



INFORMATION SYSTEMS STRATEGY

2006-2010

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Foreword



Bournemouth University is entering a new era of investment in staff and facilities and is reorganising to ensure that we maintain our traditional focus on academic excellence.

We recognise the need for high quality information technology and information systems to support our academic ambitions.

Operationally the University is increasingly dependent on robust, reliable and secure information systems and associated infrastructure for both staff and students.

The Information Systems Strategy is a key document underpinning the University's strategic plan. In particular, the Strategy seeks to develop, deliver and support information systems and to provide information technology that makes the University a better and more attractive place to work and study.

Professor Paul Curran

Vice-Chancellor, Bournemouth University

1 Introduction

1.1 Background

Information technology has become a necessary component in any organisation with increasing strategic significance.

The objective of this document is to outline a strategy which allows implementation of the technological implications of the University's overall strategy as well as subsidiary strategies such as the Marketing Strategy, Learning & Teaching Strategy (incorporating e-learning), Research & Enterprise strategy and Estates Strategy.

Other drivers and contributors to the information systems strategy are risk and business continuity management as well as statutory and legislative requirements.

The modern IT service needs to be both proactive and reactive and its emphasis changes from being merely an enabler of services to also being a driver of change.

The demand for various approaches to learning & teaching, improved access for staff and student computing and internationalisation requires a technical and network infrastructure, which allows the University to be an attractive and competitive place to work and study.

Distance learning, Virtual Learning environments, new media technologies and wireless computing are just a few examples and current developments for which the University needs to be ready and equipped in the next few years. Although the University is currently well placed in its technology provision, significant investment is required in order to remain competitive and meet future demands. Business continuity is a key aspect as 99.5% of system availability is no longer acceptable with increased reliance on information technology in learning & teaching.

The strategy, which is aimed at the next 5 years, needs to be revised annually to take into account the changes in requirements from the business perspective and changes in technology developments.

1.2 Context for IT Service Delivery

The IT Service encompasses all activity which uses information technology in order to deliver a service or provides or processes information and includes support and provision of:

- Staff desktop computing
- Open Access Centres and student computing
- Computer laboratories
- Media & IT equipment for lecture and conference facilities
- Voice and data network infrastructure
- Technical infrastructure
- E-mail, file and print management
- University student accommodation infrastructure
- Corporate and business applications

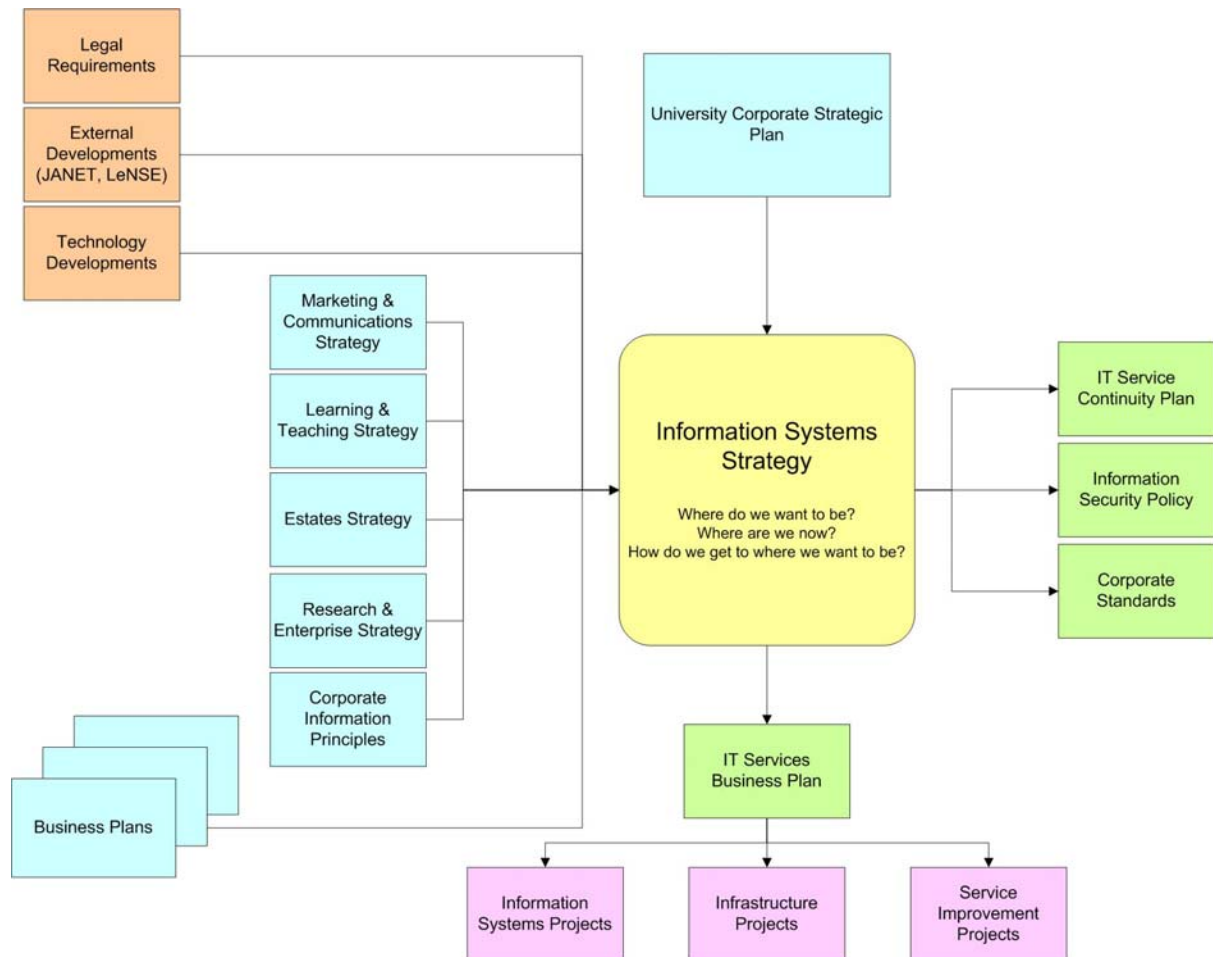
- Web technology and document management

1.3 Method and Approach

The strategy is service driven (rather than technology driven) and is structured to address the following 3 questions:

- Where do we need to be?
- Where are we now?
- How do we get to where we need to be?

