry to enhance several core research administration systems. They included the following.

a. The Postgraduate Scholarships System (PGS) was enhanced to facilitate the work efficiency of the Research Services Section of the Registry. A number of manual procedures were automated, including cancellation of PGS financial clearance, PGS suspension/recommencement, the handling of special non-study leave, fund source period and PGS renewal period cases, display of SIS de-registration information, and management of email recipient lists for different reports and PGS e-notification.

b. The Research Outputs System was enhanced to streamline data capturing and workflow, strengthen record checking by both the Digital Object Identifier (DOI) and International Standard Book Number (ISBN) systems to reduce duplicate records, and improve search functions for MPhil/PhD students, non-author departments and research output records without a publication date.

c. The HKU Research Assessment Exercise (RAE) system was supported and closely monitored during the RAE assessment period to ensure reliable and stable Internet access to the HKU publication repository by both UGC and RAE panels/external reviewers located primarily in the USA, UK, Australia and Hong Kong.

d. The Research and Conference Grants Administration System was beefed up to display additional supporting information on research staff, enable access for eligible staff under the new broadband structure without terms of service. In addition, a new module was developed to manage and administer Responsible Conduct of Research seminars for all new research staff carrying titles equivalent to post-doctoral fellow, research assistant professor and professoriate grades.

e. The Research Assistant Professor and Post-Doctoral Fellow Scheme Management System was improved to allow the summary of bid reports and award letters templates, enrich the bid maintenance function and develop a new function for generating new award reports.

# 5 Enabling IT Platform (Business Systems)

## 5.4 Finance and Related Services

During the reporting period, a number of new system developments and enhancements were made to the financial systems of the Finance and Enterprises Office (FEO) and the Centre of Development and Resources for Students (CEDARS). The major implementations made are as follows.

a. With the kick-start of the Oracle Financials Upgrade Project last year, Phase 1 of the project, focusing on upgrade planning and business process review, was completed in January 2015. The recommendations from the Phase I study provided a solid basis for formulating the scope of work for the upgrade project, as well as effort estimation and budget requirements. The preparation for tendering of Phase 2 implementation is well underway and expected to take place in the coming year.

b. A project to improve the former cheque-issuing process was completed in November 2014. The new service increases the work efficiency of the FEO and provides better administrative service

c. A new IT service for fund account management has been developed for the FEO. With more usage experience and feedback, it is expected that the new service can be further enhanced to allow a wider group of users to manage their fund accounts.

d. To ensure ongoing service improvement, various enhancements were implemented in the main and associated financial systems, including the Financial Information Enquiry System (FIES), Outside Practice Management System (OPMS), Departmental Inventory System (DIS) and University Financial Assistance System (UFAS), as follows.

i) To cater for the enforcement of new accounting rules and streamline business operations, the FIES was modified to include outside practice accounts and enable grant holders to view year-to-date accounts.

ii) The OPMS was enhanced to support the approval by division heads in the Faculty of Education.

iii) The DIS was revamped to handle the increase in the capitalisation value amount, and the re-categorisation of inventory item types has been completed. These upgrades were launched in September 2015.

iv) The UFAS was upgraded in July 2014 to incorporate the new requirements for evaluating the annual student application exercise. New enquiry functions have also been developed to streamline the approval process and the generation of statistics for purposes of analysis.

## 5.5 Estates Services

ITS provides professional IT services to the Estates Office on an ongoing basis, and several projects were successfully completed in the reporting period.

a. The building operations module of the Computer-aided Facilities Management system was enhanced in August 2014 to support work orders that incorporate maintenance work performed by outsourced integrated facilities management companies together with that performed by the Estates Office. The system is now running smoothly, providing quality maintenance services to end users.

b. A new Venue and Banner Site Booking system was successfully launched in September 2014 to facilitate the booking of university venues and banner sites for various departmental uses. The system automates the previously manual process, providing online booking and enquiry functions that have streamlined the booking procedures. This system has also been adopted by LES, allowing students and staff to reserve workstations and study room in the Learning Commons through the LES booking system.

# 5 Enabling IT Platform (Business Systems)

C. The Space Management Information System (SMIS), which provides space allocation and utilisation information to the University's Senior Management Team (SMT), was under final user acceptance testing at the time of writing. The SMIS has four major functions: online space enquiry, reporting, scenario planning and an administrative function. We will work together with the vendor to ensure that the system provides valuable space information for future space planning.

d. The EO Notice System for the Campus Services Centre was implemented to allow the Estates Office to facilitate the dissemination of alternation work information by sending e-notices on scheduled building and alteration work to the department affected.

## 5.6 Knowledge Exchange Services

The Knowledge Exchange Activity System (KEAS) was upgraded to permit interface with the Academic Portfolio of Achievement in the PRD system to support proxy assignment and allow staff and their delegates to view and modify their knowledge exchange activities.

The KEAS was also enhanced to collect supplementary knowledge exchange activity information on different activity subtypes and to interface with MIU to provide the additional activity information for CDCF return. A new module for faculty deans/department heads and their delegates was developed to facilitate the searching and viewing of knowledge exchange activities on their behalf.

# 5 Enabling IT Platform (Business Systems)

## 5.7 Smart Card Project

The Smart Card Upgrade Project (SCUP) is a complex and time-critical project driven by the depletion of and security issues surrounding the current HKU 4-byte MIFARE card technology and the urgent need for its replacement. The upgrade of all smart card-related functions/tasks is to be completed before the anticipated issuance of the new HKU smart card in July/August 2016.

SCUP gained momentum throughout the reporting year. Major related developments, including a feasibility study and project implementation, are as follows.

a. **Gather information on the University's smart card systems.**

The results of a survey conducted by ITS in early 2014 to gather information on the current Smart Card Access Control System (SCACS) deployed by the departments showed that over 1,700 doors, turnstiles and lifts have been equipped with SCACS. In addition, over 150 central-timetabled classrooms are managed by Classroom Control Systems (CCS). These systems authenticate user access by the HKU smart card, and will need to be upgraded for compatibility with both the current and new HKU smart card.

b. **Consultancy study on technical upgrade options.**

A pre-implementation review was conducted by Deloitte in mid-2014 on three possible upgrade technologies, namely, (i) the 7-byte MIFARE Plus Card, (ii) Octopus Card and (iii) Fingerprint. The major evaluation criteria were security, performance, operational effectiveness, and maintenance and support. Deloitte's report recommended that the 7-byte MIFARE Plus Card technology be used in HKU's future access control system.

c. **Departmental SCACS upgrade (doors/turnstiles/lifts).**

A tender exercise for the departmental SCACS upgrade has been conducted. Four successful vendors have been awarded tenders, with all vendors required to complete their upgrades by the end of 2015. As different departments have deployed different SCACS over the years, multiple vendors were required. It is envisaged that the SCACS will converge after the upgrade exercise, benefiting the University-wide SCACS in terms of standardisation and cost-efficiency.

d. **Central-timetabled CCS upgrade**

The University currently deploys two CCS systems, one on the Centennial Campus (~90 classrooms) and the other on the Main Campus (~50 classrooms). Each CCS integrates a number of components: (i) the Registry's central classroom booking system, (ii) a classroom smart card control panel for the display of room booking/status and ad hoc booking, (iii) means to activate/deactivate classroom air-conditioning and lighting, and (iv) additional classroom controls based on motion sensor detection.

A tender exercise for the CCS upgrade has been conducted, and two successful vendors, one for the Centennial Campus upgrade and the other for the Main Campus upgrade, have been awarded tenders. The Centennial Campus upgrade is slated for completion by the end of 2015, and the Main Campus upgrade by July 2016.

In addition to implementation of the foregoing upgrades, which commenced in the reporting period, the Upgrade Project team will continue to work on two additional major upgrades in the coming year: (i) the Smart Card Identification System upgrade and (ii) Smart Card Issuance System upgrade. All upgrades are to be completed no later than July 2016.

# 5 Enabling IT Platform (Business Systems)

## 5.8 HKU Portal

The HKU Portal is a platform that allows staff and students to access the large number of information services provided by the SIS, HCMS and other web-based applications in performing their daily tasks. The central authentication service provides a single sign-on (SSO) function that gives users access to a wide range of information services, including the University email system, Moodle LMS, HKU Event Management System (HKUEMS), Library services and My Faculty/My Department websites.



The HKU Portal is supported by a set of servers that run on a powerful and reliable virtual machine (VM) cloud, allowing the automatic and rapid recovery of any services affected in instances of failure.

In 2014-15, user access to the HKU Portal rose to roughly 1.26 million visits per month, a 6% increase over the previous academic year and in line with the additional services put into production. Table 2a presents statistics on staff and student access to the HKU Portal.

*Table 2a: Staff and Student Access to HKU Portal (July 2014-June 2015)*

| Month | Access by Staff (No.) | Access by Students (No.) |
|-------|----------------------|--------------------------|
| Jul 2014 | 276,630 | 412,002 |
| Aug | 279,224 | 756,150 |
| Sep | 332,127 | 1,562,177 |
| Oct | 307,897 | 1,286,866 |
| Nov | 287,228 | 1,307,930 |
| Dec | 257,600 | 833,791 |
| Jan 2015 | 303,748 | 1,161,509 |
| Feb | 254,826 | 908,611 |
| Mar | 310,083 | 1,115,061 |
| Apr | 282,296 | 1,076,118 |
| May | 283,329 | 834,700 |
| Jun | 297,795 | 432,362 |
| Total | 3,472,783 | 11,687,277 |

# 5 Enabling IT Platform (Business Systems)

In addition to SIS and HCMS applications, ITS has also developed web applications for various HKU departments, which are also accessible from the HKU Portal. One hundred and forty-one such applications were available in 2014-15, with access instances totalling 400,349. The 10 most popular departmental web applications developed by ITS accounted for 45.3% of all web applications accessed from the HKU Portal in the reporting year. These applications are summarised in Table 2b.

*Table 2b: Ten Most Popular Web Applications Developed by ITS for Other Departments on the HKU Portal (July 2014-June 2015)*

| Web Applications | Access (No.) | % of Total |
| --- | --- | --- |
| Performance Review and Development (ESS) | 26,619 | 6.6% |
| CEDARS Facilities Booking | 22,455 | 5.6% |
| TPG Online Applications | 21,361 | 5.3% |
| Performance Review and Staff Development (ESS) | 20,743 | 5.1% |
| Student Admin System | 19,883 | 4.9% |
| Performance Review and Staff Development (MSS) | 19,054 | 4.7% |
| Non-JUPAS Admission System | 14,898 | 3.7% |
| Research Studies Progress Review | 13,674 | 3.4% |
| Research Outputs | 12,383 | 3.1% |
| RPG On-line Application Viewing System | 11,600 | 2.9% |
| Total | 182,670 | 45.3% |

# 5 Enabling IT Platform (Business Systems)

## 5.9 HKU Mobile Applications

The HKU Mobile Application (HKU App) was first released in December 2012 to facilitate mobile access to the latest University information. In 2014-15, three versions of the HKU App were released:

- Version 1.4, released in August 2014, includes two new modules: HKU Moodle and Employment.
- Version 1.5, released in January 2015, enables web access features for HTML5 modules.
- Version 1.5.1, released in May 2015 on the Android platform, addresses navigation problems in Android 4.4 versions and above.

As of 2014-15, the HKU App now comprises 17 modules, with two additional modules put into production.

| Modules | Developed by |
|---|---|
| Food, Student Life, General Education | CEDARS |
| News, U-Vision | CPAO |
| Maps, Emergency Contacts, Shuttle Bus | EO |
| Library Information | University Libraries |
| Events, Information Security, Learning Facilities, Service Suspension, Staff Directory, Timetable, HKU Moodle*, Employment* | ITS |

Note: *new modules.

There were 10,692 downloads of the HKU App in 2014-15, 62% to iOS devices and 38% to Android devices, a 15.4% decrease from the 12,634 downloads seen last year. The three most popular modules were Timetable, HKU Moodle and Libraries.

*Chart 2: Access to HKU App by module (July 2014-June 2015)*
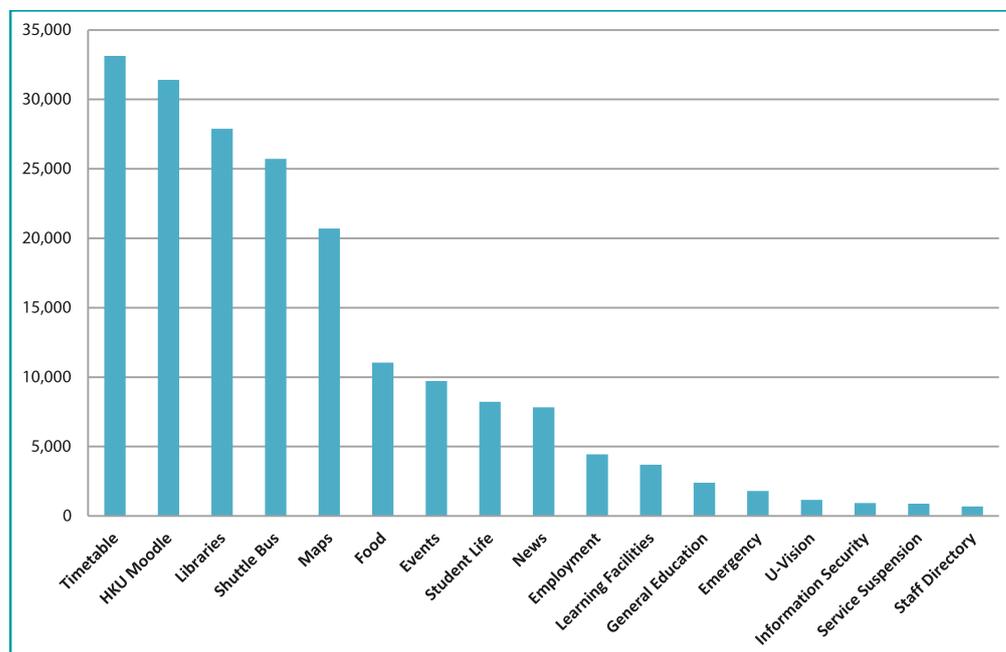
# 5 Enabling IT Platform (Business Systems)

## 5.10 HKU Event Management System (HKUEMS)

The HKUEMS continues to see high usage rates by departments and student societies for event announcement and registration purposes. In 2014-15, 107 departments posted 5,566 event announcements on the HKUEMS, 3,066 of which made use of the online registration function and 475 of which employed the online payment function. This year, the HKUEMS processed 108,721 user registrations for events.

