



National University of Ireland, Galway
Ollscoil na hÉireann, Gaillimh

Computer Services

DIRECTOR OF COMPUTER SERVICES' ANNUAL REPORT
October 2005 to September 2006

August 2007

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1 Director's Introduction

The 2005-06 academic year saw significant positive change and development in Computer Services. We remain some distance from our goal of achieving excellence in the services which we deliver to the University community. We must do this against a background of continuing increase in the demand for our services. This is driven by external factors such as the growth of research, and by internal factors: as we start to succeed in delivering service excellence, so the University community places greater trust in us to deliver basic ICT services on their behalf.

One of the most significant events was the retirement of George Deacy at the end of April 2006 after 50 years service. The University owes George a great debt. I would like to take this opportunity to record my personal gratitude and that of the entire Computer Services team to George for his contribution. I was delighted his recognition through the award of an honorary MA by the NUI in November 2005.

George was replaced by Andrew Butler, recruited from outside the University. At around the same time Sinéad Ní Fhaolain elected to take a one year career break. She was replaced on the management team by Brian Ensor from DERI. These changes, together with other appointments in the team, have helped us on our continuing journey towards the highest standards of professionalism and service excellence.

We were also helped by the introduction into Computer Services of the University's PMDS (Performance Management and Development System). The initial round of senior management appraisals will be followed by appraisals for all staff.

Our governance changed with the University decision to stand down the former Computing Strategic Policy Committee, to be replaced by a new ICT Policy Committee. This development is expected to help transfer ownership of ICT services to the wider University community and to increase the accountability and responsiveness of ICT service providers. We hope to extend this report in future years to include contributions from all the other service providers; this year we have been able to include a short report in ICT service provision by the James Hardiman Library.

This report comments on progress in many service areas. Of particular note this year were improvements in the student computer suites and in staff eMail.

The computer suites service started from a very low base in September 2005. There was limited support for memory sticks, there were regular server failures, and print service performance was poor. Substantial improvement was delivered and a very much better service was available in September 2006. Some problems remain.

Rollout of the new staff eMail service continued towards completion. The service is much more stable and reliable than its predecessor, offers additional features, and is based on proven technology. It has been well received in the campus community.

On the downside we experienced a major network service loss over the weekend period 4-6 November 2005. This affected all external Internet access. The problem was traced to a mistake by a research student. The concern is that such a mistake could bring down the whole network. The explanation is that investment in the network and the design and support skills needed to support it had not matched the growth of the University. This situation is now being rectified.

We were able to deliver a significant service development program. Initiatives included a service to allow students to pay for print credits on-line, computer suite status displays, investment in remediating the University network, new air conditioning for the computer room, a new University home page and Web “templates”, a roll-out program to bring the templates into service in departmental websites, new Web server hardware, and a centralised Linux teaching environment.

Looking ahead work continues to introduce more formal planning and monitoring of the work of Computer Services. We are looking to develop a three year rolling work programme, updated annually, and supported by robust financial and manpower plans. The biggest challenge is probably the development of manpower estimating and monitoring skills, and of project management skills.

One of our most important development projects for 2006-07 will be the upgrade of the University's Blackboard Virtual Learning Environment, which will be carried out with CELT and the MIS Office. This project will enable growth in the scope and volume of Blackboard use.

This project will also be an important step in starting to deliver the “Integrated Student Environment”. This will provide students with a single point of access to NUI Galway electronic resources, using a common electronic source of student and staff identities. Delivery depends on cooperation with other campus service providers.

Other planned developments include a major upgrade to the campus wireless service, planning work for the wider use of student owned laptops and other devices, planning to provide secured central storage for staff, and improved network access control. We also hope to complete a feasibility study on the use of “campus cards”, initially to provide improved access control to the Library. We also expect to carry out annual hardware renewals in the PC suites and to continue our network remediation work.

This all represents an ambitious agenda, especially for a department going through major change and facing resource challenges. It is nevertheless one which the University must pursue in order to deliver its own change and development agenda. Together with the Computer Services team I look forward to rising to meet the challenges of this exciting time.

Kieran Loftus
Director of Computer Services
August 2007.

2 The Computer Services Role

The Director of Computer Services is charged by the University with:

- Providing an effective, secure and confidential computing service to the academic departments and offices of the University;
- Supporting the University network and providing email, Intranet and Internet services to all staff and students on a University-wide basis;
- Delivering a reliable, consistent, high availability service while continuing to develop the technology infrastructure of the University;
- Co-ordinating the technology strategy of the University.