The diagram below highlights the main inputs and outputs of the Information Systems Strategy.



2 IT Governance

2.1 Strategic IT Governance

The University recently established an Information Systems Strategy Group, which consists of Senior Managers representing the University's strategic objectives.

Permanent membership comprises a core body of senior managers using and providing information systems:

- Pro-Vice Chancellor (Corporate Development & Finance) (Chair)
- 1 Head of School
- University Registrar
- Head of IT Services
- Information Systems Group Manager (Secretary)

Other members may be co-opted for specific purposes.

The remit of the group is as follows:

- To develop and review the information systems strategy;
- To monitor, and report to University Management team (UMT) on implementation of the strategy;
- To ensure an appropriate framework for monitoring the quality and security of information systems;
- To advise on priorities for information systems development and implementation.

2.2 Operational IT Management

The IT Management Team (ITMT) meets regularly to endorse projects, processes, policies, standards, operational decisions and oversee the day-to-day management of all IT Service provision. It consists of the Head of IT Services and the 3 Senior Managers (IT Infrastructure, Information Systems and ICT Support)

The majority of IT Services are provided in-house, with following services being outsourced/procured:

- Desktop installation
- Hardware maintenance
- Cabling
- Large-scale software development (the University does not engage in large scale in-house software development, applications are usually procured from 3rd party suppliers following appropriate tender exercises)

ITIL (IT infrastructure Library), the general recognised standard for best practice IT Service Management is being introduced within IT Services.

2.3 Interfaces between Schools/Professional Services and IT Services

In addition to the day-to-day relationships with service users for managing change, incidents and general IT support, IT User/provider liaison should exist at various levels.

Level	Provider	User	Type
SMT/UEG	Head of IT Service	Head of School/Professional Service	All
Strategic	Information Systems Group Manager	User systems Manager	Business Applications
	ICT Support Group Manager	Section Managers	IT Support related
Tactic	Customer Services Manager	ICT Co-ordinators	IT Support related
	Applications Development Manager	User systems administrator/manager	Business Applications
Operational	IT Service Desk	All	Any IT support or work requests

2.4 IT Project Management

IT related projects are being managed based on PRINCE 2 methodology, which is adapted to meet the need and size of the project.

A Project initiation and prioritisation process is being implemented. This process outlines the process from needs identification through to Project commencement. It describes the roles and responsibilities of the project originator, the project office, the information systems strategy group and the allocated project manager in order to ensure potential projects are being prioritised, communicated and planned appropriately before being initiated.

The process includes templates such as terms of reference and project initiation document (including project plan) as key deliverables.

An IT project register is maintained by the project office, which provides a central register of all IT projects and acts as library for all associated project documentation.

There are currently no dedicated roles for IT project management, in particular for business IT projects, where projects are often managed by academics or managers who have little or no IT project management experience and at the same time often continue to carry out their original duties.

This strategy recommends the creation of dedicated professional IT Project Management roles, which reside within IT Services and have the capacity and ability to drive and deliver IT projects following agreed project management processes, in effective co-ordination with the relevant business areas.

2.5 IT Service Continuity & Information Security

IT service continuity planning is a key aspect of this strategy document and is being addressed within the Infrastructure development programme (section 5.2).

Development and Implementation of an information security policy to an international standard (BS 7799, ISO 17999) is required of any medium to large organisation and aids various purposes, such as:

- Improves business continuity due to implementation of required standards
- Improves effective partnership working, which is a necessary required for Bournemouth University in achieving network connections with partner institutions and NHS, which has one of the strictest codes of connection.
- To comply with legal frameworks such as Data Protection Act and Computer Misuse Act.

Bournemouth University currently does have an Information security policy, which will be updated during 2005/06.

3 Where do we need to be?

3.1 Vision for 5 years to come

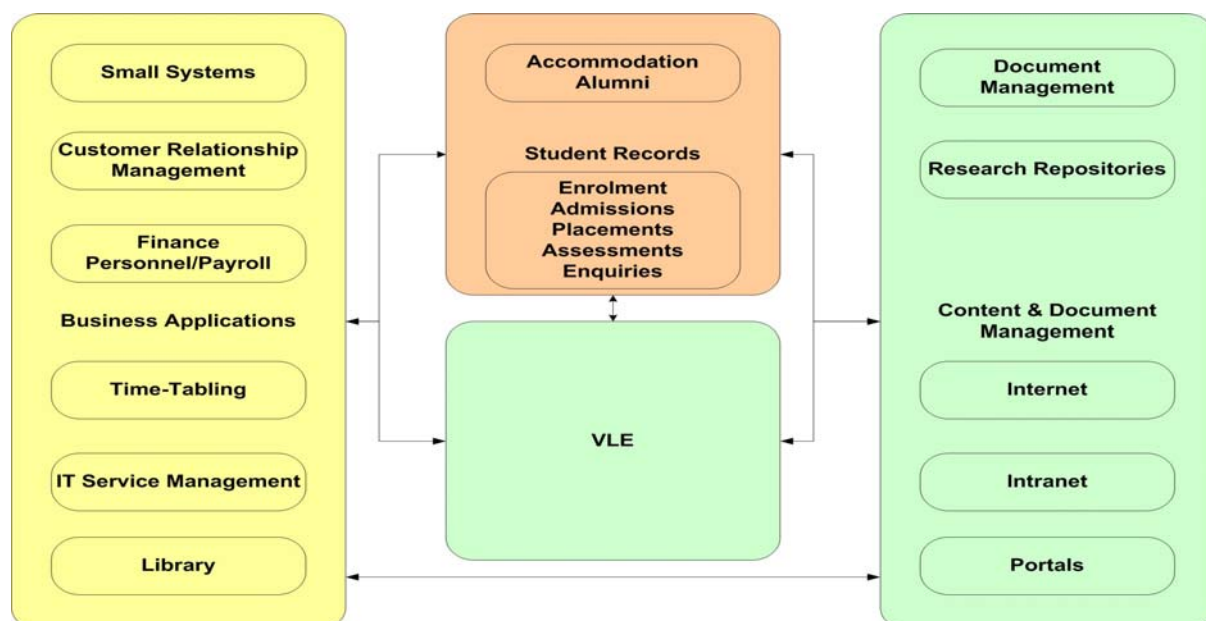
Ultimately the Vision of the Information Systems Strategy is to support the University's strategic plan and in particular to develop, deliver and support information systems and to provide information technology that makes the University a better and more attractive place to work and study and improves the learning and teaching experience.