*Table 2c: Usage Statistics for HKUEMS (July 2014-June 2015)*

|  | Count | % increase/decrease over 2013-14 |
|---|---|---|
| Event Announcements | 5,566 | 8.18% |
| Events with Online Registration | 3,066 | 5.29% |
| Events with Online Payment Gateway | 475 | 7.95% |
| Applicants Using Online Registration | 108,721 | 20.65% |

## 5.11 Bulk Email Service

ITS provides a bulk email service allowing departments to send notices and event announcements to all staff and students at once. As an auxiliary service, the bulk email service is also offered to the HKU Students' Union, which regularly send notices and event announcements to students on behalf of various student organisations.

In 2014-15, 183 departments and 110 student organisations made use of the service, with 8,443 bulk email requests and about 194 million email messages processed. The number of bulk email messages sent increased by 2.5% compared with 2013-14.

It should be noted that the Development and Alumni Affairs Office has adopted a separate bulk email system for contacting alumni.

*Table 2d: Bulk Email Usage by Departments, Student Organisations (July 2014-June 2015)*

| Requests from departments to send emails to staff and students | | Requests from student organisations to send emails to students | |
|---|---|---|---|
| No. of Requests | No. of Messages Sent | No. of Requests | No. of Messages Sent |
| 6,741 | 166,879,890 | 1,702 | 27,521,161 |

# 5 Enabling IT Platform (Business Systems)

## 5.12 HKU Information Stations

The Estates Office has established six HKU Information Stations in the CWLC to display environmental data, which ITS helped them to roll out in November 2013, along with several new ITS-developed services. The four services listed in Table 2e are now available, with access instances totalling 2,937 in 2014-15.

*Table 2e: Four services available on HKU Information Stations (July 2014-June 2015)*

| Services at HKU Information Stations | Access (No.) | % of Total |
|---|---|---|
| PC Availability | 1,032 | 35.14% |
| Environmental Monitoring Display System | 688 | 23.43% |
| Opening Hours | 626 | 21.31% |
| Today's Events | 591 | 20.12% |
| Total | 2,937 | 100% |

## 5.13 Use of Big Data Technologies

ITS has been exploring big data technologies, which were successfully employed in 2014 to enhance the Abuse Information Enquiry System and to improve efficiency in handling computer abuse cases, facilitate the reduction of potential risks caused by computer abuse cases and speed up searches of DHCP log records. ITS also makes use of these technologies to analyse network and web server log files for statistics preparation.

## 5.14 Experimental 3D Printing Service

ITS launched a project in March 2015 to set up an experimental 3D printing service to assist staff and students in applying this modern printing technology to their work. From September 2015, users can bring their 3D print files to the Main Service Counter next to the staircase on Level 1 of the CWLC to print 3D objects.
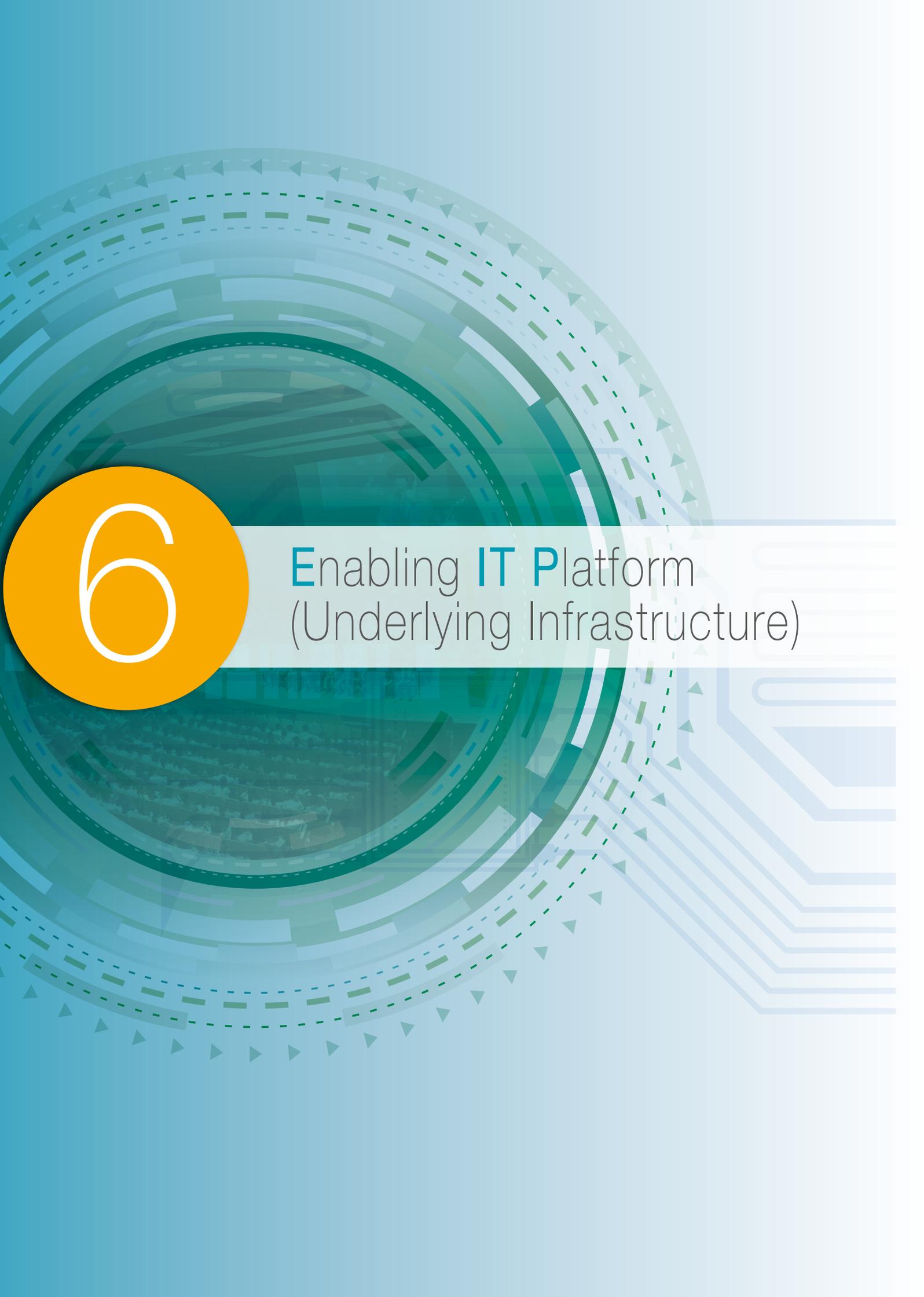
# 6 Enabling IT Platform (Underlying Infrastructure)

# 6 Enabling IT Platform (Underlying Infrastructure)

## 6.1 System Infrastructure and Service Development

During the year, ITS maintained 25 major central server systems, the service availability of which was maintained at an impressive level of 99.91% or above. Details of the performance statistics for the individual systems are summarised in the subsections that follow.

The overall annual service availability statistics for the central computer server systems are summarised in Table 3a.

*Table 3a: Annual System Service Availability (July 2014-June 2015)*

| System | Annual Availability | Total Downtime (Hrs) |
|---|---|---|
| HKUCC | 100% | 0 |
| HKUCC1 | 100% | 0 |
| WorkSpace.hku.hk | 100% | 0 |
| HKUSUC* | 100% | 0 |
| HKUSU1 | 99.91% | 7.63 |
| GRADUATE | 100% | 0 |
| WWW | 100% | 0 |
| HPCPOWER** | 100% | 0 |
| HPCPOWER2 | 100% | 0 |
| GRIDPOINT | 100% | 0 |
| SMPSERVE | 100% | 0 |
| HKUESD | 99.99% | 0.33 |
| LMS (Moodle) | 99.99% | 0.35 |
| HKUPORTAL | 99.99% | 0.90 |
| HKUAP | 100% | 0 |
| SIS | 100% | 0 |
| HCMS | 100% | 0 |
| ePortal System | 99.97% | 2.45 |
| SWEB | 100% | 0 |
| HKUAF6/HKUAF7 | 100% | 0 |
| INTRANET/UIS | 100% | 0 |
| HKUAD | 99.99% | 1.17 |
| HKUAF4/HKUAF5 | 100% | 0 |
| LIBRARY | 100% | 0 |
| uPrint | 100% | 0 |

\* HKUSUC was retired in Feb 2015

\** HPCPOWER was retired in September 2014

# 6 Enabling IT Platform (Underlying Infrastructure)

## 6.1.1 System and Service Infrastructure

As part of ongoing efforts to improve data resilience, ITS has expanded the central storage infrastructure with additional capacity to cater to the growth of data and replication set-up. In addition, resilient enterprise network attached storage (NAS) has also been installed to address the need for file sharing services. As a service enhancement, solutions for an in-house Exchange system upgrade and document management system (DMS) have been evaluated and acquired following tendering exercises, although their implementation has been delayed due to technical issues. ITS is now working actively with the vendor to resolve these issues and will launch the services with updated schedules soon.

To improve internal security and audit accountability, a solution for a privileged password management system has also been acquired, and is undergoing implementation. Implementation has met some challenges, but the vendor is currently working to resolve them. Another security-related development is implementation of a Security Information and Event Management (SIEM) system to collect and correlate events from different sources to enable the early detection of malicious activities. A solution was evaluated and acquired in June 2015, and put into service in August. Other ongoing developments include the consolidation of email systems, software update of the webmail system supporting legacy Unix mail systems, and upgrades of the HKUESD and University Information System (UIS).

### 6.1.1.1 Capacity Upgrade of Central Storage

To ensure the mirroring resilience of critical business data across two computer rooms in the Main and Centennial Campuses, ITS has acquired an additional 100 TB in storage capacity and an NAS system consisting of a pair of resilient nodes installed at these two sites. The newly installed NAS is capable of providing site-to-site failover in case one of the NAS nodes is down, thereby greatly enhancing resilience with data mirroring across the sites. The new NAS storage capacity is initially being used to replace ITS' managed file servers, but will soon be available to departmental users to consolidate file servers within the University.

### 6.1.1.2 Mail System Upgrade and Consolidation

To improve and align the central email service, ITS has implemented Exchange 2013 infrastructure to upgrade the existing HKUCC1 Exchange 2007 mail system with a coexisting configuration to facilitate the seamless migration of user mailboxes. The pilot migration of ITS and select departmental mailboxes is in progress to evaluate the potential issues that users may encounter. Full-scale migration will begin in September, and it is anticipated that the migration will take six months to complete because of the vast number of mailboxes and amount of data involved. The Exchange 2013 infrastructure also supports the hybrid deployment of on-premises mailboxes and those on the cloud simultaneously.

With the planned retirement of the in-house HKUSUC and HKUSU1 systems, all student email accounts were migrated to the cloud-based HKU Connect platform by July, which also unified the mail service and user experience for students. The legacy HKUCC mail system will also be retired, with user mailboxes consolidated to HKUCC1 after completion of the Exchange upgrade. As a step towards the better leveraging of central computing resources, the departmental email systems for the Estates Office and Faculty of Architecture were consolidated to the central email system in September and December 2014, respectively. More departmental email systems will be so consolidated in the coming months.

### 6.1.1.3 Server Compliance System

Solution implementation began in January 2014, when departments were informed to start software agent installation to enable the system to carry out compliance assessment and security vulnerability detection on the servers. Of the 1,253 servers registered by the departments, 698 (or 56%) have the software agent installed and monitored by the compliance system. Some of the servers did not get this agent installed as a result of unsupported operating systems and outdated records. ITS will continue to work with departments on the remaining servers and update the server records. With the availability of the software agent, compliance reports were generated and sent to server owners for review in November 2014 and March and July 2015.

# 6

# Enabling IT Platform (Underlying Infrastructure)

Additional software licenses have been acquired to accommodate more servers and systems running desktop operating systems (OS) such as Windows 2012 and Mac OS, which were previously not fully supported by the system. Due to OS divergence, departments are also requested to migrate their OS to mainstream systems supported by the compliance system.

## 6.1.1.4 uPrint (Cloud Printing Service)

The uPrint system, which was introduced in September 2012 and runs on two VM servers, currently supports 23 multi-function devices (MFDs) and five added-value machines, providing printing, photocopying and quota top-up via Octopus services. Eight additional MFDs were installed last year with coverage extended to faculty-based laboratories, and the overall printing unit consumption increased by about 55% compared to 2013-14 due to the adoption of this central printing service by departments.

**uPrint Service**

Mobility support for uPrint was extended to the Android platform in August 2014 in addition to iOS. Together with the support of Windows- and Mac OS-enabled laptops, more than 18% printing volume in terms of pages was submitted from personal devices, compared to about 10% in 2013-14. Chart 3 summarises the monthly uPrint printing device distribution from July 2013 to June 2015.