Computer Services aims to meet its obligation to the University community by providing eight core services. These are:

Student Computers Provision of basic fixed and wireless on- and off-campus connections to allow students to access the University ICT resources available to them. Traditionally this service was provided only to fixed computers in the suites. Increasingly the student expectation is to supplement this with wireless access on campus and with access to services from off-campus.

Teaching and Learning Support This includes procurement and management of specialist software, packaging and distribution of such software in the suites and (in future) to student provided computers, and support of Blackboard, the University's Virtual Learning Environment.

Staff Computers Provision of a desktide ordering, installation, configuration, and troubleshooting service for research, teaching, and academic support staff.

User Support Centre Provision of a problem logging and management service for students and staff. Service is generally provided to students on a walk-in basis and to staff by telephone or eMail.

Network Provision and support of the University's network infrastructure. This includes management of our connection to HEAnet, the Irish third level national network, as well as connections to NUI Galway Gaeltacht units and research stations.

eMail Provision and support of an eMail service for NUI Galway staff and students.

Web Services Management of the NUI Galway corporate presence on the World Wide Web. Support to units within the University to assist them in managing their own Web presence and remaining consistent with NUI Galway branding.

Strategic Coordination Providing leadership in the University community on strategic and policy aspects of the delivery of ICT services

3 Review of the Year

3.1 University ICT Strategy

NUI Galway has never produced an ICT strategy. Such an exercise is becoming increasingly appropriate. The University itself has embraced formal strategic planning, working to ensure that it is effective in responding to its changing environment. Technology has become much more important in delivering the University's mission. As the University becomes ever more dependent on ICT new and substantial projects are being proposed which may have substantial impact on the life of the University.

An ICT strategy for the University might look at:

- The work of the University;
- The external and internal environment;
- Existing ICT resources, assets, organisation and capabilities;
- Key ICT challenges facing the University;
- Key factors in delivering ICT in the University;
- Options by which ICT provision might be matched to the University's needs;
- Analysis of those options and recommended way forward.

3.2 Computer Services Strategy

Historically Computer Services has lacked a formal planning framework, and has therefore not provided itself with a strategic plan. Although such a framework cannot be put in place overnight substantial progress has been made.

In particular there now exists a Computer Services work programme. This is updated at reasonably regular intervals and there is greater clarity about the responsibilities of individual managers and their teams. The next step in the planning process will be to introduce formal manpower planning and professional time capture systems, without which project planning is built on rather weak foundations.

There is still no Computer Services formal strategic plan available to be documented, reviewed and agreed. However a three point strategic approach has been defined and is generally accepted. The key aspects are:

- **Firefighting** Urgently addressing some of the most serious challenges facing the services delivered by Computer Services and the relationship between Computer Services and its customers.
 - **Seeking excellence** Working over a period to build a Computer Services quality framework. This recognises the need for transition in the way that services are defined, developed, delivered and managed. The eventual aim is to match the services delivered to the strategic aims of the University and the detailed needs of the University community, and to aim for the highest
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standards of excellence in delivering, monitoring and reporting on the services.

- **Strategic reform** Understanding the ICT service provision needs of the University community and responding to it with plans and projects designed to meet those needs. Such plans may call for some or all of significant investments, changes in mission, changes in resourcing, and changes of relationships with the University community, with other internal ICT service providers, and with external suppliers. Such strategic planning for Computer Services would need to be carried out in the context of an overall ICT strategy for the University.

Development of the planning framework for Computer Services will continue on an evolutionary basis.

3.3 Governance

A decision was made during 2004/05 to stand down the former Computing Strategic Policy Committee (CSPC) and replace it by a broad based ICT Policy Committee. During 2005/06 there was significant preparation work to establish this committee, including the formal decision to establish it. Briefings were provided to UMT, to APRC and to the faculties, and nominations to serve on the committee were sought and received.

Neither the CSPC nor the ICT Policy Committee met during 2005/06.