This can be broken down into 4 main points.

- Information Systems which meet the academic and administrative demands and requirements of the University both in terms of functionality and business benefits in improving effectiveness and efficiency and in delivery of learning and teaching as well as research and enterprise.
- A network and technical infrastructure which has the capacity to support the increasing demand for network bandwidth, database activity and file and document management providing security, resilience and business continuity.
- A teaching, desktop, mobile working and remote access infrastructure, making use of technological developments to optimise access to information systems to meet a variety of staff and student requirements.
- An IT Service, which understands business and academic requirements providing an effective and efficient support service for staff, students, the learning & teaching environment and research & enterprise activities to a high level of customer satisfaction.

3.2 Applications Portfolio required

The picture below provides a graphical view of key applications/environments.



3.2.1 Content, Document Management & Web Services

3.2.1.1 Internet & Intranet web presence

Bournemouth University requires a strategy on how and where information is published taking into account requirements for staff, prospective and current students, researchers and requirements for knowledge transfer.

A planned and co-ordinated technical delivery and support for the revised web presence, including accessibility strategy to convert sites to comply with accessibility guidelines is required.

3.2.1.2 On-line payments

A generic payment service that School/Support Service web developers can link in to collect web payments for one-off events such as conferences, summer schools, ISOP, etc

3.2.1.3 Document Management

The University needs to have a structured approach for document management. This includes searchable, metadata tagged and version controlled documents, linked and integrated with matching curricula in Unit-e where appropriate.

The University needs to have a repository for research produced.

3.2.2 Virtual Learning Environment

A Virtual Learning Environment (VLE) is a fundamental requirement of any higher education institution. The recently procured corporate VLE will provide an opportunity to change the way the University will interact with its students and delivers learning & teaching.

To ensure minimum duplication and maximum efficiency an effective VLE needs a uniform underlying system with co-ordinated integration as appropriate with other systems such as student records, assessments and student portal.

3.2.3 Corporate & Administrative Applications

3.2.3.1 Student Records and Tracking System

The Student Records and Tracking system is the main administrative application system supporting the learning and teaching process from initial enquiry through to graduation.

Following functionalities are required:

- Integration of with UCAS's new data exchange system & HESA new data model
- Enquiries (incl. web enquiry handling and authenticated direct application tracking)
- Admissions
- Clearing
- Placements
- Enrolments
- Assessment
- Fees/Invoicing
- Research
- Funds & bursaries
- Awards ceremony

- Alumni
- Student self administration and associated processes including integration with student portal.
- Management information

3.2.3.2 Business Applications

These can be categorised into 4 groups:

- a) Enterprise applications – systems typically associated with medium to large organisations
 - Financial system to deliver typical financial services such as payments, invoicing, ordering & budgeting and associated management information
 - Integrated personnel/payroll system with interface to Finance system
 - Facilities management
 - Customer Relationship Management system (for knowledge transfer and enterprise)
 - b) Education Institution specific business applications
 - Library system
 - Timetabling system at course and student level
 - Student accommodation management system
 - Full economic costing
 - c) Inventory and internal support handling applications
 - IT Service Management system (incident, asset and configuration management)
 - Estates Helpdesk
 - d) Other administrative systems
- Such as:
- Car Parking
 - Room booking
 - Nurse placements
 - Various other systems supporting administrative processes

3.3 Infrastructure required

3.3.1 Network Infrastructure

3.3.1.1 Telephony

All new buildings will exploit the use of IP Telephony (IPT) technology for telephone services.

New IPT handsets have an LCD display that should be exploited in the future to provide advanced services to the desk. Such services could include the ability to report IT or Estates faults direct to the relevant support service, Directory services with full integration into the switchboard systems, security management and access control systems and SMS texting from the desk to name just a few.

Due to the fact that the IPT system is far more advanced and flexible than the standard analogue system used by the majority of staff, a full migration from the MD110 to the IPT system should be

considered for the future. An integrated IPT solution throughout the University (including all existing buildings) would also negate the need for separate PC and telephony cabling systems and hardware.

Full integration of the OneBox messaging system with the exchange e-mail system could allow for voice mails to be sent by e-mail on arrival to users. A text to speech service is also possible using the existing system. In the future personal fax numbers could be provided, allowing for faxes to be e-mailed on arrival.

Developing systems and value added services to the desk is important to ensure the best value for money is received from the investment in the telephony systems. New ways of flexible working could be achieved which could enhance both the student and staff experience of the University.

By exploiting the power of the new telephony system, hot desking could be possible whereby staff 'log in' to their telephone allowing their extensions to follow them.

The use of IPT could also be exploited for Home workers. University telephone services could be provided via the Internet to Home workers.

3.3.1.2 Data Network

90 % of the access ports across the network will be subject to authentication in the future. Once authenticated the user account details will dictate the level of access the individual has to resources on the network.

Currently the University have Cisco URT deployed for the purposes of authentication and vlan allocation for staff only. Cisco has phased out support for URT in favour of the industry standard 802.1x. Cisco switched infrastructure equipment now only supports 802.1x for authentication. A migration towards 802.1x technology should be continued.