In line with SCUP, the embedded card reader on uPrint devices, including MFDs and VMs, will also be upgraded to maintain compatibility with the next generation of HKU cards. It is expected that this upgrade exercise will be completed by the end of July 2016 before issuance of the new student cards after master registration.

*Chart 3: uPrint Usage Device Distribution (July 2013-June 2015)*
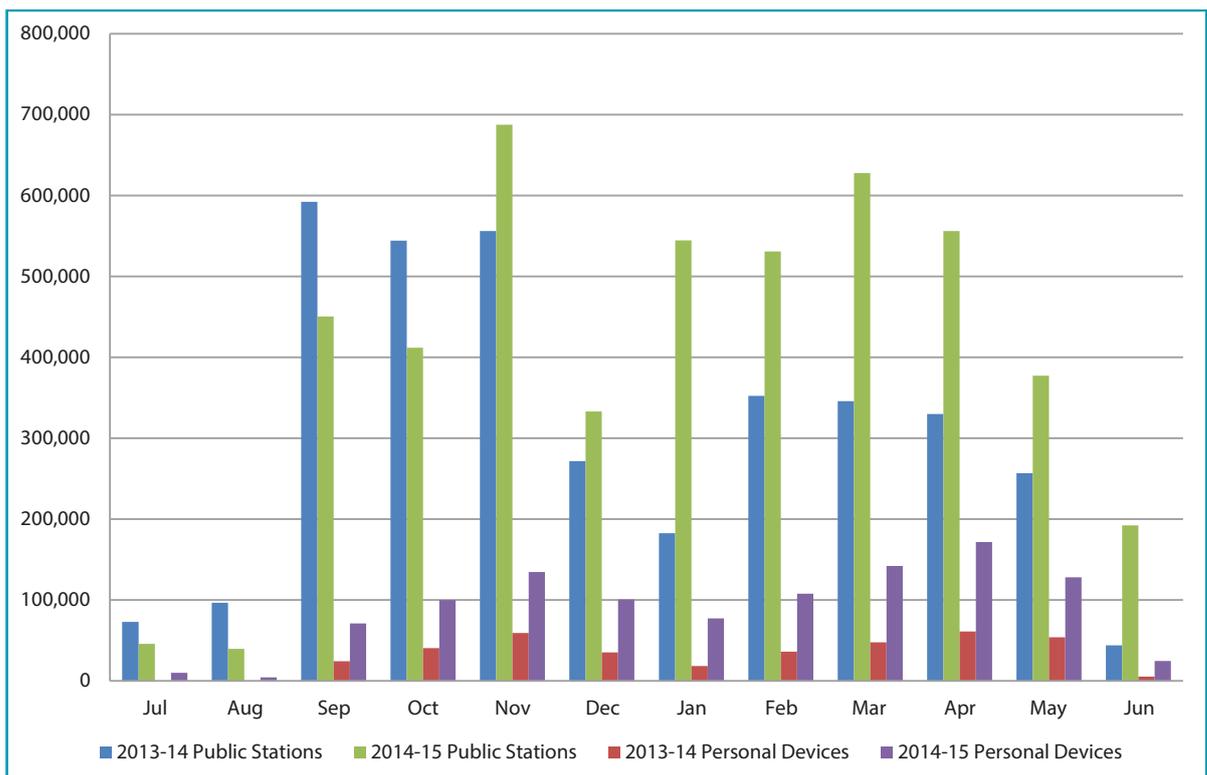
# 6 Enabling IT Platform (Underlying Infrastructure)

## 6.1.1.5 Email Facilities

ITS provided email services to a user population of over 95,081 in 2014-15, including 206 UG students, 828 PG students, 13,356 staff and 80,819 graduates. Some users, such as PGs and alumni, have more than one identity, and thus the total population does not tally with the sum of all users. The systems that support email services for staff, students and graduates are the HKUCC and HKUCC1, HKUSUC and HKUSU1, and GRADUATE systems, respectively. Since its introduction in February 2012, 24,450 graduate and 29,070 student accounts have been provisioned on the outsourced email platform, HKU Connect. With the consolidation of the student email service, HKUSUC and HKUSU1 were retired in July 2015.

Similar to the trend in previous years, the percentage of virus-bearing emails remained at a low level in the reporting year, just 0.05%, largely because the trend in email attacks has shifted from virus-infected messages to phishing messages. The number of spam messages filtered out in 2014-15 was 1.8 million, which also reflects a declining trend over the previous year.

## 6.1.1.6 Email Use Statistics

In 2014-15, our central servers processed 123 million email messages, some 9 million fewer than in 2013-14 as a result of the effectiveness of our anti-spam solution and increasing number of mailboxes hosted on the HKU Connect platform. Tables 3b and 3c present annual statistics on the number of email messages processed by these systems and the number of virus-infected email messages detected by our anti-virus mail gateways, respectively. Table 3d reports anti-spam statistics for the Ironport mail gateway, from which it can be seen that about 61% of incoming mail connections were rejected. Of the remaining 39% processed, more than 3.7% were quarantined as spam messages and did not reach our central mail servers.

*Table 3b: Email Processing (July 2014-June 2015)*

| 2014/2015 | HKUSUC* | HKUSU1 | HKUCC | HKUCC1 | GRADUATE |
|-----------|---------|--------|-------|--------|----------|
| Total | 765,134 | 3,605,433 | 37,215,933 | 34,118,185 | 47,514,242 |

* HKUSUC was retired in Feb 2015

Note: In the central servers, a bulk email delivered to a group of people is counted as one message in the statistics. Hence, the number differs from the number of emails received by users.

# 6 Enabling IT Platform (Underlying Infrastructure)

*Table 3c: Virus-infected Emails (July 2014-June 2015)*

| Combined Statistics for Central Email Servers | | |
|---|---|---|
| Total Emails | Viruses | |
| 2014/2015 | No. of Messages | No. of Messages | % of Messages |
| Total | 123,218,927 | 65,746 | 0.05% |

*Table 3d: Incoming Spam at Ironport Mail Gateway (July 2014-June 2015)*

| | Incoming Message Connections | Connections Rejected due to Poor Reputation or Invalid Recipients | | Received Messages | Messages Detected as Spam | |
|---|---|---|---|---|---|---|
| 2014/2015 | No. of Connections | No. of Connections | % of Connections | No. of Messages | No. of Messages | %. of Messages |
| Total | 125,898,573 | 77,175,328 | 61.29% | 48,723,245 | 1,835,206 | 3.76% |

## 6.1.1.7 GRADUATE Email System (x64 Linux VM)

The GRADUATE email system runs on an x64 Linux VM that supports email services for 80,819 University alumni, and processed over 47 million email messages in 2014-15. As new graduate accounts are provisioned by the new HKU Connect platform, the user population of the GRADUATE email system is expected to remain steady.

## 6.1.2 Systems for Academic Support

## 6.1.2.1 HKUCC (x64 Linux VM)

The HKUCC system is the primary server supporting legacy email services for University staff members, and has been run on a Linux VM since September 2011. Following the mail server consolidation initiative endorsed by the IT Committee, users of this legacy Unix mail server were recommended to migrate to HKUCC1 voluntarily. Full-scale migration will start after the HKUCC1 Exchange upgrade exercise. Annual utilisation exhibited a 19% increase over previous year even though the virus scanning configuration was resumed in December 2014 to release the processor power in virus scanning.

# 6 Enabling IT Platform (Underlying Infrastructure)

### 6.1.2.2 HKUCC1 (Microsoft Exchange 2007 and Exchange 2013 System for Staff)

The HKUCC1 system, supported by two-blade server functions as SMTP and more than a dozen VM servers playing the roles of client access and mailbox servers (on both Exchange 2007 and Exchange 2013), will replace the legacy HKUCC Unix email system with advanced collaborative features such as calendar sharing, task lists and email synchronisation with smart phones/tablets access. The infrastructure upgrade is in progress, and involves the migration of over 13,000 user mailboxes, consuming over 12 TB of disk space, from the Exchange 2007 to new Exchange 2013 infrastructure in a co-existence configuration to minimise the user impact during migration. Due to the increase in the default disk quota to 5 GB in July 2012 and 12% increase in the number of mailboxes during the year, overall disk space increased by 32% over the previous year. It is anticipated that it will take more than six months to migrate all Exchange 2007 mailboxes to Exchange 2013.

### 6.1.2.3 Workspace.hku.hk – Central SharePoint System (SharePoint 2010 Server for Staff)

The system is based on the ITS cloud infrastructure and adopts a multi-tenancy implementation approach to allow fully delegated administration rights to departmental administrators. The number of site collections increased from 259 to 297 in 2014-15, with a greater than 32% increase in disk storage. With the central DMS project in progress, the sites on workspace.hku.hk will gradually migrate to the central DMS platform supported by SharePoint 2013 infrastructure in the coming year.

### 6.1.2.4 HKUSUC (Linux VM)

The HKUSUC system was formerly dedicated to supporting student email services, and there were fewer than 400 user mailboxes left on the system as of June 2014. All mailboxes were migrated to the HKU Connect platform by February 2015 to align with the development direction of the convergence of the student/alumni email service platform.

### 6.1.2.5 HKUSU1 (Microsoft Exchange 2007 System for Students)

The HKUSU1 system is an equivalent Exchange messaging platform for students, with improved collaborative features such as calendars, task lists, and smart phone or mobile device synchronisation support. With the availability of the outsourced HKU Connect platform since 2012, new student email accounts are now provisioned by that platform. Accordingly, about 2,500 student mailboxes were migrated to the HKU Connect platform during the March to June 2015 period, and the system was then retired after serving for nearly six years. Ageing hardware resulted in an incident of double hardware failure in March, with a service outage that lasted more than seven hours.

### 6.1.2.6 WWW (Linux VMs)

The University's homepage is supported by several Linux VMs load-balanced by hardware load balancers, whilst other centrally maintained or departmental websites are hosted on other web server clouds. The system remained very stable throughout the year, and an OS upgrade exercise to refresh the system software for the WWW and web clouds is planned for the coming year.

### 6.1.2.7 SMPSERVE (Dell R900 System)

The SMPSERVE system was set up to support general purpose computing for teaching, learning and research activities that are not suitable for the grid or the parallel computing system infrastructure on HPCPower/HPCPower2/Gridpoint. As the upgrade of HPC facilities is now in progress, it is anticipated that the system will soon be retired and replaced by the new system(s).

# 6 Enabling IT Platform (Underlying Infrastructure)

### 6.1.2.8 HPCPOWER2 (IBM BladeCenter HS21 PC-Cluster System)

Annual usage statistics for HPCPOWER2 are shown in Table 4. The system was very stable in the reporting year, with almost 100% service availability, the only exception being a short period of service downtime in January 2015 following the hardware failure of one of its network switches. The average CPU utilisation of HPCPOWER2 systems was around 42.9% in 2014-15. The HPCPOWER system was retired in August 2014 and will be replaced by a new heterogeneous cluster system in the 2015-16 academic year.

### 6.1.2.9 GRIDPOINT System (Dell M1000e/IBM BladeCenter-H Grid System)

The GRIDPOINT system supports advanced research with demand for more powerful computing resources. As shown in Table 4, the system was very stable in the reporting year, with a high degree of system availability except for a short period of service downtime because of the suspension of electricity in the Haking Wong Building in December 2014. Average utilisation of the GRIDPOINT system increased slightly from 67.2% in 2013-14 to 68.4% in 2014-15.

*Table 4: HPC Cluster System Annual Utilisation (July 2014-June 2015)*

| System | Total no. of User jobs | CPU time (days) | | System up time (hrs) | |
|---|---|---|---|---|---|
| HPCPOWER2 (192 cores) | 10369 | 29815.02 | 42.94% | 8753.00 | 99.92% |
| GRIDPOINT (1216 cores) | 35550 | 303297.65 | 68.36% | 8748.00 | 99.86% |

*Chart 4a: Annual Number of User Jobs for Research Computing Facilities*



45
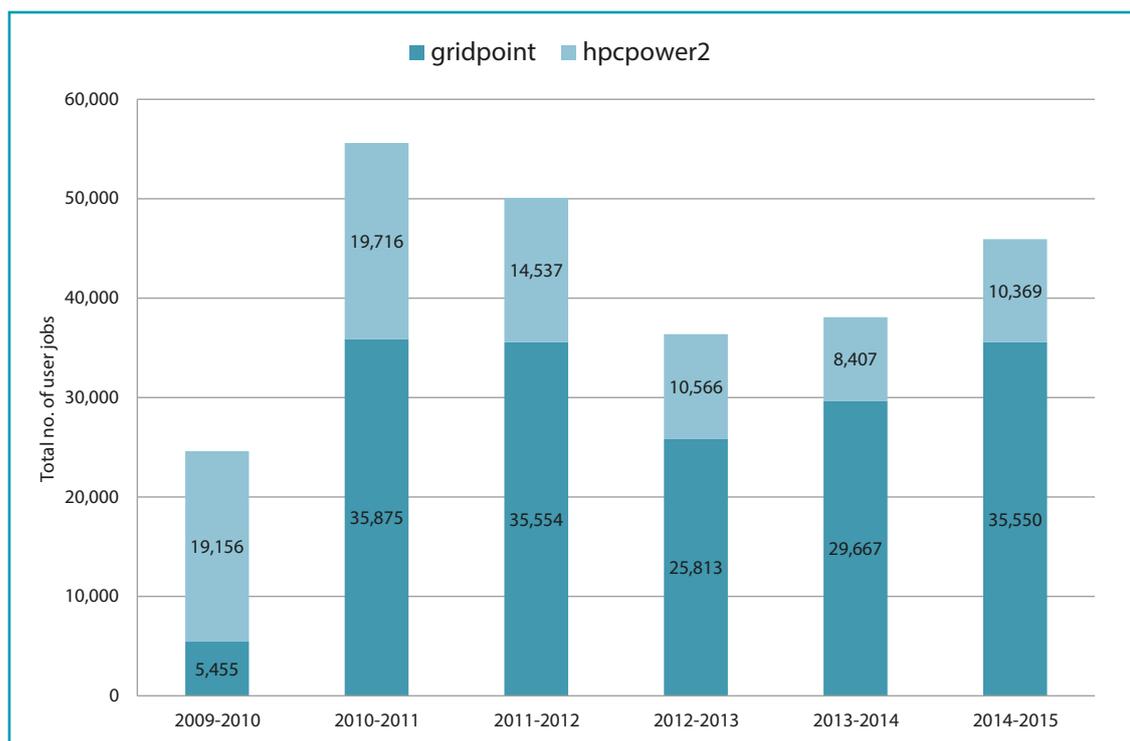
# 6 Enabling IT Platform (Underlying Infrastructure)