3.4 Computer Services Organisational Structure

We continued to adjust the Computer Services organisational structure to best match it to service and development needs. At the end of the academic year there were four sections as follows:

- **Infrastructure Services** Led by Andrew Butler. Responsible for the basic elements of the infrastructure including the data centre and physical infrastructure, the network, and the eMail service.
- **Customer Services.** Led by Conor McMahon. Responsible for ensuring that the needs of the customer are made central to the definition and delivery of all the services provided. Also responsible for delivery of the main customer facing services, including the User Support Centre and staff desktop support.
- **Projects** Led by Brian Ensor. Responsible for oversight of the Computer Services project portfolio, including project management methods throughout the department and management of specific projects. This includes the annual renewal exercise in the computer suites and the continuing readiness for service of the suites.
- **Strategic Services** Led by Pat Dempsey. Responsible for leading on the Computer Services responsibility for strategic ICT coordination in the

University. Also responsible for the development and delivery of the University's Web services.

3.5 Leavers and Joiners

The following were the main changes:

- George Deacy retired after more than 50 years service to the University.
- Andrew Butler joined us to replace George as Head of Infrastructure Services.
- Sinead Ní Fhaoláin started a career break and was replaced by Brian Ensor in a redefined role as Head of Projects.
- Tom Regan joined us as Network Architect/Planner, to undertake technical leadership in respect of the University's network infrastructure.
- Cillian Joy, Web Editor, became a permanent member of the University staff.
- Dermot Moore and Florinda Green joined the Field Service team.
- Caroline Pinkster and Seán Diviney joined us in the User Support Centre.
- Philip Graham joined us as a Computer Operator.
- Kevin Byrne (Field Service) and Ese Ogodun (User Support Centre) left Computer Services

We also welcomed John Coleman (Network), Denise Melia (Web Services), and Eugene Jordan (student placement) to various shorter term assignments.

3.6 Organisational Development

The Computer Services team continues to face two very significant challenges. The first is to place the needs of the customer and of the University at the centre of all our activity. The second is to support this with the development of a robust procedural framework enabling the team to define, develop, deliver, monitor and report on the services which we deliver.

The first of these challenges is being addressed through the design of Computer Services organisational structure, through the definition of our services, and through the approaches which we adopt to managing our customer relationships. However, it is also a cultural issue and we also continue to work as a team to emphasise the central importance of the customer experience in the delivery of our services.

Meeting the second challenge, the development of a well defined procedural framework around service provision, is essential if Computer Services is to reach its goal of delivering excellence in the services which it provides. Progress here is expected to be slow, but is being made on a broad front. For instance, during 2005/06 we continued to embed a formal change control process and we introduced a new

“Critical Incident Report”, to be published on our Web site following serious service outages.

3.7 Skills and Individual Development

We started the full implementation of the University's Performance Management and Development system during 2005/06, following training delivered during the previous academic year. The process started with appraisals and objective setting for each of the senior managers, and was due to be rolled out to the remainder of the team during 2006/07.

We see the PMDS as critical to Computer Services staff development. One very significant issue is the development of skills beyond the traditional technical skill sets. As well as being excellent technologists Computer Services staff will in future have an increasing need for consultancy and interpersonal skills, and for broader planning and management skills, even at quite junior levels in the organisation.

3.8 Stakeholder Relationships

3.8.1 Internal Relationships

We made significant progress in two key areas, the development of partnership models with academic units, and the continuing development of a “community of practice” on the campus. We also continued to conduct regular meetings with our colleagues in the Library and the MIS Office to review issues of common concern.

Increasingly we use the term “Partnership Models” in considering our relationships with academic units. This is particularly relevant to desktop services for both students and staff.

As we succeed in raising the quality of our services it becomes more attractive to units to hand over the management of student computer suites to Computer Services, and take advantage of the economies of scale, simplification, and manpower availability which we can deliver. However, units also wish to retain flexibility in the management of these suites, often because they wish to deploy specialist software quickly.

We worked on technical solutions to facilitate this approach. However the key to success in these models is trust-based relationships between the parties. We worked hard to demonstrate our growing ability both to listen to customer needs and to respond to them in an effective and timely way.

Similar issues arise for the staff desktop, and with certain basic infrastructure services, where units have in the past provided their own local solutions. Increasingly these services are coming under Computer Services management, where economies can be delivered. Such migration has been greatly facilitated both by improvements in service delivery on the ground, and by the efforts of managers in Computer

Services to consult technical staff in the University community about the development of services.