The University are planning to migrate all staff user accounts from the NT domain into LDAP directory services. The Cisco Secure ACS Server will be configured to utilise the NT Domain and LDAP for user authentication. Each staff user group will be mapped to a corresponding user group on the ACS to which the user vlan will be assigned. Upon authentication the mapped vlan will be allocated to the port on which the specific user is connected.

In the longer term the University should aim to enable authentication throughout the entire network including Resnet. However, the full integration of 802.1x services would only be possible once the existing 6 year old infrastructure is replaced with newer technology.

3.3.1.3 Income Generation – Bournemouth University Internet Services (BUIS)

The investment into IT Infrastructure should be utilised to further expand the current service to the private sector (mainly web and server hosting) to increase income and also to securely connect this service to the University network to provide a backup link to the internet for business continuity. This means that the commercial services could also be used to provide a resilient internet connection to the University in the event of failure of the LeNSE link.

3.3.1.4 IP Technology and building automation systems

Ethernet-based multi-function building automation systems are emerging that combine heating, ventilation and air conditioning (HVAC) with lighting and lift controls, and fire and safety with security and access controls. Soon these multi-function systems will converge into an IP building platform - just the same as voice, video and data converged into an IP communications platform. Ultimately, a single IP environment will exist for both user systems and building systems, and it need not be confined to a single building. Multiple properties can be linked together into a connected campus or estate portfolio,

enabling building control systems across all buildings to be monitored and controlled from a single centralised (and/or remote) location.

To reap the benefit of such systems, the IT Infrastructure must be considered early in the design phase of major refurbishment or new building construction. Enhancing the power of the network will create opportunities to

- reduce the lifecycle costs of a building
- reduce the capital costs of the building automation and management systems and network infrastructure
- attract staff, students and partners
- generate new revenue and service streams
- improve health, safety and security

These benefits can be achieved by connecting building automation systems to the IP network.

3.3.2 Technical Infrastructure

3.3.2.1 Server design

The development of new systems should be made in a more cohesive way with greater integration and communication with colleagues throughout IT Services and the University's wider community. A clearly defined process for specifying servers, building, commissioning and supporting them should be developed to ensure consistency in hardware platforms, operating systems and software.

A standard set of supported hardware and operating systems should be defined to ensure that support continues but also that in the event of failure hardware could be resourced far more easily to enable the restoration of services far more quickly.

Standard hardware and operating systems will allow for server rationalisation, which in turn will reduce support & maintenance cost as well as space and power consumption.

3.3.2.2 Resilience & IT Service Continuity

Purpose built machine rooms should be built at each campus with appropriate network connections to ensure stability and robustness.

A critical review of the current server structure should take place with a view to clearly defining those systems which are considered as critical to the University business. Once these have been defined, an appropriate model of resilience should then be implemented.

Whilst all systems are recoverable, given time and available replacement hardware, a more resilient system should be put in place in future to ensure full availability at all times, this is particularly important

3.3.2.3 Security, Authentication and Protection

Further security measures should be considered for the server infrastructure. A Cisco product called Network Access Control (NAC) and Cisco Security Agent (CSA) can be used to prevent any uncontrolled change to server systems that are deemed 'out of the ordinary'. This includes changes for example that a virus could cause.

The issue of controlling and maintaining server operating system patch levels needs reviewing. An effective solution to maintain patch levels automatically must be established.

The anti-virus solution currently in use at the University should be reviewed against its overall effectiveness in combating service affecting virus outbreaks.

There is a need for a patch management system to allow the tracking of patch installs and the ability to roll-back in case of conflicts.

3.3.3 Desktop Infrastructure (Staff)

Flexible and mobile working needs need to be considered when deploying computers to staff. Staff desktops need to be refreshed on a 4-year cycle, ideally centrally co-ordinated and funding to allow adequate resourcing and prioritisation.

The need for mobile computing and home working will increase and standard, secure, supportable solutions need to be implemented.

3.3.4 Desktop Infrastructure (Students)

The requirement for students to access University applications will continue to increase, in particular as a VLE will be implemented across the whole institution. This will require either more open access facilities at the University campus or some kind University sponsored student lap-top scheme.

3.3.5 Learning & Teaching Infrastructure

3.3.5.1 Computer laboratories

The need for computer laboratories is driven by the type of courses run, but with a school of design, computing and engineering and a media school with a strong focus on computer animation it is evident that lab computers will continue to represent a large percentage of computers within the University.

The specification and deployment needs to be co-ordinated effectively between schools and IT services in order to provide appropriate, yet manageable and timely implementation and support of lab PC's.

3.3.5.2 Lecture theatres and seminar/conference rooms

All lecture, seminar and conference rooms need to be fully equipped with a range of IT and multimedia devices. Deployment of standard equipment will reduce staff training needs as well as reduce support costs.

New technology developments in teaching delivery need to be investigated and if found suitable adequately resourced and implemented.

3.3.5.3 Audio-Visual Services

The University needs to:

- Improve quality of video conferencing facilities
- Implement an off-air recording system, in which staff and students should be able to request a TV or radio program by selecting from an intranet wide 7-day electronic programme guide or from a 48-hour rolling archive of previously recorded material.
- Develop a premier lecture theatre equipped with lighting, cameras and sound. This could also be used to achieve inter-campus conference ability, with the capacity to accommodate small-large meetings to Lectures.
- Continue to upgrade/replace media lending equipment stock to meet current and future demands.

3.4 Standards & Policies required

There are various standards, both national and international to which the University needs to aspire. Achievement of these standards (and possibly accreditation) will increase the profile of the University and its potential for partnering with external bodies.

This includes quality standards, such as Information Security (BS 7799, ISO 17999) and IT Service Management (BS 15000) as well as software development standards and configuration standards (as per Microsoft and Oracle, etc.)

Other important standards and policies required are about usage of systems, such as e-mail, internet, document management, web authoring and archiving.

