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## Background

Monash University approved the first Information Technology Strategic Plan (ITSP) in June 2001 as an enabling plan. This first ITSP was both aligned with and took its strategic direction from *Leading the Way: Monash 2020* and the functional plans for the university's core business areas of Research and Learning and Teaching.

The ITSP has now been the vehicle for determining the operational and developmental activities of the university's Information Technology Services Division and the Faculty IT teams for over a year. In line with accepted quality procedures, a number of review tasks have been undertaken to ensure that the plan remains in alignment with other relevant university plans and contains an appropriate balance of innovation, service and value. Review strategies in this round included:

- A review of progress against the objectives of the ITSP
- A round of consultation with stakeholders in Faculties and support units
- A two-day seminar attended by key stakeholders to examine new directions and critical issues.

The outcomes of these review activities have been used to revise the ITS Operational Plan for 2002, update the Information Technology Strategic Plan 2001 – 2003 for the university and develop a portfolio of requirements for the 2003 budget.

This document forms the Update to the ITSP 2001 – 2003 and should be read in conjunction with the substantive Plan. It is set out in two sections:

- The first identifies key development areas that now require additional attention or that were not identified in the original plan (that is, information management across the university, support for Monash user communities, the specific needs of global campuses and supporting Monash Commercial interests)
- The second section examines the most critical issues facing IT service areas of the university.

Objectives to be met and strategies to achieve them are specified for both sections.

**Attachments to the document include:**

- Progress Against Plan – An overview of the review of progress towards the achievement of the 2001 ITSP,
- Proposed Development Programme Portfolio for 2003, and
- Project Budget Estimates for 2003.

## Key Development Programmes

### Information Management

Large organisations like Monash have typically done a good job of managing data and a poor job of managing information and knowledge. But as the volume and complexity of their operations increase, such organisations are recognising that in order to continue to grow they need to solve the problem of information stored in many different locations. These various locations act as islands of information. It is not possible to search across them, it is difficult to browse them and it may not even be possible to discover that some of the islands exist. In addition, the systems for organising the information on each of these islands may well differ from one to the next, even when the same information is being managed. As well as the location problem, there is no version control, so a single document probably exists in multiple versions on different information islands, and possibly in different (perhaps inconsistent) forms, including Word, PDF and HTML.

The lifeblood of the university is the information held in these information islands. People across the university are engaged in learning, teaching, research and administration. All of these activities consume and generate information, either directly or via transformations of other primary information sources. The amount of information within the university is growing exponentially, and the risks associated with this unmanaged growth are themselves growing. Without a coherent information management strategy, the university faces a range of risks: competitive, legal and procedural.

Software vendors are recognising the needs of organizations to deal with this issue and are providing tools for:

- document management
- web content management
- associated workflows
- rich-media management.

Monash needs to solve all of these issues in an integrated system, and in a way that makes life easier for all members of the Monash community (academics, researchers, general staff and students) to manage their information.

### Objective

A framework is established which guides the development of systems, policies and governance for the location, versioning, storage, retrieval, management and distribution of the information and knowledge that is integral to the university community.

### Strategies:

- Implement appropriate governance structures for cross-sectoral information management projects
- Develop a 5-year roadmap for Information Management at Monash
- Implement a system for managing paper documents across the university
- Investigate document imaging technologies
- Implement a university-wide print-to-PDF-and-file system
- Move towards a system where each authorised version of a document exists in a single canonical form that can be rendered on demand in a number of formats on a number of different media

- Ensure that previous required versions of documents are securely archived in a way that allows for efficient and easy recovery
- Implement a system for efficient electronic archiving of documents, whatever their original form
- Implement a Hierarchical Storage Management architecture to allow older information to migrate to cheaper, slower storage
- Remove the disincentives to storage of older emails on the central mail server
- Progressively migrate existing web content to the new Web Content Management system
- Implement a system for central management and control of digital objects and their associated rights
- Migrate digital content from existing systems (WebCT, Library, Web) to this system.

## **User Communities - Learners and Teachers**

### ***Role of Information Technology***

Information technology plays an increasingly significant role in supporting the development, delivery and management of services supporting learning and teaching. IT systems and infrastructure need to assist Faculties to provide high quality and flexible educational programs and effective, accessible learning and teaching support. Development of new projects and expansion of services must be aligned with the university's Learning and Teaching Plan, taking direction from its broad objectives and supporting both the innovation and consolidation of services that it recommends.