3.8.2 Suppliers

We continue to work with our supplier community to ensure that the University achieves best value and that we understand what our suppliers seek to achieve from their relationships with us. Key supply relationships for us include:

- **HEAnet** The University is a part owner of HEAnet, which provides the Irish national research and education network, with very high bandwidth access to the Internet. A large proportion of HEAnet's costs are nationally funded. However there is also a very large client contribution to HEAnet costs, made by each of the customers including ourselves.

During 2005/06 HEAnet agreed a new client contribution model, under which our contribution was largely determined by our student and staff FTE numbers. This replaced the earlier model based on technical measures. The impact on NUI Galway was not significant.

We continue to contribute to discussions with HEAnet to assist them in developing their customer focus and their capability to offer customers the services which they need.

- **HP Ireland** HP (both in their current structure and in their previous incarnations as Digital and Compaq) have for many years been a large ICT supplier to the University. They continue to provide maintenance services to us and we buy HP printers procured under the University's IT equipment contracts.
- **IBM and Unitech** The University's storage area network is an IBM product bought through their distributor Unitech. We also purchased IBM equipment to provide the infrastructure for our new staff eMail service.
- **Fujitsu Siemens and Dell** These suppliers provide us with PCs under the University IT equipment contracts. We worked with both to explore opportunities to improve the customer experience.
- **CK Business Systems** (Since merged with PFH Technology). This is a Galway focused IT reseller and integrator. They provide printers under the University contract and have often provided additional services, including manpower to assist with the successful 2005/06 PC suites renewal project.

3.8.3 Other External Relationships

We continued to participate in the "eGalway Group". This is a combined initiative of Galway City and County councils, bringing together Galway organisations with an interest in electronic service provision.

3.9 Service Definition and Reporting

Part of the challenge of delivering excellence in our services is the need to identify the services which we deliver, to provide detailed service specifications, to define success criteria and metrics for delivering the services, and to understand and communicate the extent to which we are succeeding against those criteria.

We are some way from being able to do this routinely. At present we have identified a set of core services and drafted definitions for them. We have also started to create the detailed specifications which constitute the next layer of documentation. However, we still do not have an agreed set of service levels nor do we routinely measure our performance against defined service levels or indeed any criteria.

Our spring 2006 organisational tuning released some capacity which will allow us to start to focus on these issues.

3.10 Service Availability and Business Continuity

There is an increasing expectation that our services will be available to the University community on a 24 hour, seven day, 52 week basis. This expectation is not unreasonable in the modern world, but is not yet reflected in the definitions of the services which we provide.

The approach which we are adopting to delivering against these expectations is as follows:

- To invest in the technology needed to provide high availability services able to survive and rapidly recover from faults.
- To develop the procedural framework necessary to reduce the risk that incidents will occur and that they will cause service loss.
- To find organisational solutions which allow those situations which do impact service to be resolved as quickly as possible, whenever they occur.

The technology solutions to deliver the necessary high availability are being put into place, and work continues on the procedural framework. Little progress was made on the organisational solutions during 2005/06.

These issues are closely related to the issue of disaster planning. At present there is no plan which identifies the risks which we face in this area and the impact of those risks. There has been some work led by the University's Risk Management Group, and there has been a decision in principle to establish an ICT risk sub-group. However, this work has yet to produce tangible deliverables.

3.11 Service Delivery

Highlights and lowlights during 2005/06 included:

- A major service outage on the University network over the weekend period Friday 4 November to Sunday 6 November. This took place at a particularly unfortunate time, coinciding as it did with a weekend meeting organised by a large research institute. The meeting was particularly dependent on Internet access.

An expedient was put in place to support the meeting. The cause of the outage was traced to a mistake made by a research student. However, the fact that this mistake could have such a major impact was unacceptable. This situation arose because of weaknesses in the design of the network, which had grown organically during the University's recent period of expansion.

Following this outage remediation work on the network was accelerated. The current aim is to renew the central parts of the network and bring them up to modern design standards, partitioning the network so that the impact of mis-configuration (and of viruses and worms) is reduced, while simultaneously simplifying the network and improving its performance.

- Continuing and very successful rollout of the new staff eMail system. During 2005/06 migrations from the old server continued, leaving a residual group of users to be migrated during 2006/07. The use of Blackberry devices for eMail access continued to grow in popularity.
- Successful turnaround in the PC suites. The year started with very poor levels of service in the suites. In many suites it was not possible to use memory sticks, print service levels were poor, and there was a distressingly high frequency of total service failures.