*Chart 4b: Annual CPU Time for Research Computing Facilities*



**gridpoint** **hpcpower2**

| Year | gridpoint | hpcpower2 |
|------|-----------|-----------|
| 2009-2010 | 37,609.98 | 66,212.28 |
| 2010-2011 | 212,504.63 | 66,806.59 |
| 2011-2012 | 272,153.39 | 55,901.83 |
| 2012-2013 | 281,982.03 | 56,101.04 |
| 2013-2014 | 296,563.04 | 39,388.55 |
| 2014-2015 | 303,297.65 | 29,815.02 |

CPU time (days)
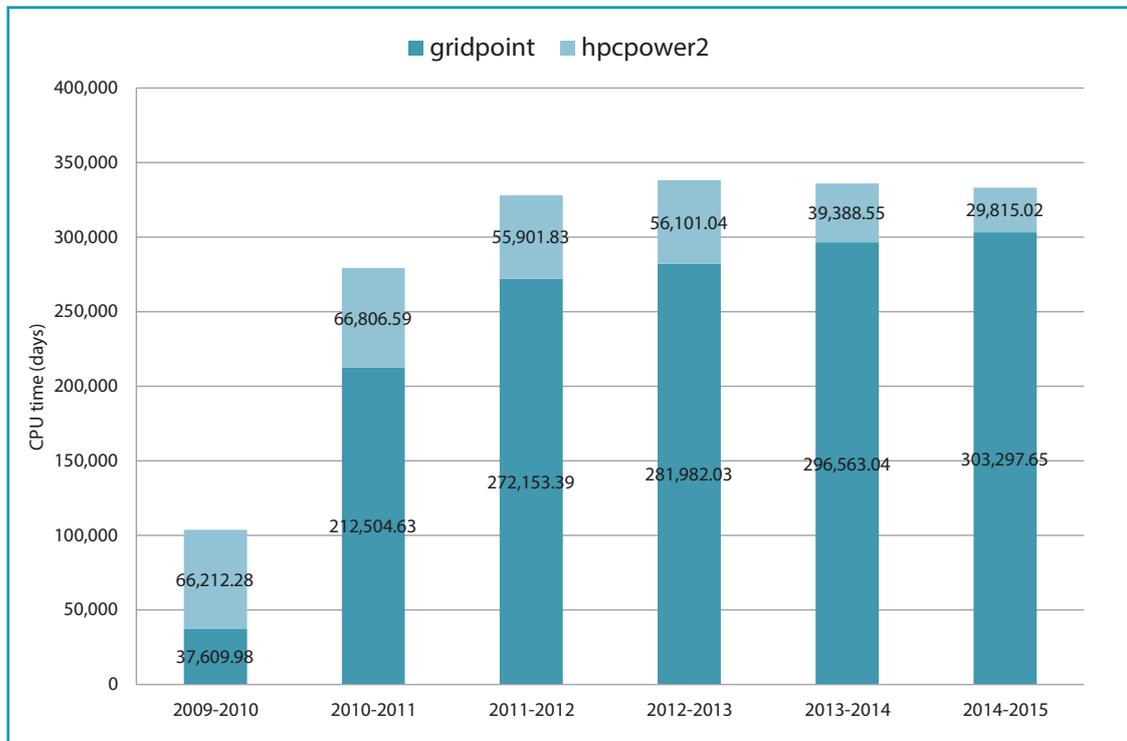
### 6.1.2.10 HKUESD (IBM Power 550 System; IBM PowerVM and x64 Linux VM)

The HKUESD system is supported by a pair of IBM Power 550 servers with a high-availability configuration to serve the University's HKUESD applications, including PRD and PRSD, which are not supported by the HCMS. As the system has been in use for over six years, it was upgraded to a Linux VM-supporting web application with the database consolidated to the database system-supporting UIS/Intranet on 6 June. The system hardware remained very stable through the year, although there was about a 20-minute outage due to an application software issue.

### 6.1.2.11 Moodle LMS System (Linux VMs)

The Moodle LMS, which is supported by nine Linux VMs, became the University's sole eLearning system in September 2012. Since then, the Moodle software platform has undergone annual upgrades, with the last successful upgrade performed in July 2015. The file sharing VM provides a file service to web application servers that were replaced by the NAS system, which was installed in that upgrade exercise. In addition, old Moodle courses have been archived annually since the launch of an archive platform in July 2014. Although the system was designed with resilience, there was an incident causing a 20-minute service outage in January 2015.

### 6.1.2.12 HKU Portal (Linux VMs) and ePortal (HP rx8640 partitions/IBM x3650 servers, HP BL460c servers)

The HKU Portal, which runs on the ITS cloud, remains the University's only SSO authentication platform for web-based applications. The system software was upgraded in late June 2014 to refresh the OS and the application server supporting the SSO platform.

The ePortal infrastructure is configured in a three-tier (database, application and web) structure with high-availability components in each tier. A disaster recovery drill (DRD) was carried out together with the HCMS and SIS systems in June and July 2015, respectively.

# 6 Enabling IT Platform (Underlying Infrastructure)

### 6.1.2.13  ITS Cloud (Cloud Management System)

ITS Cloud is the University's private cloud platform, providing HKU departments with an automated server hosting platform in a virtual environment. All departments can subscribe to a Windows or Linux server system with customisable computing resources through the automatic workflow on the ITS cloud portal according to their needs. Current subscription statistics for this private cloud service are as follows: 99 VM, 237 vCPU, 553 GB memory and 18.15TB storage. In summary, the total number of new (or extended) VM subscription requests increased from 89 in 2013-14 to 99 in 2014-15, showing a growing trend. The increase in the number of subscriptions and associated computing resources is clear indication that cloud services are well received by the HKU community.

### 6.1.3 University Administration Systems

### 6.1.3.1 HKUAP (IBM p710 PowerVMs) and HCMS (HP rx8640 partitions, HP BL460c servers and HP DL380 server/Windows VM)

The HKUAP system is the main server supporting all University administrative applications that are not provided by the HCMS, and it also includes a data exchange platform between enterprise resource planning (ERP) and non-ERP applications. With the consolidation of databases following the UIP upgrade exercise, annual CPU utilisation underwent a slight increase of about 13%.

The HCMS, which is configured with a high-availability three-tier server architecture, was launched in April 2011 as the University's main administrative platform. A DRD was carried out in June 2015 to validate the DR procedure to bring up standby machines at a remote site.

### 6.1.3.2 SWEB (p710 PowerVMs and Linux VMs) and SIS (HP rx8640 partitions, HP BL460c servers)

The SWEB system was the primary system supporting student-related web applications before the launch of SIS. Its role has now shifted to that of a supplementary system for SIS, providing functions not implemented in the latter system. In addition, the SWEB system also hosts the University Extranet website. Annual CPU utilisation increased by 48% compared to the previous year because of steady growth in online applications via the platform.

SIS has the same high-availability hardware/software infrastructure as the HCMS and ePortal. Supporting student-related activities, the system is equipped with abundant computing resources to ensure smooth operation at peak loads during prime periods. A DRD was carried out in July 2015 to validate the DR procedure to bring up the standby machines at a remote site. As a Peoplesoft software upgrade is in progress, it is anticipated that the system hardware will also be upgraded to cope with this development in late 2016.

### 6.1.3.3 University Information System (UIS) (p710 PowerVMs and Linux VMs)

The UIS, run on IBM PowerVMs supported by ITS cloud infrastructure since February 2014, supports the UIS and Intranet applications. Aggregate annual CPU utilisation dropped by 63% as a result of this technology upgrade. To cope with the obsolescence of the Oracle application server 10g on the UIS, the application server was upgraded to an Oracle HTTP server 12c in July 2015.

### 6.1.3.4 HKUAF6 and HKUAF7 (IBM eServer p5 550 System)

HKUAF6 and HKUAF7 are the two IBM p5 550 servers supporting the University's financial applications. They handle the general ledger, purchasing and payment, and fixed asset functions using the Oracle Financials package, as well as the receipt and debit note systems developed by an outside vendor. As these systems have been in service since 2006, an upgrade of the system hardware and Oracle Financials package is needed and will begin in 2015-16.

# 6

# Enabling IT Platform
(Underlying Infrastructure)

### 6.1.3.5 HKUAD (IBM PowerVM on p710)

The HKUAD system is a development and test platform for the University's in-house administrative IT applications. Statistics on annual aggregate CPU utilisation show a drop of 47% in CPU utilisation on a yearly basis.

### 6.1.3.6 HKUAF4 and HKUAF5 (IBM eServer p5 550 Systems)

The HKUAF4/5 systems are a pair of IBM eServer p5 550 systems that support the testing and development of Oracle Financials packages and other financial applications. Annual aggregate CPU utilisation grew by more than 55% thanks to active development works.

### 6.1.4 Other Systems

### 6.1.4.1 LIBRARY (Dell PowerEdge R910)

ITS continued to offer operational management services for the LIBRARY online catalogue system used by the University libraries in 2014-15.

### 6.2 Network Development and Services

### 6.2.1 Upgrade of Campus Network Infrastructure

### 6.2.1.1 City-Wide WiFi (Hi-Fi.HK) Available at HKU

The University is supporting the HKSAR Government's "City-wide Wi-Fi for the Public and Visitors" initiative, as set out in the "2014 Digital 21 Strategy". The initiative's objectives are

• to make it easier for the public and visitors to find and use free Wi-Fi services in Hong Kong;
• to stimulate the development of public Wi-Fi in Hong Kong; and
• to further advance Hong Kong's position as a highly connected world city.

The WiFi.HK initiative is led by the OGCIO, and was officially launched in August 2014 when 3,000 Wi-Fi access points were made ready for public use.

To support the initiative, ITS converted the HKU Open-WiFi service into a WiFi.HK service in early December 2014. The major change arising from this conversion is that the Wi-Fi SSID (Service Set Identifier) for use by campus visitors has been changed from "HKU Open-WiFi" to "Wi-Fi.HK via HKU".

### 6.2.1.2 Retirement of Access Anywhere Network (ACENET), HKUVPN1 Service and End of Support for 802.11b WiFi Clients

A number of network services have been retired or had their support ended to consolidate network resources and strengthen overall network efficiency.

ACEnet was introduced over 15 years ago to support the first student notebook program launched at that time. Fixed network points were installed in open areas and offices for the use of research students in academic buildings. Over the years, Wi-Fi connections have gained popularity, overtaking that of fixed network connections. In view of the shrinking use of ACENET, ITS decided to phase out the ACENET service. Doing so allowed us to streamline the network infrastructure and, more importantly, redeploy resources to support other network areas that are in common demand and enjoy high usage rates. The whole ACEnet service had been withdrawn, with access disabled, by the end of August 2014.

HKUVPN1 had been in service for more than a decade. However, in view of the obsolescence of the hardware used for, and security limitations associated with, HKUVPN1, the service was retired on 1 March 2015. HKUVPN2, which has been in production for students and staff as a replacement, provides better performance and more secure VPN connections using standard-based IPSec technology.

The standard for the first Wi-Fi generation back in 1999 was 802.11b. Its maximum theoretical speed was 11 Mbps, which is much slower than the latest Wi-Fi standard of 802.11ac, which supports a speed of above 1 Gbps. Due to technological obsolescence, mobile devices that support only the 802.11b Wi-Fi standard should be retired. Because supporting this outdated standard would severely degrade the network

# 6 Enabling IT Platform (Underlying Infrastructure)

performance of Wi-Fi devices using faster Wi-Fi standards, such as 802.11g and 802.11n, on the same network, such support was withdrawn from HKU's Wi-Fi network with effect from 1 January 2015.

## 6.2.1.3 Wi-Fi Expansion and Enhancement across the University

The use of Wi-Fi continues to feature prominently in daily University activities. The University's Wi-Fi service continues to keep pace by extending its coverage and capacity campus-wide.

Seventy-two Wi-Fi access points supporting the latest 802.11ac Wi-Fi standard, have been installed in the newly renovated student residence in Ching Lin Terrace. The Wi-Fi infrastructure there is based on the latest models from Cisco.

In 2014-15, another 180 new Wi-Fi access points supporting the latest 802.11ac standard were installed across the University, including in the following buildings.