These services must support all aspects of student life, ensuring a positive experience which fosters a lifelong relationship with the university for both staff and students.

The university portal and the recent implementation of a Learning Management System (WebCT) have extended and enhanced the university's capacity to provide a flexible, globally accessible learning environment. In order to maintain and expand these learning services and ensure that all staff and students of the university can have a simple, consistent environment, the WebCT service must be reviewed and scaled up to facilitate increasing usage. Usage and roll-out should also be monitored to enable accurate advice about learning outcomes and required future functionality as well as the total service cost. Innovative use of electronic support for learning and teaching should be encouraged.

There is also an increasing need to manage and store the learning material developed or accessed by teaching staff and students to ensure appropriate access, record keeping and IP protection. Archiving of these learning objects is discussed above in the section on Information Management.

Bandwidth and connectivity may limit the range and speed of access to services, both on and off campus, for students and staff. Depending on previous experience, there may be a mismatch of user expectations and the level of services that can be provided. The diversity of technologies used in learning and teaching and the skills required to use them also have training and resource implications that impact on user expectations. As a consequence of these factors, existing and intended technology use in learning and teaching must be appropriately reported to facilitate planning and manage expectations.

There is a need to undertake structured evaluation of technology supported flexible learning and teaching to extend the university's understanding of the learning outcomes and real costs. It will also facilitate appropriate future development, project planning and prioritisation of resource allocation. These understandings will also help to ensure that supported technologies align with university plans, services are more clearly defined, student and staff expectations can be better met and managed, and training needs can be predicted.

**Objective:**

Planning for the ongoing resourcing and use of technologies to support learning and teaching is well informed and grounded in reality.

**Strategies:**

- Work with CeLTS and Faculties to develop a comprehensive plan to adequately prepare the WebCT programme to become a widely adopted university service
- Develop and implement a procedure for the completion and processing of a Technology Impact Statement to be approved by appropriate IT service areas for all new and reviewed units and courses
- Inform students and staff of service levels and limitations through staff development and training and the Computer Resources Guide
- Assist the assessment of both learning outcomes and return on investment for the use of learning technologies by utilising management reporting tools in appropriate systems eg Callista, portal, WebCT, to provide analyses to ESTL and the Academic Support Network.

***Teaching Space Facilities***

Facilities and Services Branch, the Monash Library and Information Technology Services currently manage different aspects of the provision of teaching space facilities and services. However feedback from Faculties during recent interviews suggests that governance of teaching spaces, planning and support requires greater coordination.

An assessment of educational technology equipment in centrally managed lecture theatres has been undertaken and a regular maintenance programme developed. However the devolved management of other teaching spaces leads to varying standards of services and this approach does not take advantage of the economies of scale that can be achieved through centralised purchasing and maintenance of equipment.

**Objective**

Technologies used in all teaching spaces of the university are effectively managed and upgraded.

**Strategies:**

- Liaise regularly with Facilities and Services, Faculties and the Conference Office regarding lecture theatre functionality, maintenance and upgrades
- Consider the most appropriate manner in which the Lectures On-line service might be expanded to campuses other than Clayton in consultation with the Library
- Measure utilisation of teaching spaces through Syllabus Plus, including seat utilisation
- Provide accurate information to Faculties about the costs of maintaining and supporting teaching spaces
- Pilot provision of laptop connectivity for students in selected lecture theatres
- Improve availability of educational technology equipment in teaching spaces used for postgraduate teaching (and other small teaching areas) by providing appropriate technology, based on fitness for purpose, at minimum cost
- Negotiate with Faculties for the transfer of independently managed teaching spaces to the central programme
- Review and improve quality of seating, lighting and furnishings across all lecture theatres (with Facilities and Services Division)
- Benchmark Monash educational technology in lecture theatres against other Universities.