During the course of the year there was significant effort to address these problems. This made progress largely through a process of attrition – students were eventually able to use memory sticks, and the frequency of serious issues did fall.

The real solution to these problems lay in the process by which software was configured and distributed for use in the suites. Preparation for the summer 2006 software renewal programme was very carefully managed. A disciplined technical approach was adopted in which individual suite software builds were developed independently, and carefully tested. To assist in this process we engaged external suppliers for packaging and quality testing of these software builds.

The outcome was that we entered the 2006/07 academic year with a much better product which proved much more acceptable to students.

3.12 Service Development

We continue to invest in the basic ICT infrastructure and in the services provided on it. Investment highlights during 2005/06 include:

- Replacement of the life expired air conditioning equipment in the main computer room. We now have an installation based on modern equipment with adequate capacity using dual units. We can tolerate the loss of units taken off line, whether for maintenance or by reason of a fault.
- Completion of the purchase of a Storage Area Network and initial provision of services on it. This provides reliable and fault tolerant storage. It makes it much easier to provide high availability and high reliability services which can tolerate the loss of individual machines.
- Provision of a “clustering” capability for the main servers used to support the computer suites. This distributes services over six servers, with fault tolerance between them. This approach means that the main services can now continue to operate in circumstances which would previously have led to a service break for customers. The cluster was brought into service at the end of summer 2006.
- Development of a centralised service for supporting Linux applications for teaching and learning. This will enable partial replacement of the very troublesome “dual boot” systems on certain computer suites. It will also enable these applications to be provided to students at any on-campus location, instead of restricting them to specific computer suites.
- Purchase of new hardware to host the University's Web site. This will replace the single end of life machine by a “cluster” of four machines. The old hardware was highly proprietary, could no longer be expected to be reliable, required specialist skills to support it, and could not run many of the Web programs in common use. The replacement uses modern technology based on open and industry standards and can be configured to provide a highly reliable service.
- Development of software to allow students (and third parties, such as their parents) to pay for computer suite print credit on line using a credit or debit card. This was made available to students, without wide publicity, during the latter part of the academic year. Full implementation was dependent of establishing robust procedures with the Financial Accounting Office for managing payments.
- Provision of an initial capability to monitor activity in the computer suites, including the provision of real time displays to students of seat availability by suite. The initial development provided students with a simple “spreadsheet” display on three screens at strategic locations on campus.

3.13 Technology Standards

The 2004 Computer Services Quality review noted that certain services were dependent on highly proprietary technology.

The present situation is that new procurements in Computer Services universally seek to purchase technology based on open standards or on widely available industry standards. Suppliers are expected to compete for the University's business on the basis of the value which they offer us, and there are no formal or informal arrangements to give any supplier preferred status.

Two proprietary platforms remained in service at the end of the academic year, both due for early replacement. These were the University Web server and the older staff eMail server. The student eMail service was also based on proprietary technology with no immediate replacement plan. However it is recognised that this service does not meet the University's needs, and it is expected that plans will be brought forward for its early replacement.

The University's view on other technology standards debates is determined by consideration of the University's strategic aims and of the needs to deliver excellent services economically.

The standards issues which cause greatest concern in the University community are desktop hardware operating systems and the use of open source software.

We take a pragmatic view in respect of desktop systems. Many members of the University community wish to use Apple computers or the Linux operating system on their desktop. We take the view that this should be treated as a matter of researcher and staff attractiveness, and that we should look for ways to accommodate these wishes. We also recognise the dominance of Microsoft Windows on the desktop.

Our concern as a desktop service provider is to meet the needs of our customers in their existing environment. We therefore expect to write desktop service definitions which accommodate all three of these main desktop platforms.

We do also have an obligation to provide our service economically, and to promote technology which allows the University community to work most effectively. We therefore see it as our responsibility to reduce costs by promoting simplification and standardisation of desktop services. We will therefore define our services around specific standardised configurations of each of these platforms, and, as far as possible will test the services in each of these configurations.

Where customers choose to depart from these standard configurations we will expect them to take responsibility for configuration and testing of their non-standard configurations. Units may wish to take a view as to the most cost effective way in which to organise their local ICT resources to achieve this, while enabling their staff to work most effectively to deliver their teaching, research and support activities.