- Run Run Shaw Building
- Runme Shaw Building
- Hui Oi Chow Building
- Main Building
- Chow Yei Ching Building
- Haking Wong Building
- Composite Building
- Knowles Building
- KKL Building
- Chong Yuet Ming Chemistry Building
- Chong Yuet Ming Physics Building
- Meng Wah Complex
- Faculty of Medicine Building Lab Block
- Faculty of Medicine Academic Block
- Kadoorie Biological Sciences Building
- Prince Philip Dental Hospital Campus

## 6.2.1.4 New Wi-Fi Connectivity in Centennial Campus' Centennial Garden

Centennial Garden is located behind Cheng Yu Tung Tower and Jockey Club Tower on the Centennial Campus. Although the Garden initially had no Wi-Fi coverage, as more activities and functions began to be held there, demand for on-site Wi-Fi connectivity grew. After exploring various products and carrying out on-site feasibility studies and tests, ITS selected and installed a pair of long-haul Wi-Fi outdoor access points on the balcony of a high floor level in Jockey Club Tower in October 2014.

## 6.2.1.5 Software Defined Networking (SDN) Testbed

SDN is an emerging networking technology that enables computer networks to be made more programmable and centrally manageable, allowing networks to be tailored to user requirements more efficiently. In 2013-14, we created a small SDN testbed to learn how to apply such technology. In 2014-15, we evaluated:

1) OpenDaylight, the de facto SDN controller standard, which has evolved to include an increasing number of features, and
2) the feasibility of a particular use case to enhance the security of the HKU network. This project is ongoing, with completion expected in early 2016.

Areas to be explored in future include a special programmable network zone for science research big data and network function virtualisation technology.

# 6 Enabling IT Platform (Underlying Infrastructure)

### 6.2.1.6 Upgrade of Floor Switches and Installation of Power-over-Ethernet (PoE) Switches to Replace DC Injectors

We began replacing the old network switches on building floors with new switches with greater capacity and enhanced security protection in 2005 to meet staff demands for increased capacity, as most staff PCs were running Gigabit network interfaces. In 2014-15, we replaced 42 floor switch units within the staff network (in which the oldest floor switches had been in use for more than five years) with new PoE floor switches (Huawei S5700-28C-PWR-SI). This upgrade also affords full support for the IPv6 protocol and multicast applications, such as the efficient delivery of high-resolution video. The Kadoorie Biological Science Building and May Hall were upgraded this year.

In addition, the PoE feature of the new floor switches made way for the retirement of 46 DC injectors for Wi-Fi access points, which not only saved space in IT closet rooms, but also reduced the equipment failures arising from the overheating of crowded DC injectors. The PoE feature also makes ready for IP phone deployment on the staff network.

### 6.2.1.7 Upgrade of Network Links Connecting Remote Campuses

The bandwidths of the network links connecting the remote campuses at Admiralty Centre (20 Mbps), the Ap Lei Chau Clinic (10 Mbps), Hing Wai Centre (4 Mbps) and Tsan Yuk Hospital (2 Mbps) to the campus backbone were upgraded to 100 Mbps with enhanced resiliency in early February 2015, as shown in the following diagram.
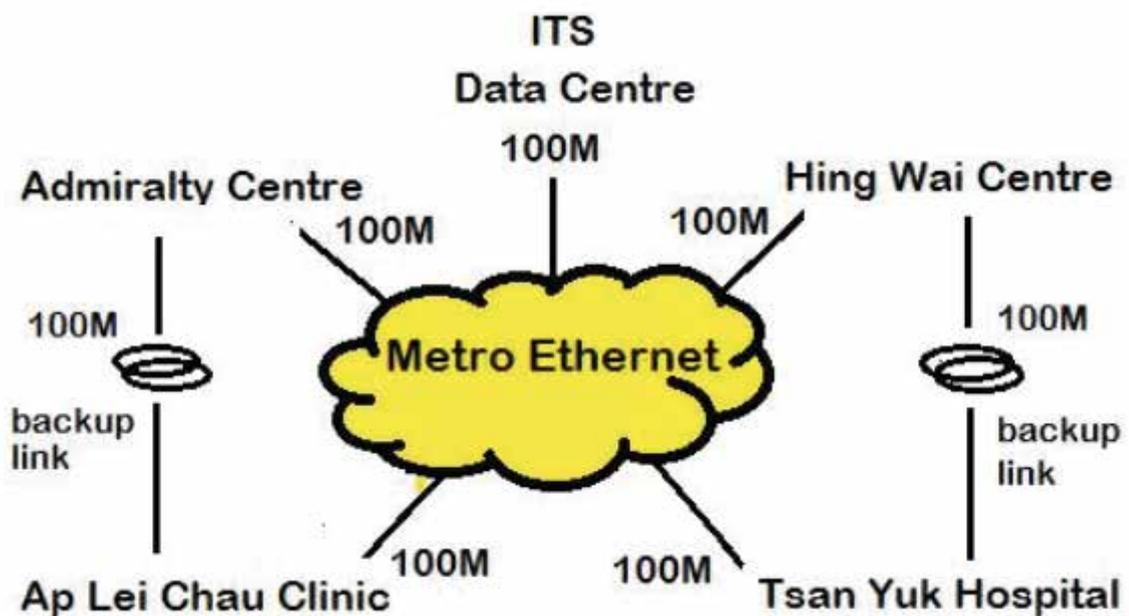


### 6.2.1.8 Hall Wi-Fi Enhancement Project

Wi-Fi networks were first installed in HKU residential halls in 2009. With network demand on Wi-Fi network capacity and performance increasing over the years, ITS found that the Wi-Fi coverage in some residential halls was inadequate, particularly in rooms located near the ends of corridors. Occasional reports were received from students about weak or no Wi-Fi signals in some hall areas. Accordingly, in June 2015, a Hall Wi-Fi Enhancement proposal to add 328 new access points in 12 halls was submitted to the Committee on Halls through CEDARS, and subsequently approved.

# 6 Enabling IT Platform (Underlying Infrastructure)

The design and implementation of this enhancement project are currently in progress. The overall schedule will depend on various processes, including tendering and equipment ordering, site surveys and design, actual implementation and project acceptance. The estimated project completion date is August 2016.

### 6.2.2 Hallnet (Hall Network)

Hallnet consists of 5,568 network points distributed across 16 student halls of residence, Robert Black College and Graduate House. The statistics for Hallnet usage in 2014-15 are presented in bar chart form in Chart 5. Compared with 2013-14, usage declined by 13% and 14% in terms of connection sessions and connection time, respectively. The declining trend reflects the ongoing trend for users to shift from Hallnet, which is wired, to Wi-Fi, which is wireless. An average of 271 connections were made at each Hallnet point, for a total of 288 connection hours over the year. Translated into daily figures, 0.74 connections were made from each network point per day, for a total of 0.79 hours.

*Chart 5: Annual Utilisation of Hall Network*
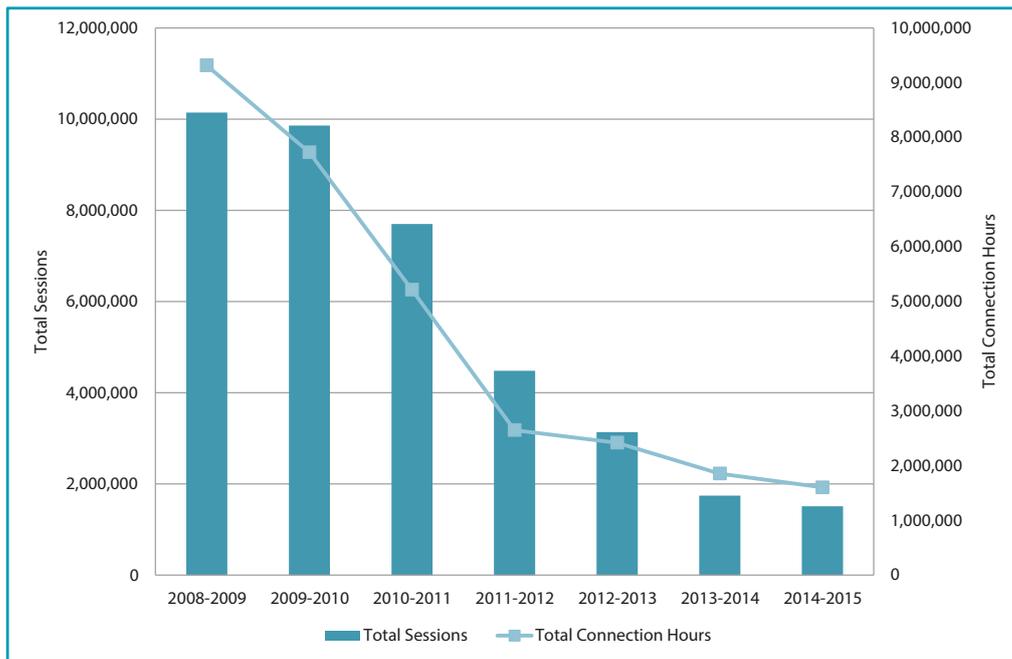


### 6.2.3 VPN (Virtual Private Network)

Use of the HKUVPN facility in 2014-15 is summarised in Chart 6. Compared with 2013-14, there was a 177% increase in the number of VPN sessions and 127% increase in total VPN connection time. This sharp rise in VPN utilisation is the result of greater user awareness of information security issues and the need to encrypt remote access through a VPN connection. The use of a more accurate program for statistical analysis also contributed to the increase.

Departmental VPN accounts have been migrated to HKUVPN2, which provides enhanced encryption and throughput.

# 6 Enabling IT Platform (Underlying Infrastructure)

*Chart 6: Annual Utilisation of HKUVPN*
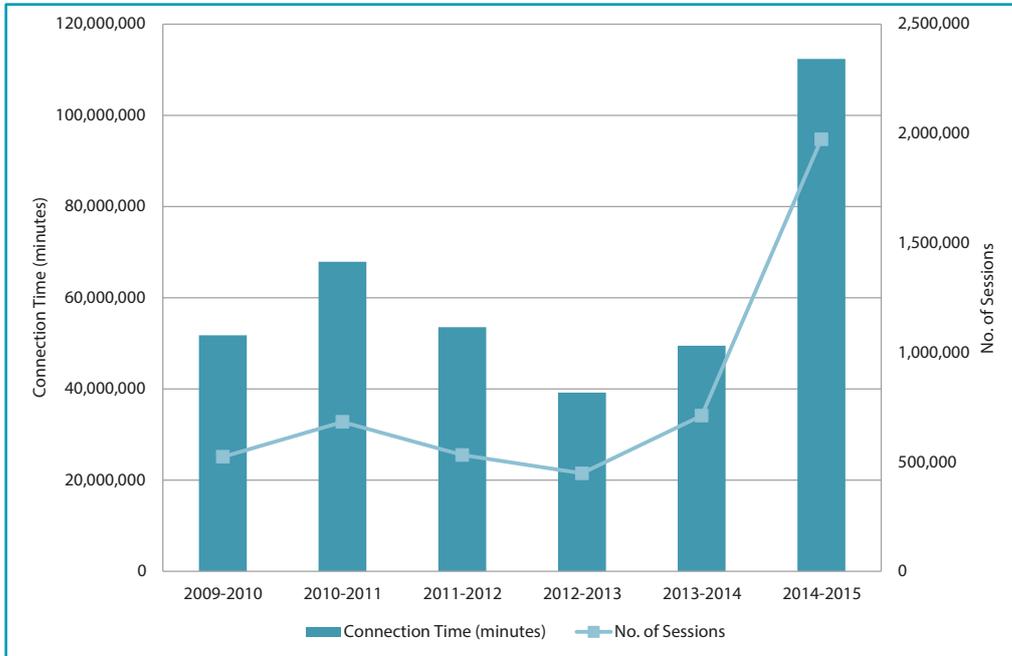


## 6.2.4 Wi-Fi Service

HKU's Wi-Fi network consists of 4,530 access points distributed across the Main Campus, Centennial and Sassoon Road Campuses, remote campuses, and student residential halls. Charts 7a and 7b show that compared with 2013-14, the number of Wi-Fi users has increased by 15.4%, whilst the number of user hours has decreased by 22.7%. As of June 2015, the number of Wi-Fi users stood at 48,188 and the number of user hours at 38,992,279.

Last year, the "Occupy Central" movement broke out in September, and there was also a one-week student strike during the protest period. These events affected total Wi-Fi usage last year.