3.5 IT skills required

3.5.1 Employees

The reliance and dependence on information technology and information systems will require an increased level of IT literacy amongst staff.

Standard competences are:

- Use of standard desktop applications
- Effective use of e-mail, file storage and calendar systems
- Basic understanding of the standard desktop operating systems for file and print management
- Use of browser software

Mandatory training should be provided where basic competences are not met.

3.5.2 Students

Due to similar desktop environments, the basic IT skills requirements for students do not differ significantly from staff. The introduction of the VLE will add to the potential training requirements.

4 Where are we now?

4.1 Current Applications Portfolio

4.1.1 Content, Document Management & Web Services

4.1.1.1 Internet & Intranet web presence

Currently Bournemouth University's only web presence is an outward facing Internet. There is no intranet, which means that both externally and internally relevant information is published on the World Wide Web. The University uses a product named 'Collage' as its web content management system.

There is a staff-portal, which is the default home page for all staff, but this is based on a Document Management system (Microsoft SharePoint) and on its own is not a suitable alternative to an Intranet.

Web-Content is co-ordinated centrally (via Marketing) with a significant number of editors across the University. Resourcing of web-editors differs greatly, which results in some schools being able to dedicate more time to web-editing than others.

4.1.1.2 On-line payments

Schools/Professional Services use non-secure email/web forms, or third parties (egg WorldPay) for one-off payments. There is no standard on-line payment system in place except for a pilot web payments service for accommodation deposits and rent.

4.1.1.3 Document Management

Microsoft SharePoint has been implemented as a document management system, but is currently used in a relatively limited capacity focusing on key documents and staff news. There are a number of ad-hoc repositories, but no universal document management and searching facility.

There is presently no integration with Unit-E (the student registry system) on document management and various paper based systems, except piloting integration of ADQ documentation.

The University currently has no institutional repository for publishing research produced.

4.1.2 Virtual Learning Environment

There are currently a variety of VLE's across the schools with basic information co-ordination, but no technical integration with user authentication and registry systems. The University has recently defined a single product (Blackboard) as the standard VLE and is planning to roll-out on a phased approach by 2007.

4.1.3 Corporate & Administrative Applications

4.1.3.1 Students Record System

Capita Unit-E has been implemented as the University's students record and tracking system. Its implementation has been a phased approach with following modules implemented:

- Curriculum
- Enrolments & Finance

- Admissions
- Assessments
- Placements
- HESA
- DLHE
- Specialist printing
- Management Information
- Enquiries
- SLC Interface
- Library Interface

4.1.3.2 Business Applications

There are approximately 40 centrally supported applications in operation, which include:

- Symmetry – Financials
- InfoSupport & HR Info - Personnel system
- CMG Bureau - Payroll system
- Facility - Timetabling system at course level
- Student accommodation management system
- Remedy - IT helpdesk system
- RACE - Full economic costing
- TALIS – Library system
- Car Parking (in-House)
- DLHE Web – on-line submission of DLHE returns (in-House)
- TMS/Assessrite – DSE Assessment (Health & Safety)
- Transparency
- E-Accommodations
- HEMIS Legacy systems
- QMP – on-line assessment tool
- Staff Portal
- Student Portal
- IntraMap

4.2 Current IT Infrastructure

4.2.1 Network Infrastructure

4.2.1.1 Summary

The Network infrastructure consists of:

- 35 communications rooms
- 300 + Cisco routers and switches and over 20000 network points
- Wireless coverage throughout the University using c.150 access points
- ResNet Services to 1500 rooms offering connection to the University network via 100 Megabyte links
- 155 Mbit connection to the internet
- VPN connectivity to partner institutions and home workers

- Ericsson MD110 PABX system providing c2500 analogue and digital extensions
- Cisco IP Telephony System capable of supporting c4000 users

4.2.1.2 Telephony

The majority of the University's telephony systems are based on the Ericsson MD110 telephone system. The 6 telephone switches located throughout the University provide both analogue and digital telephony services to the desk.

In 2005, the use of IP Telephony (IPT) systems was used for the first time at the University to provide more advanced telephony services to both staff and students. This technology, based on the Cisco range of call manager and IPT products provides telephone services across the existing data network negating the need to purchase additional MD110 telephone switches.

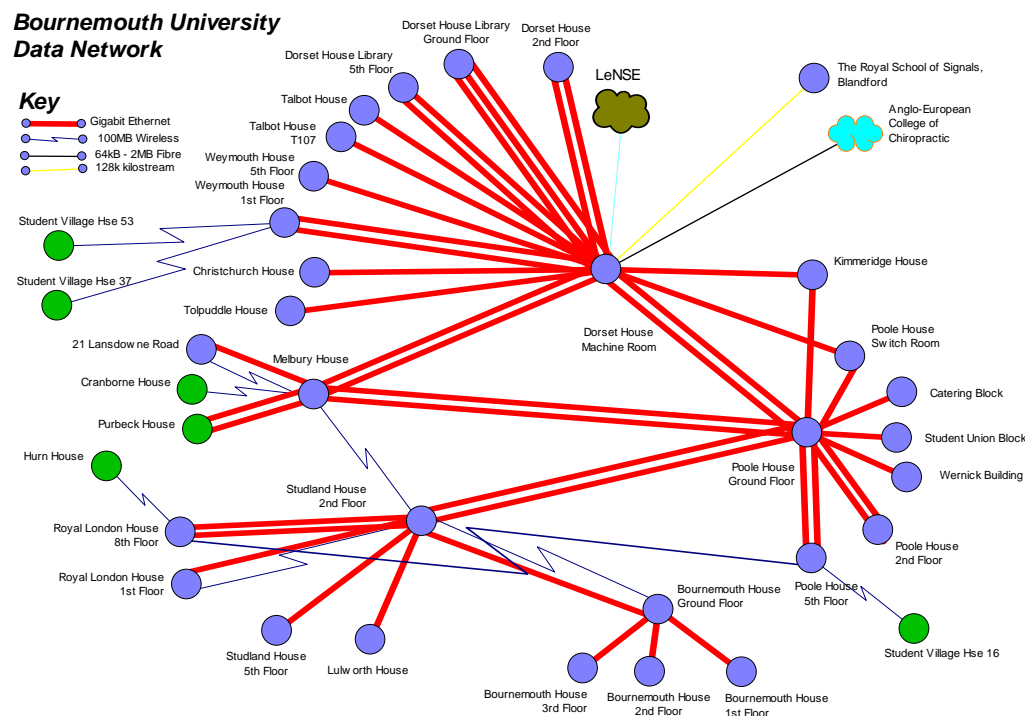
The University's voice mail system was upgraded in 2004. The OneBox messaging system can provide more than just voice mail services.