***Management of Flexible and Off Campus Distributed Learning (OCDL)***

The number of OCDL students is increasing, on-campus students now access services previously limited to OCDL students (eg WebCT helpdesk) and the range of support services required is expanding. Surveys indicate that approximately 95% of students have access to a computer and approximately 85% have access to the Internet. Financial considerations constrain the majority of those without access. In order to extend and improve flexible learning opportunities for all students, it is necessary to enable financially disadvantaged Monash students to have access to an Internet enabled computer.

The administrative management system that underpins the OCDL function at Monash is not operationally sustainable. Review and redevelopment are essential and urgent, not only to maintain a base level of service, but to expand the level and functionality of administration and support services to the university's increasingly global and off campus student population.

**Objective**

All Monash students have equitable access to services of the university, and are supported by an effective administrative management system.

**Strategies:**

- Assist CeLTS and Faculties to consolidate surveys of student access to computers, determine the real level of need for specific student groups, and identify manageable solutions
- Establish a project Steering Committee chaired by the Director, CeLTS, to develop a proposal for a new administrative management system to support off campus and distance learning and flexible learning.

## **User Communities – Researchers**

Information technology is an essential tool for most researchers to access facilities and information, share resources, collaborate with colleagues and store data. Many researchers have requirements for IT infrastructure and services that are beyond those found in the broader community of IT users. Meeting these expectations while maintaining a robust, highly available production environment is a challenge that requires a significant investment in infrastructure and services.

The provision of core IT infrastructure underpins the needs of the research community. Network connectivity is crucial at university, state, national and international levels, and planning for the provision of bandwidth must anticipate and lead demand. Grid systems are becoming an essential component of research throughout many disciplines where networked resources are utilized and shared across the world, addressing areas such as high performance computing, remote instruments, data sets, digital libraries, visualisation and collaborative systems. Volumes of electronic data are increasing rapidly with a corresponding need to provide high capacity management procedures for data storage, archiving, backup and recovery.

### **Objective**

Individual researchers in Faculties and teams of researchers in geographically dispersed locations are well supported with appropriate technologies.

### **Strategies:**

- Develop an advanced communications network that supports high bandwidth connectivity to resources within the university, nationally and internationally, consistent with the VERN initiative
- Support the development and deployment of network grids to facilitate the sharing and consolidation of resources and collaboration between researchers
- Revise data storage, backup, recovery and archival facilities to cater for large volumes of data, including time-series volumetric datasets
- Investigate extending the current portal support for researchers to include a research channel.

## **Overseas Campus Developments**

By the end of 2001 Monash University had successfully implemented campuses in Malaysia and South Africa, Centres in London and Prato and a wide range of degree programs delivered with partner support in Singapore, Indonesia, Malaysia, Thailand, Hong Kong and the United States. Within the next few years, Monash intends establishing its presence and reputation in other parts of the world with respect to learning, teaching and research, as well as being involved in development assistance and other projects.

High quality IT systems have been successfully built to support international campuses and centres and flexible student centred systems have been implemented to support off campus distributed learning. It is important that a deployment methodology for IT is adopted, to make future global development sustainable through a network of integrated and consistent services that support the global Monash community.

There are challenges to this plan not the least of which is the status of the international telecommunications network. While it was possible to affordably build a very high capacity network between the Victorian campuses, this is not the case internationally. Monash must instead rely on the public internet with all its attendant limitations and vulnerabilities. Further, overseas campus and off-campus operations depend upon around-the-clock access to central infrastructure and support.

**Objective**

IT services are established on a global scale to provide staff and students with a consistent standard of services and facilities.

**Strategies:**

- Ensure decisions relating to future global activities are made with an awareness of the IT implications including costs and service levels
- Develop policies, plans and procedures (including quality standards) for a staged roll out of any new developments, in cooperation with other support divisions (these plans can then be adapted to suit the specific needs of any new location)
- Ensure that consultation between senior managers responsible for overseas development and the Project Manager for Global IT Development occurs at the earliest opportunity in the planning and evaluation process
- Identify an account manager to act as a focal point for communication relating to IT in international activities. Responsibilities should include ensuring that new developments are fully costed and ongoing resource requirements are identified and met.

**Supporting Monash Commercial Interests**

As part of its vision of self-reliance (articulated in *Monash 2020*) the university is seeking to develop an environment where income generation and entrepreneurial activity is an important aspect of the work of the university. A number of companies have been established under the umbrella of Monash Commercial Pty Ltd to service the university and to exploit opportunities. These companies require a range of IT services to support their operations, which might be provided by ITS or in partnership with external IT organisations on a commercial basis.