*Chart 7a: Number of Wi-Fi Users*
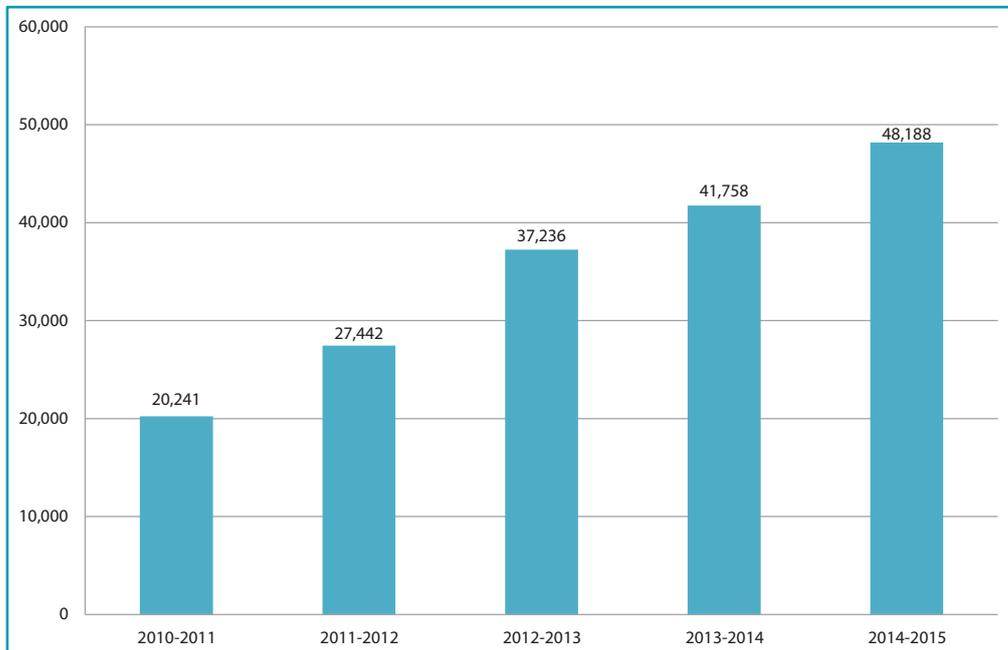
# 6 Enabling IT Platform (Underlying Infrastructure)

*Chart 7b: Number of Wi-Fi User Hours*
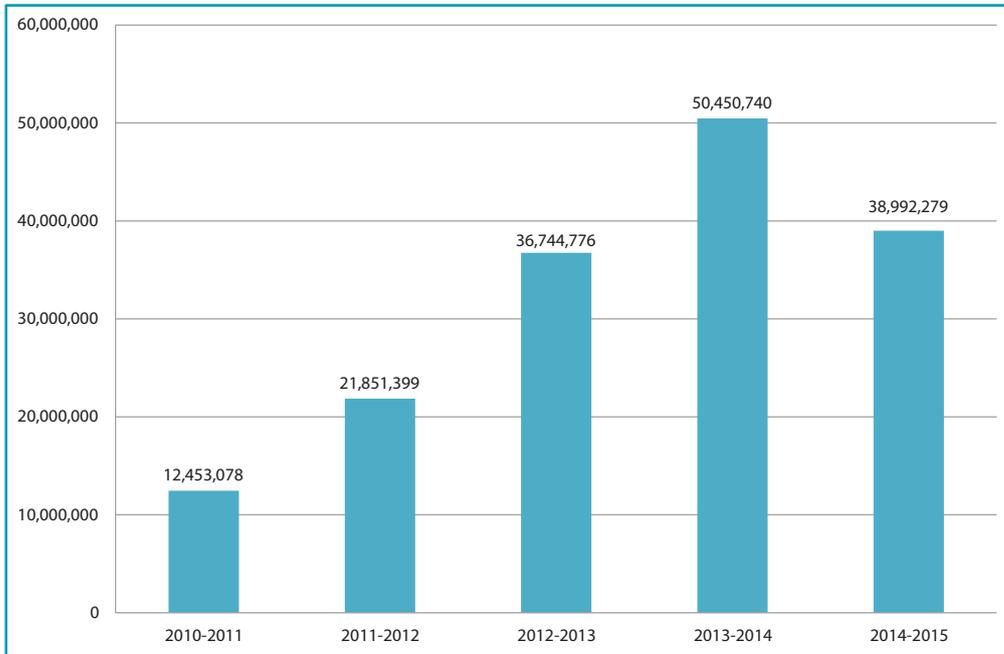


## 6.3 HARNET and Internet Connectivity Development

### 6.3.1 Growth in Internet Traffic

Utilisation of HARNET and the Internet continued to increase steadily in 2014-15. The graph of Internet traffic in Chart 8 was recorded using average values over one-day periods. It shows that incoming traffic grew from a daily average of about 660 Mbps (82.5 Mbytes per second) in July 2014 to over 1,390 Mbps (173.75 Mbytes per second) in May 2015. In June 2015, the volume of Internet traffic reached 850 Mbps (106.25 Mbytes per second), which was 28% higher than the previous year's peak. Over the year, the data transmission rate during the peak traffic period (between 2.00 and 5.00 pm) rose to as high as 1,500 Mbps (187.5 Mbytes per second).

The outgoing traffic spike that occurred in January 2015 was the result of file transfers between an HKU department and the Amazon Web Service. A network traffic control policy has since been applied, after which the outgoing traffic pattern returned to normal.

*Chart 8: HKU-Internet/HARNET Traffic (July 2014-June 2015)*
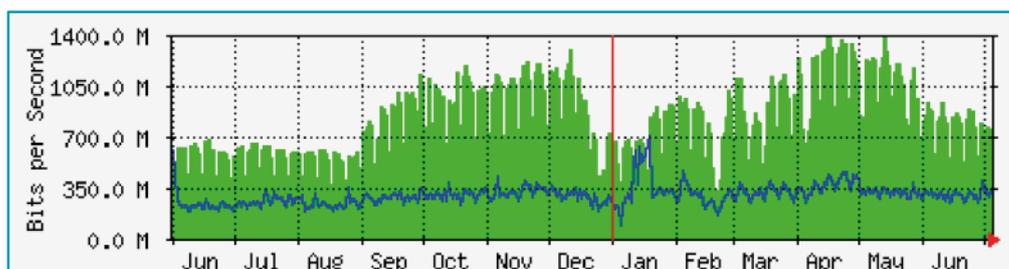


Notes: - The graph shows the sum of local and international traffic.
    - Incoming traffic is indicated by the green shaded profile.
    - Outgoing traffic is indicated by the blue line.

# 6 Enabling IT Platform (Underlying Infrastructure)

### 6.3.2 Upgrade of HKU-HARNET-Internet Connections

In September 2014, the HARNET-Internet link was upgraded to 4.2 Gbps to cope with the new academic year. The link was further upgraded to 4.3 Gbps in March 2015 as planned. Total bandwidth returned to 2.6 Gbps in mid-June 2015 for the summer holiday, but then increased again to 3.2 Gbps on 31 July 2015 and to 4.9 Gbps in September 2015 for the new academic year.

### 6.4 Managing Information and Network Security

### 6.4.1 Information Security Assessment for Departments

ITS is greatly concerned with the University's information security, and we have carried out an information security assessment exercise annually over the past few years. Ten departments/offices are selected with the objective of exposing any network or system vulnerabilities, recommending improvements to address any information security weaknesses identified and suggesting good information security practices to be adopted in relation to data and information management. Ernst and Young Advisory Services Limited was engaged as an independent consultant to conduct this year's exercise, which started in June 2014 and was completed in January 2015.

### 6.4.2 Information Security Awareness Promotion

ITS organised a series of activities to promote information security awareness and technical knowledge to HKU staff and students in the reporting year. The Information Security Awareness Exhibition 2014, held at the Run Run Shaw Podium, covered a variety of topics, with a special focus on mobile device security. Visitors to the exhibition were invited to participate in a quiz aimed at reinforcing their awareness of information security risks, good practices in using USB storage, personal data protection, cyber security, phishing and mobile security.

Two workshops were also held on 25 and 27 November 2014. Invited consultants from Ernst & Young Advisory Services Limited spoke about personal data and information protection measures, and the University Data Protection Officer answered questions related to the University's code of practice on personal data protection from audience members. These workshops were very well received, and attended by over 200 participants.

### 6.4.3 Abuse Case Handling

ITS implemented the following security measures in 2014-15 to address the proliferation of spam and malware (including computer viruses, Trojan horses and spyware programs).

• Alerting owners of PCs and servers involved in computer abuse activities to eradicate viruses, Trojan horses, spyware and other zombie programs residing in their systems.

• Advising departments through the Coordination Group for Departmental Network/PC Support to take the necessary precautionary measures when new computer vulnerabilities or global computer viruses are reported.

• Fast-tracking and containing the sources of computer abuse cases with the aid of the Abuse Information Enquiry System.

• Controlling person-to-person (P2P) file-sharing activities by blocking P2P connections at the HKUVPN gateway and setting up a dedicated VPN server for legitimate P2P connections.

# 6 Enabling IT Platform (Underlying Infrastructure)

The reporting year saw a significant rise in the number of computer abuse cases over the previous year, as shown in Charts 9a and 9b. The notable increase in the number of "compromised account" incidents is the result of cyber attacks detected by the latest deployment of SIEM by ITS. ITS also plans to deploy a 2-Factor Authentication Solution next year to strengthen the protection of and access to HKU network resources.

*Chart 9a: Total Number of Computer Abuse Cases (2014-15)*
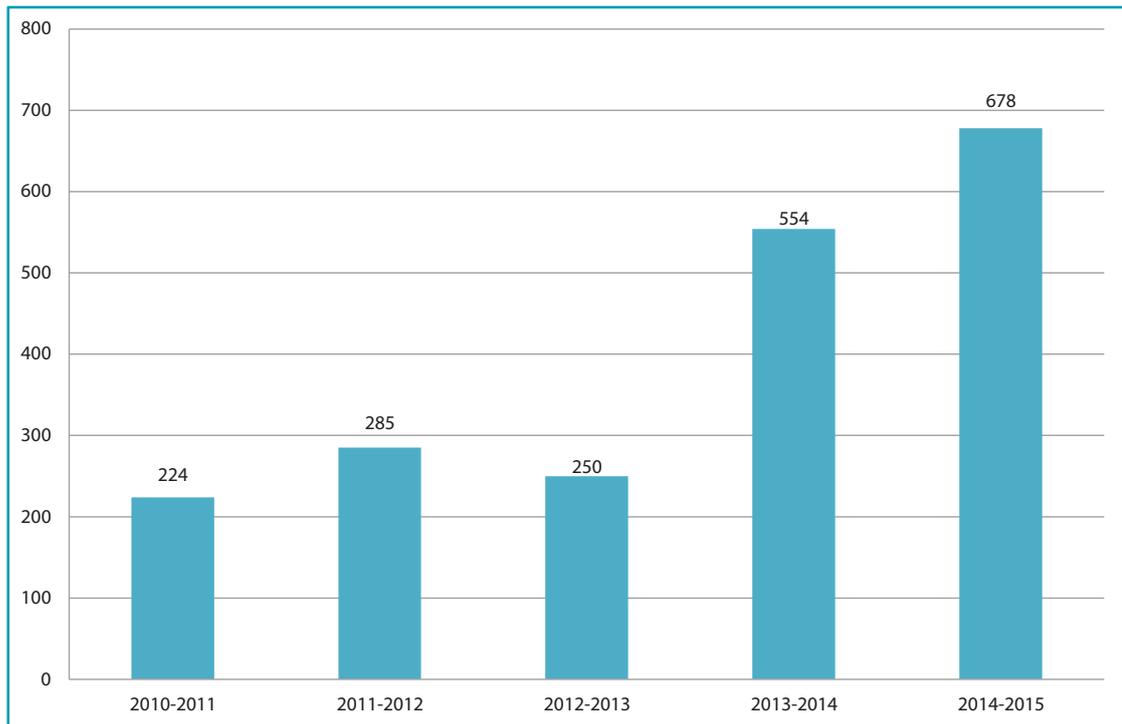


*Chart 9b: Computer Abuse Cases by Type (2014-15)*



- Account Compromised
- Suspected Hacking
- Excessive Bandwidth and Improper Network Settings
- Email Spamming and Fake Email
- Port Scanning
- Virus
- Copyright Infringement
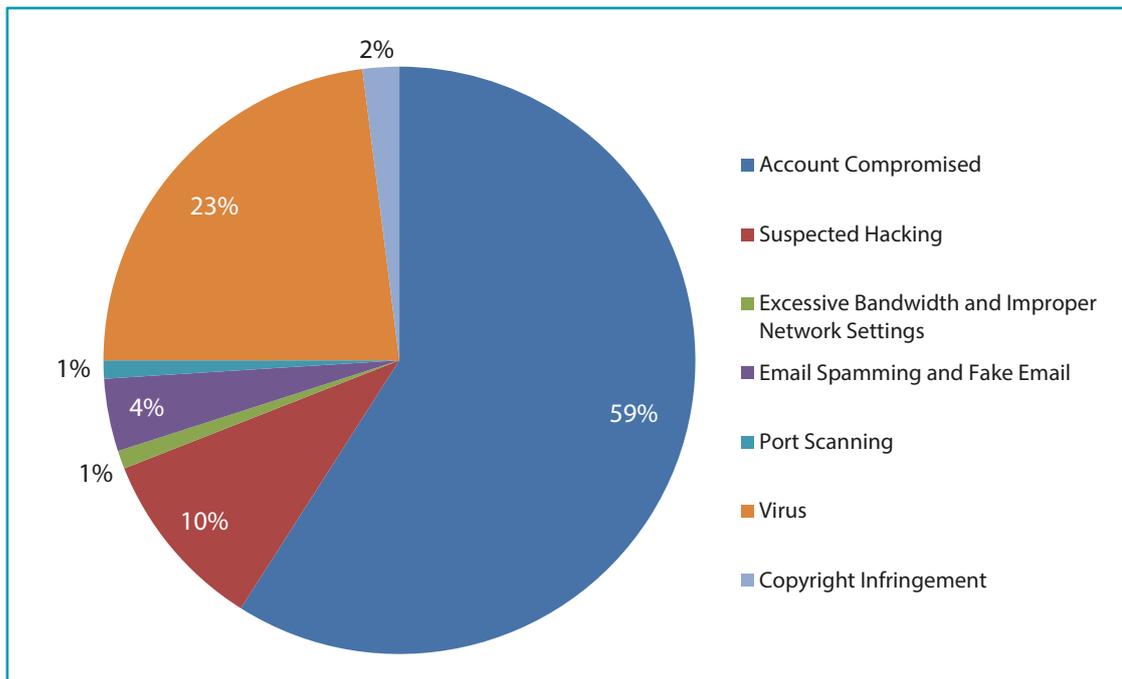
# 6 Enabling IT Platform (Underlying Infrastructure)

### 6.4.4 JUCC Collaboration

As a member of the JUCC ISTF, ITS actively participates in JUCC ISTF meetings, which are held on a bimonthly basis. These meetings allow JUCC members to share ideas and experiences of institutional information security management practices, technical knowledge and incident handling. In 2014-15, the ISTF engaged an external consultant, Thales Transport & Security (Hong Kong) Ltd, to develop a series of information security newsletters for general users and experienced technical users. These newsletters are published on the HKU ITS website.