At the end of 2006, the University's move to a new DDI numbering scheme will be complete. All extensions in use at the University will be accessible from callers by dialling the same prefix 01202 96xxx or 6xxx internally. By exploiting the use of this, in conjunction with the new IPT system, 'important' extension numbers can now be used at any location within the University.

4.2.1.3 Data Network

The University's data network was installed in 1999/2000 and is entirely based on Cisco hardware. 10 or 100Mbps services are provided to all desktops and the University has an 11Mbps wireless network which provides coverage to around 80% of all the University's estate.

A schematic of the data network is shown below.



URT (User Registration Tool) is a Cisco proprietary product which is used to automatically move staff PCs onto the relevant network segment (secure or non-secure) based on the staff members username and password. This technology is now no longer supported by Cisco. Access to the rest of the

University's network either by blue sockets, white sockets or the wireless network is currently insecure and not authenticated.

4.2.1.4 Income Generation – Bournemouth University Internet Services (BUIS)

The University currently manages an internet web hosting service called BUIS (formally BUCC). The services are connected by completely autonomous internet systems and hardware. A review of this service has recently taken place. Future development should include the expansion of the current service to increase income and also to securely connect this service to the University network to provide a backup link to the internet for business continuity.

4.2.1.5 Resilience

Bearing in mind the growing use of IPT as a telephony service, all buildings relying on that technology for telephone services should have resilient network connections in the form of direct fibre connections 'backed-up' by secondary lower speed wireless point to point links. Network hardware is securely located in dedicated communications rooms protected physically through the use of appropriate security systems, and environmentally through the use of appropriate air conditioning equipment and UPS (uninterruptible power supplies).

A 100Mbs point to point link was installed between Poole House and Royal London House in 2005 to provide resilience against possible failure of the existing inter-campus fibre (provided by ntl).

4.2.2 Technical Infrastructure

4.2.2.1 Summary

The Technical infrastructure consists of:

- c200 servers running HP-UX, SunOS, Microsoft Windows and Linux operating systems
- c20,000 internal user accounts
- c40,000 e-mail accounts

4.2.2.2 Server design

The development of new systems has in the past been undertaken by at least two sections within IT Services and within schools themselves. Little or no communication existed during the development phase of these new systems and therefore a non-standard approach is followed with regards to specifying hardware and operating systems etc.

The implementation of various different hardware platforms and operating systems over the years means that support and maintenance by IT staff is proving challenging and more of an issue in respect of knowledge and time resources.

The University's e-mail system is currently made up of 8 separate servers each with their own role in delivering e-mails sent to and from the University.

Servers are currently located in one of two locations – Kimmeridge House machine room and Dorset House machine room (DG12). Neither room is really fit for purpose and the co-location of both rooms on the same campus provides for little or no resiliency.

4.2.2.3 Resilience & IT Service Continuity

Some 'resilience exists' with regards to Disaster Recovery planning. Central services are replicated onto 'passive' standby systems which can be brought into service at relatively short notice. However, this approach is generally piece-meal and wholly manual. Automated arrangements are in place for student records with extra resilience provided during clearing.

4.2.2.4 Security, Authentication and Protection

The anti-virus solution currently in use at the University is based on the McAfee suite of desktop products. Keeping desktops up to date with the latest DAT files (to ensure protection against the latest viruses) is difficult to manage as these updates can only be made when the desktop is switched on.

There are currently no authentication mechanisms in place for access to network resources. Anyone can access the University network using their own computers via student residences, blue top sockets and the wireless network without having to authenticate. Only when users try to access server resources are they challenged to provide a valid username and password. Static University PCs such as in student labs or casual computing areas do challenge users to provide valid usernames and passwords.

Server protection is based on a similar product though easier to manage due to the central location and number of servers.

Server patching currently has to be carried out during periods arranged ad-hoc with the University staff and out of normal operating hours. The increased number of servers means that this has extended to several nights/early mornings for the installation of one patch across the server infrastructure. Also there is only an informal patch management system in place.

4.2.3 Desktop Infrastructure (Staff)

4.2.3.1 Hardware

There are currently approx. 2000 staff computers in use by the University and approximately 200 printers.

Hardware (PC's and any peripherals) is procured centrally, but budgets are devolved with each school/professional service establishing its own annual capital programme for desktop replacements.

PC's are usually replaced within a 4 year cycle, although often older equipment is used due to a 'hand-down' approach of internal recycling.

There is a small amount of dedicated home-workers, the vast majority of staff computing is office based, with applications such as e-mail and shared drives being accessible via any computer connected to the internet.

4.2.3.2 Software

All computers are Windows based PC's (Windows XP professional as standard for new builds) with core applications (Including Microsoft Office 2002) delivered to desktop as part of the standard image.

Microsoft Outlook is the standard e-mail and calendar client software, Internet Explorer the default web browser.

As with hardware, software is procured centrally with software licensing controlled within IT services.

4.2.4 Desktop Infrastructure (Students)

Students can access BU systems via 5 different routes:

- a) Remote access from outside BU (e.g. home using home PC or anywhere in the world)
- b) Access within campus (using lap-tops) via 'blue-sockets' or wireless networks
- c) Access from University student accommodation
- d) Open Access Centres within BU campus (see 4.2.5)
- e) Social computing (thin-client terminals positioned at various locations throughout the University) designed mainly for web access.