There are a number of legislative restrictions and contractual limitations that need to be taken into consideration when providing services outside the traditional university model. These include competitive neutrality and telecommunications legislation. Current agreements for the provision of software, hardware and maintenance to Monash University attract substantial price reductions based on the non-commercial application of these products and services in a university environment. The financial impact of their use by commercial entities will need to be carefully considered and appropriate service delivery models, pricing models and contracts established.

**Objective**

Monash commercial interests are provided with appropriate IT services, with due regard to legislative and contractual obligations that affect Monash non-commercial activities.

**Strategies:**

- Develop a services catalogue and appropriate service delivery models, service level agreements, pricing models, contracts and financial processes for the various categories of Monash Commercial clients

- Identify a range of partners who can assist in the provision of IT services to the commercial community within the Monash IT architecture.

## Critical Issues

### Providing Value for Money and Containing Costs

The level of expenditure on information technology within the university represents a significant percentage of the total revenue. It is imperative that this expenditure is viewed as providing value for money to the university, that IT solutions are deployed efficiently and that the desired outcomes are achieved, realising overall benefits to the university.

The major cost pressures associated with the provision of IT derive from:

- Development and ongoing support of new services, and upgrades to existing services and infrastructure, in response to community expectations
- Increased utilisation of services as they are adopted more widely within normal work practices
- External factors such as risk management, changes in technology, supplier licence fees, CPI-related increases, exchange rate variations, etc.
- Diversification and complexity inherent in the way in which IT is deployed within the university.

### Objective

The expenditure on IT within the university represents (and is seen to represent) value for money.

### Strategies:

- Apply a quality framework for the deployment of IT at Monash, which accommodates effective planning, project management, service management, benchmarking, performance review and improvement
- Formulate a development programme that has been prioritised to reflect the strategic and operational needs of the university
- Identify through Strategic Cost Management the inescapable linkages between developing new services and the need to allocate funds for their ongoing operational costs of deployment
- Adopt a benefits realisation methodology that ensures that the expected benefits from each IT investment are realised
- Review opportunities for the consolidation of servers, the development of Standard Operating Environments, asset planning and the consolidation of duplicate services within the university
- Adopt a formal IT architecture for the university that will guide the deployment of IT on all campuses and address issues such as diversity, integration, and interoperability.

### Managing Complexity through IT Architecture

The IT infrastructure at Monash is already very complex, given the diversity of hardware and software systems and the university's global activities. The increasing dependence on IT, the growing need for additional functionality and the international developments of the university are all trends that necessitate the adoption of a structured approach to reduce the complexity of our IT environment.

The implementation of a comprehensive IT architecture containing guiding principles, standards and models, and promoting reuse of existing data, functionality and capacity will:

- Facilitate a reduction in existing complexity
- Increase the reliability of IT systems
- Reduce the costs of IT systems and time to implement new systems
- Permit greater interoperability of existing and new IT systems
- Reduce the risk of security violations
- Provide a blueprint for the deployment of IT on Australian campuses, offshore campuses and centres, within ITS and within Faculties.

### **Objective**

Future IT systems are developed within a consistent and integrated framework.

### **Strategies:**

- Adopt a formal architecture development methodology and framework.
- Develop a comprehensive information technology architecture, drawing together work already completed and underway, and using the formal architecture development methodology and framework
- Integrate architecture monitoring and maintenance into project establishment and management methodologies
- Develop and implement a policy framework to influence relevant elements of the architecture across the university.

## **Core IT Infrastructure**

It is relatively easy to associate the costs of investing in IT applications and services with identifiable and realisable benefits to the core functions of the University. However, it is equally important to continue investing in IT infrastructure, which underpins the applications and services upon which all areas of the university are critically dependent. Two aspects of infrastructure that are of vital importance are the **network services** that connect the entire university and upon which every other IT application depends, and the **management of data** that underpins most aspects of our work.

### ***Data Management***

The demand for electronic data storage at Monash is doubling every 18 months. This represents a substantial investment in hardware and operational support and is a matter of immediate concern. It is essential that, before the current storage model becomes unsustainable, the university implements a storage management strategy that addresses the requirement to secure the university's mission critical data, both now and into the future.