The other significant standards issue of concern in the University is the use of Open Source software. The University does not have a formal policy on this issue. Informally we are guided by the need to provide solutions to the University



community which enable it to conduct its core activities in the most effective, efficient and economic ways achievable within the available resource base.

In practice this means that we look for solutions which are effective, which can be delivered in timely fashion, and which can be supported without disproportionate risk, expense or use of staff time.

4 Financial and Business Performance

The tables on page 19 provide a summary of the Computer Services business performance during 2005/06. All information is extracted from records held locally in Computer Services. Some of the numbers may vary slightly from information held in the University's central business systems. This will typically be because of difficulties reconciling the two sets of records, particularly at financial year end.

The total Computer Services income for 2005/06 was €4.4M. This consisted of allocations from the University's academic budget (€3.8M), supplementary allocations from other University budgets (€63K), and other income (€522K) largely from providing print credits and conference facilities.

Table 1 shows how this income was applied to service provision and development, including overheads at 7.8% of total costs, allocated over the services. This is supported by table 2, which shows how manpower was allocated by service (This includes all effort applied during they year and the figures may differ from the manpower figures presented in section 4.2).

The two largest Computer Services cost areas are direct student services (student computers, teaching and learning support and an 80% allocation of User Support Centre costs) and the basic infrastructure (network and data centre). These areas are responsible for 44% and 23% respectively of total costs.

Table 3 shows the main development investments committed during the year. These are dominated by improvements to the basic infrastructure, with replacement air conditioning (€180K), the Storage Area Network (€174K) and network remediation (€124K). Development investment continues to rise, and was a reasonable 13.5% of total income during the year.

Training investment (Table 4) fell compared with the previous year, where we had significant investment in PMDS training and in the fundamentals of the PRINCE 2 project management methodology. The average of 2.8 days per FTE was lower than we would wish to see in an organisation which must continuously renew itself.

The remaining three tables provide information on our performance. Table 5 provides indicators about demand for our services, which continues to grow substantially. Student numbers are no longer growing at the rapid pace of earlier years. However, University staff numbers are growing, reflecting success in attracting research funding.

Overall we believe that these figures show a creditable performance in containing cost and in improving service performance and productivity. This improvement has allowed us to apply a greater proportion of our effort to improving our services and to deploying new ones.

Computer Services 2005/06 Year End, Summary by Service								
Services	FTE	Staff	Non-Staff	Allocated Overheads	TOTAL Staff & Non-Staff	Previous Year	Percentage change	Capital Investments
Income								
Direct University Allocation		2,282,966	1,353,877		3,636,843	3,236,328	12.4	
Other University Initiatives			216,800		216,800	80,000		
Other Income			522,446		522,446	453,164	15.3	
TOTAL INCOME		2,282,966	2,093,123		4,376,089	3,769,492	16.1	
Expenditure								
Basic Student Desktop	16.1	696,526	646,590	133,779	1,476,895	1,172,616	25.9	74,780
Teaching & Learning ICT Support	1.2	76,605	186,054	26,162	288,821	546,587	-47.2	
Staff Desktop	7.4	289,023	29,524	31,728	350,275	329,450	6.3	
User Support Centre	4.4	206,945		20,612	227,558	174,528	30.4	
Network	6.3	365,647	371,210	73,393	810,250	720,302	12.5	123,581
Data Centre	2.4	112,924	61,288	17,352	191,564	110,054	74.1	351,931
eMail	1.8	142,737	28,908	17,096	188,741	150,368	25.5	28,318
Strategic Co-Ordination	0.7	63,129		6,288	69,417	34,198	103.0	13,721
Web Services	4.3	171,203	16,465	18,692	206,360	151,447	36.3	
TOTAL	44.6	2,124,740	1,340,038	345,103	3,809,881	3,389,550	12.4	592,332
Departmental Overheads	2.0	183,830		161,273				
SERVICES TOTAL	46.6	2,308,570	1,501,311		3,809,881	3,389,550		592,332
Capital Investments						592,332	33.2	
GRAND TOTAL	46.6	2,308,570	2,093,643		4,402,213	3,834,209	14.8	