Student computers used for accessing BU systems using options b) or c) are required to undergo a security check prior to connection in particular involving anti-virus software.

There are currently approximately 200 thin-client terminals within BU to be used for social computing.

There are 2 dedicated open access centres within Bournemouth University, which are accessible 24 hours, 7 days a week, which are located at Dorset House, Talbot Campus and Studland House, Lansdowne Campus. In addition there are open access facilities at the Library & Learning Centre and Bournemouth House Library. In total there are approximately 350 PC's available for student use in all open access centres.

4.2.5 Learning & Teaching Infrastructure

4.2.5.1 Computer laboratories

There are approximately 40 computer laboratories consisting of approximately 1500 computers within BU. These are primarily controlled by the various schools for delivery of learning & teaching.

The installation of hardware and software are the result of joint planning between the schools and IT services, with IT Services having responsibility for image development, deployment and support and schools responsibility for specification and specialist application support.

A large computer animation suite with specialist hardware exists within the Media school. This is supported by application specialists from within the Media school and the IT Services desktop support team supporting the Linux operating environment.

The Media school also operates a significant number of Apple Macs, which are supported entirely by the school.

4.2.5.2 Lecture theatres and seminar/conference rooms

There are approximately 130 rooms, which are fully equipped with a full range of media equipment for the delivery of learning & teaching and other forms of presentations.

IT/media equipment includes:

- PC
- Projector (usually ceiling mounted)
- DVD player
- VCR player
- External USB connectivity
- Ability to connect lap-tops and other portable devices

All projectors can be controlled via remote control, PC software and can be controlled centrally (all projectors are networked) to reduce the need for physical on-site support.

4.2.5.3 Audio – Visual services

The University currently provides:

- An off-air recording service to both staff and students using VCR and DVD recorders.
- Video Conferencing facilities, which are used by students for course work and job interviews; however the equipment has compatibility issues with external connections resulting in the

speed and quality reduced to the lowest common connection resulting in low quality. It is also used by external users on a full cost, bookable service facilitated by Media Services.

- A media equipment lending service to both staff and students

4.3 Current IT skills

4.3.1 Employees

There is wide range of IT literacy amongst BU employees. Although the general level of IT literacy is very good, approximately 50% of all support calls are directly attributable to lack of IT knowledge. This applies in particular to part-time lecturers who usually are not exposed to any formal IT training.

There is in-house provision of IT training due to delivery of IT workshops, however, attendance to these workshops is based on individual initiative rather than competency based assessment.

The need for IT literacy and training will be fundamental with the introduction of a University wide implementation of a Virtual Learning Environment (VLE).

4.3.2 Students

The general student IT literacy is at a generally high standard with most students entering the University with more than adequate IT skills.

However, there are number of students who have had no prior exposure to computers and are significantly disadvantaged in their learning.

There is currently no minimum IT literacy standard for students. Frequently IT support staff are being asked by students to provide help in using Microsoft Office applications, which puts pressure on resources, particularly during assignment hand-in times.

5 How do we get to where we need to be?

5.1 Application Portfolio Development Programme

5.1.1 Content, Document Management & Web services

5.1.1.1 Internet & Intranet web presence

- a) A web-redesign project is underway with an estimated completion of June 2006.
- b) Development of an Intranet for web content for internal information.
- c) Development of a Strategy, which identifies the University's approach of how Internet, Intranet, VLE, staff and student portals and document management link and interact seamlessly together.

5.1.1.2 On-line payments

Develop a generic web payment service, thus ensuring benefit from Barclaycard discounts
Document Management

5.1.1.3 Document Management

- a) Develop a corporate document management strategy
- b) Deliver searchable and integrated document management solution either using existing Microsoft Share Point solution or alternative product
- c) Implementation of Institutional repository

5.1.2 Virtual Learning Environment

- a) Implement VLE across all schools integrated with student records system and network authentication system
- b) Integrate student portal with VLE

5.1.3 Corporate & Administrative Applications

5.1.3.1 Student Records and Tracking System

Further develop Capita Unit-E as follows:

- a) Upgrade to updated desktop and server environment to support updated version
- b) Design and develop new partner college Unit-e delivery technology
- c) Integration of Unit-e with UCAS's new data exchange system and new HESA data model
- d) Enhanced and unified data processing covering a wider range of work streams, thus reducing data duplication and risks of independent databases
- e) Solutions for improved prospectus enquiries
- f) Student self administration
- g) Authenticated on-line enquiries and direct applications

5.1.3.2 Business Applications

Following applications development/implementation/replacement projects are required:

- a) IT Service Management system (incident, asset and configuration management)
- b) Integrated personnel/payroll system with interface to Finance system
- c) Financial system – upgrade to Blu Qube (short-term), possible replacement (long-term)
- d) Timetabling system at course and student level
- e) Student accommodation management system
- f) Student portal migration to standard technology
- g) Co-ordinated hosting and application development environment
- h) Review and replace library system
- i) Investigate requirements and options for Customer Relationship Management system for Knowledge transfer and enterprise

5.2 Infrastructure Development Programme

5.2.1 Network Infrastructure

5.2.1.1 Telephony

- a) Migration from the existing telephony system to IP Telephony services to all staff.
- b) Development and implementation of advanced applications for the IP Telephony system for both students and staff.
- c) IP Telephony services to be provided 'as standard' to all students resident in main University halls.
- d) Further development of the OneBox messaging system to provide services to all staff regardless of location.

5.2.1.2 Data Network

- a) The existing network infrastructure hardware is now over 6 years old. To enable the implementation of advanced network services, network authentication, access control and IP Telephony solutions, all existing hardware must be replaced ideally by the end of 2006.
- b) Implementation of end to end authentication on all parts of the network infrastructure and implementation of an efficient mechanism for the granting of visitor access to University resources.
- c) Upgrade of the Network towards 802.1x technology should take place in parallel to the network upgrade.