The industry trend with respect to such a strategy is to adopt an holistic view of storage resource management through consolidation strategies that address **disk storage**, **backup** and **archival** services collectively.

There are currently over 14.5 terabytes of **disk storage** directly connected to 200+ servers, which are centrally managed by ITS. The current growth rates in terms of sheer volumes of data and implementation of new services have exposed the limitations of the current server-centric approach to disk storage. Many organisations are now moving to alternative methods (Storage Area Networks and Network Attached Storage) that allow disk storage to be managed as a virtual resource and

independently of server-based applications. These technologies support the kinds of heterogeneous server environments at Monash, are dynamically scalable, allow mirroring of data across multiple sites increasing business continuity/disaster recovery capability, and reduce the system management overhead.

The rapid growth in disk storage also has a flow on effect on the central **backup** service. The capacity to backup new services to the tape facility is a priority issue. Two of the three tape silos installed within ITS are running at capacity and an additional silo needs to be purchased to accommodate increasing capacity demands. An emerging potential problem is the elapsed time taken to perform backups and restores. In the event of a disaster the restoration time for large data-sets would in many cases exceed expectations. The throughput of backup/restore would be greatly reduced by directly connecting the tape silos to a dedicated storage network, which would also reduce the load on the data network.

Finally, legislative and regulatory data **archival** requirements need to be met. Alternative storage methods need to be investigated utilising different media types (e.g. CD, DVD), to enable multiple copies of the data to be stored in more than one location and on more than one medium.

### **Objective**

Backup, storage, archiving and retrieval of all university data is effectively managed.

### **Strategies:**

- Include the issues of data storage, backup, recovery, and archiving within a university information management strategy
- Review as an urgent priority the current data archiving, backup and recovery strategies and plan short-term and future upgrades
- Raise awareness of the volumes and costs of data management at Monash with users and key stakeholders, and encourage better management practices
- Undertake a pilot project to address immediate WebCT archival requirements. This pilot will assist ITS to evaluate and develop an archival capability that will position it to be able to offer this as a service to the wider Monash community into the future.

### **Network Infrastructure Services**

Many aspects of the university's core business are critically dependent upon the sophisticated and extensive global communications network (over 10,000 telephones and 20,000 computers). It is essential for the future growth of the university that it continues to maintain a secure, reliable and 'future-ready' network infrastructure with the capability to support research activities demanding high capacity advanced network services, as well as highly reliable production network services to support online service delivery. Without this, innovation will be stifled, strategic developments inhibited, and university operations severely impeded.

Network technology continues to be an area of rapid technological change, and regular capital investments need to be made. Typically a major new core network technology is introduced approximately every five years with each such technology having a total production life of around ten years. Similarly, edge network devices have a limited technology lifecycle and must be upgraded every three to five years.

In addition to facilitating network connectivity, there is also an increasing need to allocate a greater proportion of resources to underlying network services such as

directory, security and network management services which are essential to enabling data, voice and video communications.

Due to the rapid growth in numbers of users and on-line applications, development activities and funding must be regular, ongoing, and at significant levels to maintain appropriate network capacity and functionality, in anticipation of demand. Anything less will have a crippling effect on the university.

### **Objective**

Core network infrastructure and services are resourced to ensure that capacity and functionality can be maintained at expected levels.

### **Strategies:**

- Continue investment in tactical developments and long-term planning to improve the capacity, functionality, and reliability of core network infrastructure (on-campus, inter-campus and globally)
- Progressively rollover edge network devices to newer technology to deliver additional capacity, functionality and reliability to end-user services
- Eliminate single points of failure where the critical nature of the service justifies expenditure
- Improve the reliability of network connectivity through the introduction of automatic fault recovery mechanisms and duplication of critical network elements
- Continue to support the implementation of Wireless LAN services
- Liaise with telecommunication carriers regarding the provision of ISP services (including Broadband into the home) to the university community
- Extend the authenticated, encrypted Virtual Private Networking environment for a variety of applications and user groups on-campus and worldwide
- Re-design the logical network architecture to improve security, protection, intruder detection and response regimes
- Implement enhanced billing and reporting systems consistent with Strategic Cost Management
- Further develop and implement systems to monitor and analyse network integrity

### **Security**

The proliferation of the Internet and ubiquitous access to the global data communications network has increased the potential for computer systems to be compromised from any location in the world. The growing number of university services and applications being implemented, that are accessible via the Internet, increases our exposure and it is essential that a proactive approach be taken to secure Monash systems from unauthorised access and compromise. Maintaining secure IT services is both the responsibility of university technical service providers and all users of Monash IT systems.