### 6.4.5 Others

Microsoft ended its support for Windows Server 2003 on 14 July 2015. In December 2014, ITS sought support from HKUS departments to replace/upgrade Windows before that date. This forward planning was designed to mitigate the risks of hackers leveraging Windows Server 2003 security vulnerabilities. ITS will review the campus network and make spot checks to identify any Windows Servers 2003 that are still connected to the network and notify the corresponding departments to ensure follow-up action.

### 6.5 Managing IT Operations

In 2014-15, ITS launched several initiatives designed to enhance IT operations across the University.

### 6.5.1 Relocation of the Operation Control Centre

The Operation Control Centre (OCC) was relocated from the main data centre in Room 108, Run Run Shaw Building to 1/F Library Building (Old Wing) in December 2014. The OCC is currently residing in office space, but ITS is working to equip a dedicated room with enhanced security and monitoring facilities for its operations. The space vacated by the OCC in the main data centre will be revamped and equipped with greater server hosting capacity to cope with IT growth.

### 6.5.2 Computer Batch Job Automation

The Operations Team handles many computer batch jobs daily. These include such routine tasks as backups, scheduled server reboots and other system housekeeping jobs. A pilot project to automate 50 backup jobs based on the IBM Smart Workload tool was completed in February 2015. A project review report was completed in July 2015, and we will be working with other teams to find opportunities to make use of the tool for business process improvements.

### 6.5.3 Data Centre Strategy Study

ITS's main data centre in the Run Run Shaw Building has been in operation for more than 30 years, and is thus ageing and substandard. A recommendation paper was submitted to the HKU SMT in July 2014 outlining a number of options for consideration. Following on from this recommendation paper, a Task Force was formed with members from ITS, the Estates office, the Faculty of Architecture, the Faculty of Engineering and an advisor from the IT industry to further explore the available options. The Task Force completed its study and submitted a paper to the SMT in April 2015 recommending the construction of a new data centre on the Main Campus.

# 7
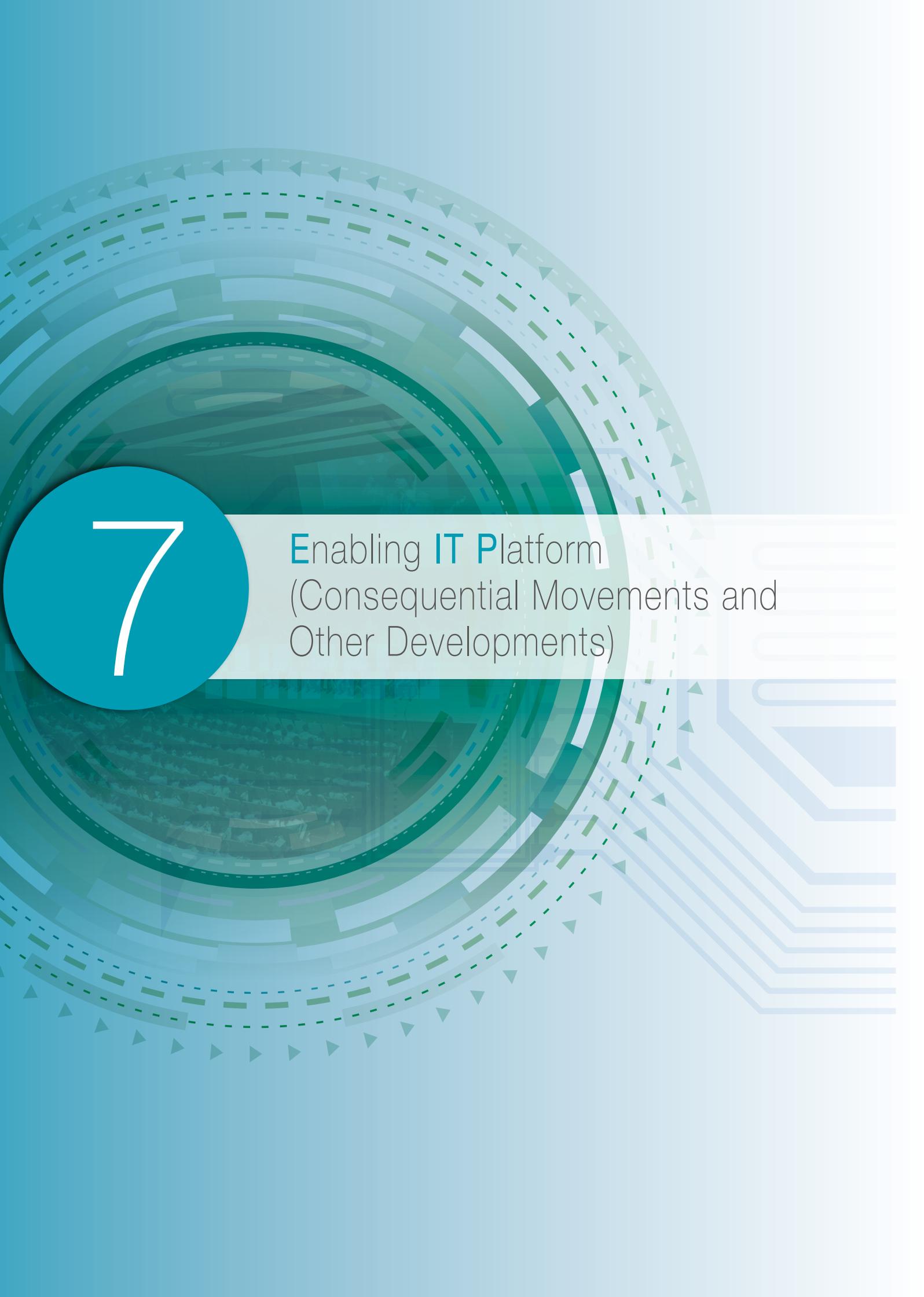
Enabling **IT P**latform
(Consequential Movements and
Other Developments)

# 7 Enabling IT Platform (Consequential Movements and Other Developments)

## 7.1 Consequential Movements Project

The Consequential Movements Project is a multi-year project to realign the accommodation of faculties, departments, offices and administrative units following the opening of the Centennial Campus. During 2014-15, ITS supported the project through IT service provision to the Meng Wah Complex, Eliot Hall and May Hall.

## 7.2 New Children Hospital

ITS has joined the HKU Working Team to work with the Hospital Authority, IT Team of the Faculty of Medicine and CUHK to plan the research network and associated IT facilities for a new children's hospital expected to commence operations in the third quarter of 2017.

## 7.3. Chong Yuet Ming Amenities Centre Auditorium Project

The IT infrastructure, including Wi-Fi services, was completed for the new auditorium and dressing rooms of the Chong Yuet Ming Amenities Centre in June 2015.

## 7.4 Queen Mary Hospital Redevelopment

ITS is working closely with a team from Queen Mary Hospital team on a project to convert its Senior Staff Quarters into offices and other clinical facilities by 2016. Technical specifications on structured cabling and network and Wi-Fi services are currently under preparation for submission to the Procurement Team of Queen Mary Hospital for the tendering process. Discussions are also underway on the HKU IT requirements for a new hospital block to be opened in 2018.

# 8

# Enabling IT Platform (Unified Communications)

# 8 Enabling IT Platform
(Unified Communications)

Unified communications constitute a key development area for ITS. Unified communications refer to the collaboration of different modes of communication in various media formats, such as AV and text messaging in real and non-real time. The Unified Communications Team is responsible for:

1) running the HKU voice network;
2) acquiring a unified communications platform to gradually replace the old analogue phone system; and
3) integrating voice, video and mobile communication, call centre services and meeting services into a single communication platform for a unified communication experience.

## 8.1 Instant Messaging Service
In February 2011, ITS launched a pilot service based on Microsoft Office Communication Server 2007 R2, which allows users to send instant messages, conduct audio and video conferences, set up virtual meeting rooms and share one another's desktops from their PCs. The service currently has 250 users, and will be replaced by Skype for Business 2015, which makes use of the Microsoft Office 365 cloud service, by October 2015. Pilot tests are now being conducted among ITS staff and invited users from various departments.

## 8.2 Short Messaging Service (SMS)
ITS launched SMS as a subscription service from an external service provider in June 2011 for use by the University's administrative departments. The FEO uses SMS to send notifications to students regarding the payment of tuition fees and other fees, and the Centre for the Enhancement of Teaching and Learning uses it to send survey invitations to graduates. An automated system for sending SMS messages in cases of emergency is now under development and will be rolled out to authorised administrative departments throughout 2015. More than 92,000 SMS messages were sent in 2014-15.

## 8.3 Phone System
ITS took over the HKU PABX systems from the Estates Office in September 2011, and is now actively deploying IP phones in all new offices. HKU currently houses 4,300 analogue lines, 210 digital lines and 4,400 IP telephony lines.

The HKU central IP telephony system is powered by a Cisco CUCM IP PBX system that provides a state-of-the-art communication platform. Advanced IP phone features such as audio and video conferencing, softphones on PCs and Macs and simultaneous ringing are provided. The system is built with high-availability and disaster recovery mechanisms in place across two data centres, one located on the Centennial Campus and the other on the Main Campus, allowing a telephone service to be maintained in case one centre is disabled in a disaster.

IP phones have been deployed in new offices across the University, including those on the Centennial Campus, those created as part of the Consequential Movements Project, the LKS Faculty of Medicine Building, Lung Wah Street Student Residences, Graduate House, Simon KY Lee Hall and Swire Hall.

To ensure public telephone network connectivity, the University has subscribed to 24 IDAP lines from Hutchison Global Communications, 20 on the Main Campus and four in the Faculty of Medicine Building, meaning that 552 simultaneous conversations with external parties can be supported. In addition, 12,000 telephone numbers with the prefixes '3917', '39102' and '39103' have been assigned to the University, which should allow ITS to standardise all University telephone numbers.

# 8 Enabling IT Platform (Unified Communications)

## 8.4 HKU Connect Email Service (email outsourcing)

The HKU Connect email service for students and graduates, a service provided by Google, was rolled out in 2011. Since then, all new student and graduate accounts have been created on this outsourced email platform. In addition, by June 2015, all current students with email accounts on one of the in-house email systems had been relocated to HKU Connect. Originally, each HKU Connect user enjoyed a storage quota of 30 GB. Starting from November 2014, Google raised the storage quota for all HKU Connect users, who now enjoy unlimited space for the storage of emails and files.

As of June 2015, there were 53,669 accounts with total storage of 105.3 TB on HKU Connect. There were significant increases in the number of HKU Connect user accounts and the amount of storage space used in 2014-15. The number of accounts grew by 34%, whilst the amount of storage space used grew by 9.4 times. This growth in storage space usage is mainly attributable to the growth in the number of users and stored files. The number of files stored in HKU Connect has grown by more than 8 times since June 2014, rising from 1,165,680 files to 9,396,223 files in June 2015.

## 8.5 High-definition multi-party Conferencing and Web Conferencing System

A new high-definition, multi-party video-conferencing system was rolled out in January 2014. The system allows up to seven meetings at full high definition (1080 p), 15 at high definition (720 p, 30 fps) or 60 at standard definition (360 p). Users can join a meeting from room-based video-conferencing end points, PCs, Macs, iOS or Android devices, or ordinary telephone. The system also supports recordings and webcasting to up to 600 viewers simultaneously.

ITS also makes use of the Adobe Connect web-conferencing system to provide a high-capacity web conferencing service as a complementary solution at a lower video quality. This system supports up to 100 participants in a single meeting, and participants can join using a PC, Mac, or iOS or Android device.

Nineteen departments are currently making use of the high-definition, multi-party conferencing system to host meetings, and 80 departments are using the Adobe Connect system to host a variety of functions, including meetings, interviews and group discussions. In 2014-15, 337 meetings were held on the high-definition, multi-party conferencing system, and 133 on Adobe Connect.

# 9
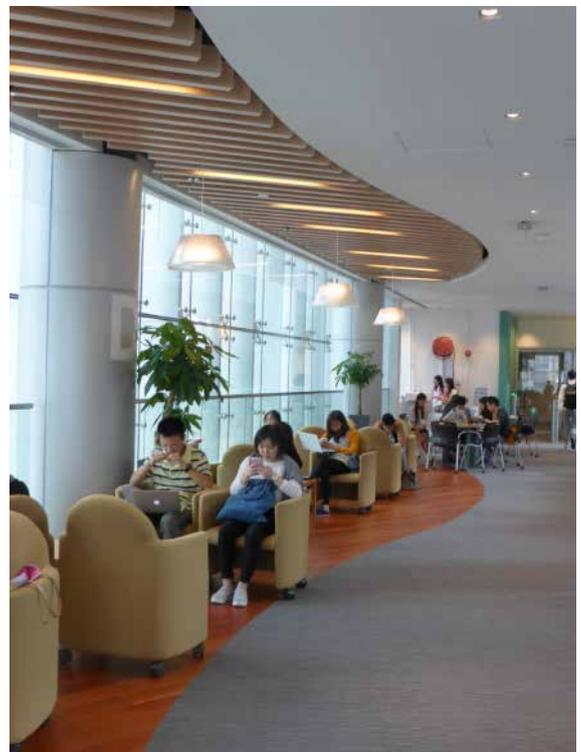
## Enabling IT Platform
## (Service and Process Improvement)

# 9 Enabling IT Platform (Service and Process Improvement)

## 9.1 IT Service Management Tools

ITS continues to run such ITIL processes as Service Desk, Incident Management and Problem Management, primarily in support of Service Operation.