5.2.1.3 Income Generation – Bournemouth University Internet Services (BUIS)

- a) Further develop and enhance the services offered through BUIS, and in conjunction with colleagues elsewhere, utilise this to increase the income generation potential of the University.

5.2.1.4 IP Technology and building automation systems

- a) Work with the Estates Group and Purchasing to further develop the Cisco Real Estate ideal and exploit its potential for future building projects.

5.2.1.5 Resilience

Develop a resilient link via commercial services could to provide an internet connection to the University in the event of failure of the LeNSE link.

5.2.2 Technical Infrastructure

5.2.2.1 Server Design

- a) Develop and implement an effective process for the development, deployment and commissioning of all central servers.
- b) Reduce the number of different hardware and OS platforms used by central servers to improve the support and maintenance of those systems.
- c) Work with colleagues to develop at least two purpose built machines rooms that are 'fit for purpose'.

5.2.2.2 Resilience & IT Service Continuity

- a) Develop and implement fully resilient systems for critical services such as:-
 - o Staff and student e-mail
 - o Staff and student file stores (H drives)
 - o Central file stores (I drive)
 - o Web services (www.bournemouth.ac.uk)
- b) Implement an effective change control procedure by the end
- c) Implement an effective configuration management process
- d) Exploit the use of advanced technologies to improve the robustness of all systems
- e) Develop a good value resilient environment for Oracle databases with improved ability to provide services outside of office hours without support
- f) Work with colleagues in the Estates Group to provide generator backup for all systems located in central machine rooms (currently Dorset House and Kimmeridge House).

5.2.2.3 Security, Authentication and Protection

- a) Implement an 'at risk' period as soon as possible for all infrastructure systems to allow for system patching and routine maintenance work to be carried out. A suggested model is 7am to 9am every Tuesday morning (the same period that the network infrastructure, LeNSE and UKERNA have specified)
- b) Implement Network Access Control (NAC) and Cisco Security Agent (CSA) to prevent any uncontrolled change to server systems that are deemed 'out of the ordinary'.
- c) Carry out review of the anti-virus solution currently in use at the University against its overall effectiveness in combating service affecting virus outbreaks.

5.2.3 Desktop Infrastructure (Staff)

- a) Simplify annual hardware refresh via a single centrally co-ordinated capital bid
- b) Develop roadmap for desktop application software standard

- c) Develop standards for mobile computing for secure and supportable solutions

5.2.4 Desktop Infrastructure (Students)

- a) Increase space for 'Open Access' Computing to provide more computer access for students

5.2.5 Learning & Teaching Infrastructure

- a) Develop and agree process for Computer lab builds with relevant schools
- b) Develop annual plan for all multi-media/IT facilities at lecture/seminar rooms
- c) Develop and implement centrally managed computer lab
- d) Maintain up-to date digital off-air & DVD recording equipment and implement web based TV scheduler and off air recording system with searchable and editable programme archive and network distribution for the whole university.
- e) Maintain up-to date AV stock

5.3 Training and development Programme

- a) Develop process for IT literacy/competency capture for new students
- b) Develop ECDL programme for staff development
- c) Develop annual training plan for IT staff
- d) All IT Managers and Team Leaders to achieve ITIL Service Management Foundation Certificate

5.4 IT Service Improvement Programme

In addition to the Infrastructure Development programme, which is aimed at improving overall service delivery and resilience, an internal improvement programme is required to achieve continuous service improvement.

- a) Review reporting lines of IT Services within BU Management structure
- b) Produce updated Service Level Agreement
- c) Develop Service Level management and effective customer liaison with schools and professional services
- d) Develop Processes and tools for Incident Management, Problem Management, Configuration Management and Change Management
- e) Develop and implement Project Management lifecycle
- f) Develop Performance Monitoring for IT Services
- g) Develop Processes and tools for Release Management, Availability Management and Capacity Management
- h) Work towards BS15000 accreditation
- i) Develop testing & research environment

6 Breakdown of estimated cost

Estimated IT Strategy & Service Costs								
(in 000)								
Reference	Project/Description	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	TOTAL
Capital Spend (New Spend)								
5.1.1	Content & Document Management	36		60				60
5.1.2	Corporate VLE	55	15			25		40
5.1.3	Corporate & Administrative Applications	45	266	80	435	100	400	1281
5.2.1	Network Infrastructure	160	415	325	125	225	50	1140
5.2.2	Technical Infrastructure	941	130	575	175	175	175	1230
5.3	Training & Development		15	15				30
5.4	Service Improvement Programme		90			85		175
TOTAL: Capital Spend (New Spend)		1237	931	1055	735	610	625	3956
Capital Spend (Replacement)								
5.2.3	Desktop Infrastructure (Staff)	550	600	600	600	600	600	3000
5.2.4	Student Computing (OAC)	65	95	95	95	95	95	475
5.2.5	Learning & Teaching Infrastructure	645	705	655	655	655	655	3325
TOTAL: Capital Spend (Replacement)		1260	1400	1350	1350	1350	1350	6800
Maintenance & Support								
5.1.1	Content & Document Management	16	26	26	26	26	26	130
5.1.2	Corporate VLE	67	91	91	91	91	91	455
5.1.3	Corporate & Administrative Applications	228	257	257	264	264	264	1306
5.2.1 & 5.2.2	Infrastructure Maintenance Costs	300	351	351	351	351	301	1705
5.2.3	Desktop Infrastructure (Staff)	85	85	85	90	90	90	440
5.3	Training & Development	5	5	5	5	5	5	25
5.4	Service Improvement Programme		5	5	5	5	5	25
TOTAL: Maintenance & Support		701	820	820	832	832	782	4086
TOTAL: Internal Staffing *)		1807	1989	2048	2110	2173	2238	10558
OVERALL TOTAL		5005	5140	5273	5027	4965	4995	25400

*) Includes 3% annual cost of living increase, step-change to 2006/07 includes Project & Finance Management Resource costs.