A 2002 Australian Computer Crime and Security survey reports that the companies surveyed suffered twice the level of computer security incidents in 2002 over the previous 1999 survey including significant financial loss to the organisations. Analysis of the security and system files at Monash also reveal that attackers are constantly probing devices connected to the Monash network for potential weaknesses that can be exploited to gain unauthorised access to Monash systems and resources.

The university IT policy committee (UNITPOL) has endorsed the IT Security Policy and in line with this, it is essential that we plan and implement further changes to the university network and computers on that network to ensure the confidentiality, integrity and availability of university data.

Providing a secure networked environment is a major challenge for an organization as large as Monash with over 20,000 network attached devices (7,000 directly connected to the internet) spread across local and international sites. It only requires one non-secure device on the network to provide an entry point for illegal activity.

**Objective**

Networked Monash University systems are secure and managed to prevent unauthorised access.

**Strategies:**

- Extend the secure technologies already in use on Monash services to all systems where appropriate
- Develop a Monash Network Connection Policy that defines and manages Internet connections both for all devices using the Monash network and all remote access to Monash systems
- Develop and implement a User Authorisation Policy governing requirements for password use, encryption and authorised access to all network attached devices
- Establish 'class of service' network subnets and in consultation with stakeholders, migrate devices that do not require direct internet attachment to the appropriate subnets
- Ensure critical security-related operating systems are maintained and updated, key applications systems are audited, and evolving authentication methods are monitored and considered for implementation where appropriate
- Implement leading-edge network intrusion detection technologies to provide an alerting and reporting capability
- Include a security component in the university IT Architecture blueprint.

**Privacy**

Monash University has reviewed the ways in which it collects and handles information relating to individuals (staff, students and others) to ensure that it conforms to the provisions of the Victorian Information Privacy Act and the Health Records Act.

Monash's official records of its students and staff members are gathered, held and processed through the SAP-HR and Callista systems. However, Faculties and organisational units collect information about people at many locations and through many techniques, including the use of IT systems (for example, by email, through web-based forms and by recording of various kinds of IT usage). It is critical that all staff involved in these activities are aware of their legal obligations with respect to the collection, storage, use and distribution of private and sensitive information.

**Objective**

University systems comply with legislation related to privacy of information.

**Strategies:**

- Ensure that university systems are audited for compliance with the Victorian State Government Information Privacy Act 2000
- Ensure that staff with access to student and staff records are trained in their obligations with regard to the relevant Acts
- Mandate the use of secure encrypted technologies for the transmission of private data
- Incorporate a Privacy checklist in the Project Management framework
- Ensure policies are in place for the removal of data from systems when they are returned at the end of leasing arrangements.

**Business Continuity**

Business Continuity management requires a set of plans and procedures that can be followed when an event occurs that impinges on the delivery of services. These procedures and plans must be integrated into all core functions, without which the very survival of the university may be threatened.

There are three required elements of a best practice planning process for business continuity. These are planning at the highest organisational level to address strategic issues; plans for the recovery and resumption of IT infrastructure services; and the detailed steps to allow functional units to both conduct operations temporarily and to assist the resumption of normal operations.

A University Disaster Management Plan has been developed and tested which details how the Executive of the university will respond to a major crisis. Information Technology Services is currently developing Disaster Recovery Plans for recovering IT infrastructure (hardware, software, data and networks) for many of the university's critical services.

Planning within functional units has not yet been fully addressed. Faculties and organisational units of the university are responsible for ensuring that plans are developed to mitigate the impacts of major disruption in their areas. The plans need to include:

- Work-around procedures to allow the university to resume its operations temporarily after disruption, to a minimum standard
- Procedures to allow the university to resume its operations on a semi-permanent basis using available resources
- Procedures to allow the university to return to the operational state that existed prior to the disruption.