The ITIL Configuration Management module implemented thus far facilitates change discovery, auditing and dependency tracking. There is still a lot of work ahead to smooth management and quality control of the overall Configuration Management Database (CMDB). Another challenge is to make greater use of the CMDB in the change management process. We are currently working with the vendor to identify key information from the CMDB to simplify our configuration management process and work with support teams to build more coherent relationships between configuration items (e.g. servers) and key system modules.

## 9.2 Quality Management

In the first quarter of 2014, ITS established a Quality Management System (QMS) that can be expressed as the organisational structure, policies, management practices, standards and resources needed to implement quality management. The primary objective of establishing the QMS was to ensure a high level of quality in all products and services offered by ITS to the user community. More specifically, the QMS provides a basis for:

(a) the formulation of ITS policies, rules and guidelines;
(b) development and adoption of management practices; and
(c) establishment and enforcement of ITS standards.

The ITS QMS is being enforced by a new Quality Management Committee (QMC) chaired by the Director of ITS. The QMC meets once a month with the following terms of reference.

(a) To guide and oversee implementation of the ITS QMS.
(b) To endorse policies/rules/guidelines, management practices and ITS standards for adoption.
(c) To receive a QMS status report submitted by the Quality Management Team (QMT) leader.

Documentation is central to achieving ITS's quality objectives. Documents concerning polices/rules/guidelines, management practices and standards are collectively referred to as ITS Quality Management Documentation. A growing set of document templates is available to assist staff in drafting these documents. In 2014-15, more than 40 new quality management-related documents were produced.

Under the leadership of the Deputy Director, the QMT has taken up responsibility for driving the ITS quality journey. Following the establishment of ITS PMM and QMS, greater quality awareness has been achieved in the past year, with increased emphasis on standardisation with a view to achieving good work quality and customer satisfaction.

## 9.3 User Services

ITS continues to run all Service Desk-related services and organise training courses to help staff and students to use the University's central IT services.

# 9 Enabling IT Platform (Service and Process Improvement)

### 9.3.1 Service Desk

The Service Desk offers professional advice and assistance to staff and students who have general problems when using central IT services. In addition to frontline support officers, second-line support teams are also in place to support enquiries requiring follow-up and investigation. Users can obtain assistance by visiting the Service Desk in person on Level 1 of the CWLC, calling 3917 0123, using live chat or sending an email to ithelp@hku.hk.

In the reporting year, 14,556 enquires were handled. The distribution of enquires over the year is shown in Chart 10.

*Chart10: Service Desk Enquiries by Month (July 2014-June 2015)*
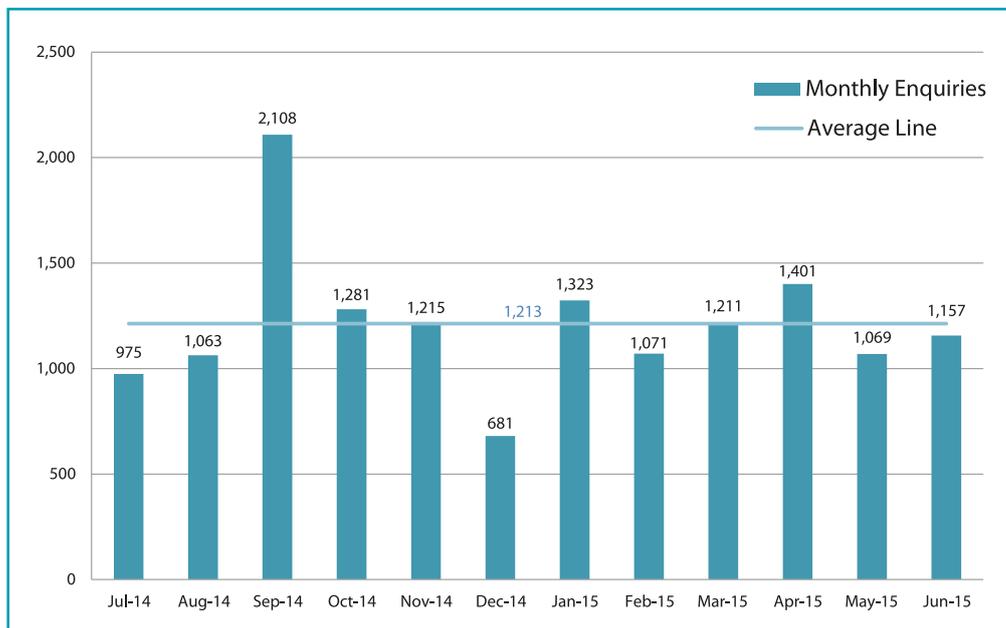


*Table 5: Most Frequent Categories of Service Desk Enquiries (July 2014-June 2015)*

| Category | Count | % of total |
|---|---|---|
| **Teaching and learning** (eLearning, PC Laboratories, classroom Centennial Campus services, classroom IT services and the Learning Commons) | 4,582 | 31% |
| **Account management services** (account maintenance/ applications and account passwords) | 3,256 | 22% |
| **Communication Services** (email and bulk mail services) | 2,128 | 15% |
| **Network Services** (WiFi, VPN and LAN) | 1,552 | 11% |
| **Miscellaneous** (Microsoft Student Advantage, Library information, etc.) | 797 | 5% |

# 9 Enabling IT Platform (Service and Process Improvement)

The Service Desk strives to offer a responsive service in addressing user enquiries. Performance figures in terms of response time and resolution time in handling enquiries over the past two years are tabulated below for reference and comparison. It can be seen that we met our performance targets in 2014-15 by resolving enquiries within three working days and that the average response and resolution times were well within our service pledge of 30 minutes for critical events.

**Comparison of Resolution Time of Incidents Resolved by ITS in 2013-14 and 2014-15:**

| Resolution Time | July 2013- June 2014 (Total no. of cases: 11,503) | July 2014- June 2015 (Total no. of cases:14,556) |
|---|---|---|
| Within 1 day | 99.37% | 99.59% |
| Within 2 days | 99.83% | 99.93% |
| Within 3 days | 99.87% | 99.95% |

**Comparison of Average Response Time and Resolution Time of Incidents Resolved by ITS in 2013-14 and 2014-15**

| Average Time Spent | July 2013- June 2014 | July 2014-June 2015 |
|---|---|---|
| Average Response Time | 14 mins | 15 mins |
| Average Resolution Time | 21 mins | 21 mins |

The enquiries received by the Service Desk are regularly reviewed by the User Services Team, support teams and ITS SMT to identify areas for improvement and formulate action plans to address frequently asked questions. The web pages on FAQ are also regularly updated to give users handy self-help information when they encounter problems using any of our services.

### 9.3.2 User Training

ITS organised regular computer training courses and workshops for students and staff throughout the year on the use of the facilities and services it provides. At the start of the academic year, orientation seminars and workshops were held for new University members to familiarise them with the central IT services. In 2014-15, 105 training courses, workshops and seminars were attended by 1,842 participants.

# 10 Other Services

# 10 Other Services

## 10.1 Community Services

### 10.1.1 Joint University Programmes Admissions System (JUPAS) Online Application System

ITS has supported the JUPAS Online Application System on a cost-recovery basis since 2002. The JUPAS system was redesigned with new architecture and functionalities in 2011 in line with the curriculum reform. Since 2011-12, it has needed to support only Hong Kong Diploma of Secondary Education (HKDSE) applicants. In 2014-15, there were 63,293 HKDSE applicant accounts, and the system supported 5,550 school accounts and 605 institutional accounts.

## 10.2 Services for Departmental Users

### 10.2.1 Computer Equipment Maintenance Service

This year, ITS focused on providing a hardware and equipment maintenance service for common network equipment, including that used in the campus buildings and student halls of residence.

### 10.2.2 PC and LAN File Server Support for Departments

ITS continues to manage two LAN file servers for file sharing by the academic departments on the Main Campus, Medical Campuses and Prince Philip Dental Hospital Campus. In view of the ageing hardware and platform, an upgrade of the LAN file servers is being planned to consolidate the service with our cloud infrastructure.

We are also helping the Registry to maintain a departmental LAN file server and an email server. During 2014-15, we also provided regular technical assistance to many departments, helping them to resolve PC problems related to hardware and software installation, carrying out system troubleshooting and removing computer viruses on a cost-recovery basis.

# 11

## Staff Matters

# 11 Staff Matters

## 11.1 Staff Management

ITS is committed to HKU's strategic direction and to the advancement of IT both locally and globally. Given the important roles played by its HPC, Security & Quality, IT Infrastructure, Learning & User Services and Administrative Applications Sections, ITS currently employs 176 staff members.

## 11.2 Staff Awards

ITS regularly recognises the efforts of its staff, who are seen as the key drivers of successful developments within the department. Appreciation for the great work done by all ITS teams is shown through the presentation of Best Project Awards. This year, the following Best Project Awards were given.

| | |
|---|---|
| **Best Project Award** | Resource Management Suite (RMS) Implementation Project, LES Team |
| **1st Runner-Up** | Enhancement to High Throughput Computing Service, HPC Team |
| **2nd Runner-Up** | PABX Replacement at Faculty of Medicine Building, UC Team |

## 11.3 ITS Senior Management

ITS is managed under the collective leadership of the ITS SMT. Chaired by the Director of ITS, the team comprises the Deputy Director of ITS, Associate IT Director (Administrative Applications), Associate IT Director (Learning and User Services) and Associate IT Director (IT Infrastructure). The SMT holds regular meetings to review issues and to formulate policies and recommendations for IT services across the University.
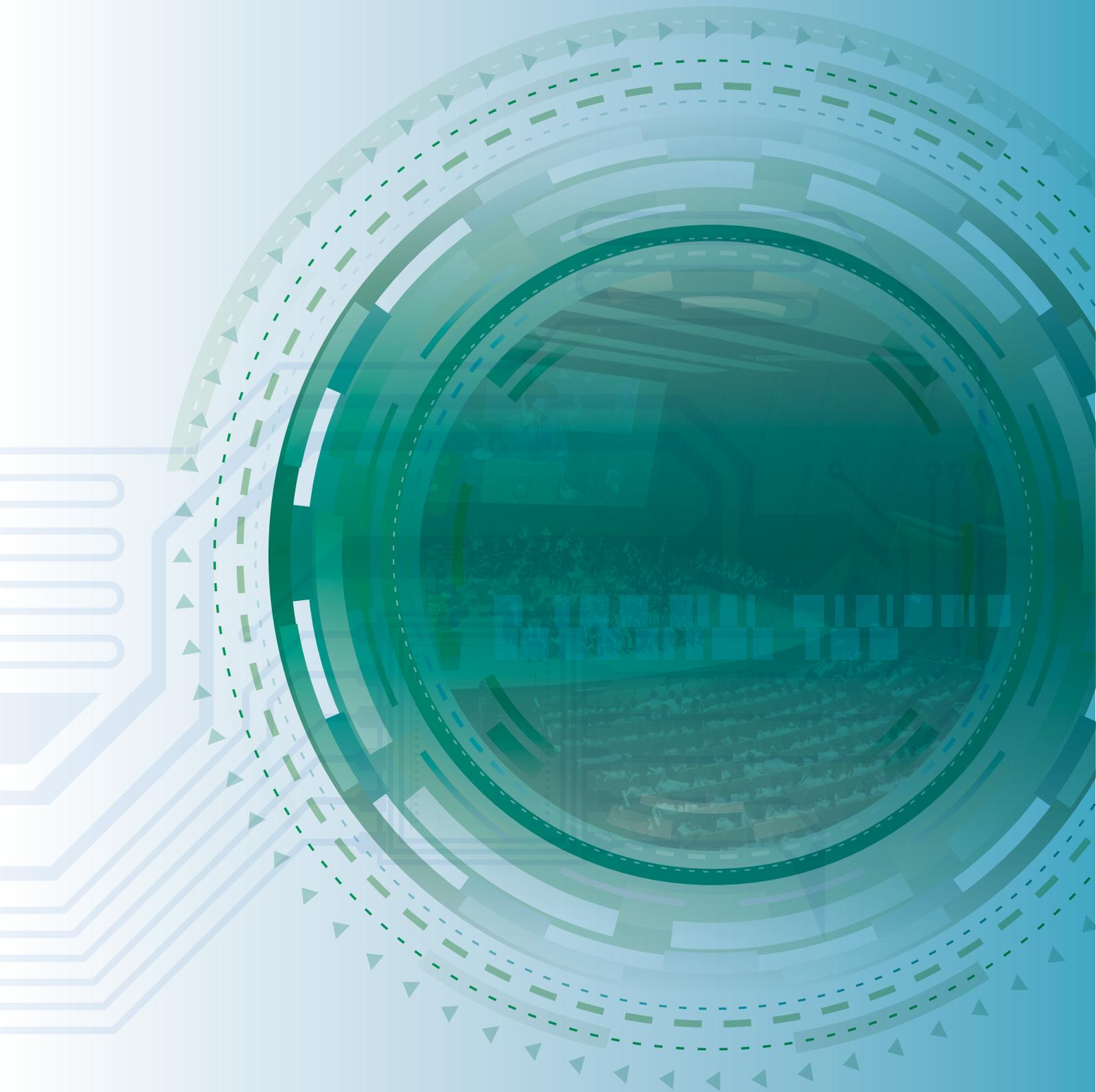
Prepared by :

P.T. Ho
Director of IT Services

December 2015