Further progress on the development of the infrastructure Disaster Recovery Plan is contingent upon the identification of critical business priorities and the maximum time it should take to recover data and applications and the maximum acceptable transaction data loss. These parameters determine the level of investment in infrastructure needed to satisfy business requirements.

**Objective**

All essential IT services are able to be recovered in a planned and prioritised manner, with minimal loss of time and data, in the event of a major failure.

**Strategies:**

- Review the university Crisis Management Plan and ensure that all its assumptions are still valid
- Assist in the audit of business continuity capacity in Faculty and organisational units, and in the development of timelines, frameworks and templates to assist in the development of Business Continuity Plans
- Create Disaster Recovery Plans for all critical services and test these plans annually
- Conduct a university wide awareness campaign to communicate the need for Business Continuity planning for all IT processes.

**Exploiting Innovation**

Monash has a history of providing innovative IT solutions to support the core functions of the university, and there are many examples of demonstrable leadership within the sector, (eg portal technology, SMS messaging, high capacity networking, public key infrastructure, virtual private networks, high capacity networks). It is desirable that leading edge deployments of technology occur only when there is a reasonable chance that the university will receive an adequate return from its investment. The transition between experimentation, leading edge deployment and widespread adoption of production services can be difficult and costly and needs to be carefully managed.

Examples of leading edge developments that require a watching brief include:

- Emerging network technologies such as convergences of SAN / Metropolitan Area Networks /10 Gigabit Ethernet; broadband to the home; peer to peer networking and Bluetooth wireless applications
- Emerging Security technologies including biometrics; smartcards (including commercial applications)
- Student feedback systems & analysis in lecture theatres
- Personal digital assistants (PDAs), which are becoming increasingly more capable, converging with mobile phone technology and reducing in price
- Web-based, dynamic and controlled content and applications
- Emerging portal technologies
- Emerging data storage technologies.

**Objective**

Monash maintains its reputation for deploying innovative technology solutions to support its core functions of teaching, learning and research, in a cost effective way.

**Strategies:**

- Work with Faculties and vendors to explore opportunities
- Support the Faculty of IT in the development of a 'CoolCampus' forum to enhance the Monash student and staff experience
- Encourage the generation of ideas by hosting discussion forums and conferences, fostering a culture of innovation (time to research and reflect, celebrate innovation success, actively engage concept champions), using existing committees to explore innovative technologies and their applications.

## Integration of Applications and Data Records

Consistent with what is regarded as industry best practice, Monash has adopted a strategy of purchasing applications software rather than developing bespoke systems, thereby minimising costs of ownership, and sustaining a high level of functionality.

There is a need to share information between applications and to ensure that university records are consistent. This is addressed by developing “interface” systems that transfer data between applications. As the number of implemented applications increases, it can be appreciated that the number of interface systems will increase exponentially, and with it a significant burden of labour intensive software maintenance.

Two steps are required to increase integration and limit maintenance requirements. The first step is the implementation of a large, integrated ERP system that incorporates most of the required functionality, thereby reducing the need for additional applications. Secondly, the process of developing and maintaining interfaces between disparate systems can be automated by the use of an **integration broker** methodology. Both steps are necessary at Monash, given the number of legacy systems and the need to implement applications from a variety of suppliers to support the core functions of learning, teaching, research and administration.

There are significant dangers in not providing automated integration tools in a large applications environment. These include the loss of data integrity through the existence of duplicate and redundant data records; greater difficulty in maintaining the required standard of privacy and security; increased costs of data management; inability to keep authoritative data records; and reporting inaccuracies potentially leading to ill-informed decision-making.

### Objective

A single authoritative source for each university record and an automated method of updating other instances of the record, is maintained wherever possible.

### Strategies:

- Develop an over-arching information management policy for the university
- Use the existing SAP functionality where it meets university needs in preference to implementing additional applications
- Investigate and evaluate integration broker technologies
- Develop Web Services for integration of applications
- Review and rationalize interfaces in view of new technologies 18 months after implementation
- Investigate reporting options including the feasibility of a data warehouse, end user reporting and analysis tools, and strategic and management reporting requirements.