Table 1 - Income and Expenditure

Manpower Summary by Service	2003/04	2004/05	2005/06
	FTE	FTE	FTE
Basic Student Desktop	11.1	11.1	16.1
Teaching & Learning ICT Support	3.5	4.8	1.2
Staff Desktop	6.0	7.6	7.4
User Support	5.0	4.4	4.4
Network	3.9	5.5	6.3
Server Management	1.8	1.3	2.4
eMail	1.9	1.5	1.8
Strategic Co-Ordination		0.8	0.7
Web Services	1.8	2.3	4.3
Overheads	1.5	2.0	2.0
TOTAL	36.5	41.2	46.6

Table 2 - Manpower by Core Service

Main Development Investments €K	2003/04	2004/05	2005/06
Replacement Air Conditioning			177.9
Storage Area Network			174.0
Novell Clustering			19.3
Electronic Print Payments			27.0
Computer Suites Real Time Information			13.2
Central Linux Server			15.3
Email Server Infrastructure			28.3
Network Enhancements			123.6
Campus Card Feasibility Study Part 1			13.7
TOTAL	168.1	444.7	592.3

Table 3 - Main Development Investments

Training & Development Summary	Units	2003/04	2004/05	2005/06
Total Training & Travel Budgeted	eur	45,000	66,820	82,500
Total Training & Travel Expenditure	eur	45,741	75,694	50,606
Training & Development Days Delivered	days	94	206	129
Training & Development days per FTE	days	2.6	5.0	2.8
Training & Travel Cost per FTE	eur	1,255	1,839	1,085

Table 4 - Training Summary

Basic Information	2003/04	2004/05	2005/06
Rollover Payroll Increase		11.1%	6.8%
Students Registered (HEA return, 31 Mar)	14,368	15,088	14,468
University Staff (HEA return, September)	1,411	1,548	1,721
Student Desktops in PC Suites	1,152	1,245	1,391
Wireless devices registered	541	1,407	2,615
Network Ports Installed Base	10,102	10,411	12,632
Network Ports Lit	6,829	7,362	9,756
Staff support engineers (year end)	5	6	5

Table 5 - Service Demand Metrics

Unit Costs (all per annum)	EUR	EUR	EUR
Total CS cost per student FTE	258.65	248.99	304.27
Total CS cost per staff FTE	2329.26	2427.16	2557.33
Cost of student support services per student	133.77	121.79	134.63
Cost of student support services per desktop	1437.93	1475.96	1400.26
Staff support per staff member	223.08	233.23	229.92
Cost of eMail service	10.55	8.79	13.05
Network Maintenance & Support per active port	113.36	74.74	83.05

Table 6 - Unit Costs

Other PIs	2003/04	2004/05	2005/06
Overheads as % of total costs	6.5%	6.6%	7.8%
Investment as % of total income	5.2%	11.8%	13.5%
Student FTEs per CS FTE	355.91	366.51	310.31
Staff FTEs per CS FTE	38.71	37.60	36.92
Students per Supported student desktop	10.7	12.1	10.4
Staff supported per support engineer	282	258	344

Table 7 - Other Performance Indicators

Figure 1 - Computer Services Performance Summary

Our staff desktop services represent a continuing weakness for us. The 2005/06 ratio between the number of our frontline support engineers and total University staff was some 344:1. This contrasts with consultant guidance on best external practice, which suggests that this ratio should be closer to 50:1.

These numbers do not tell the whole story, because certain units have staff who work on desktop support issues for some or all of their time. Work is continuing to analyse this situation across the campus community and to provide a realistic analysis of desktop support coverage across campus.

4.1 Physical Resources

The main Computer Services office accommodation and computer room is located in the Arts and Sciences Building.

During 2005-06 we continued the upgrade of our computer room, replacing the main air-conditioning units which had reached the end of their service life and had become increasingly troublesome. The computer room is divided into three areas and the new configuration covers each of the main areas with two units, each of which has sufficient cooling capacity for the area which it serves. This allows us to tolerate loss of a single unit to a fault or for maintenance.

The next priority in developing the data centre will be to rationalise and upgrade the power supplies. These are at capacity and significantly lacking in flexibility, making it very difficult to install new equipment. The current power supply configuration also uses floor space very inefficiently, with discrete uninterruptible power supplies for servers and groups of servers.

We continue to release computer room space by the removal of older larger equipment and its replacement by, and consolidation into, physically smaller space.

The existing computer room continues to represent a concentration of information resources. This creates significant risk to assured business continuity for the University. Any failure affecting the main computer room carries with it substantial risk to the continuing daily work of the University. This risk will need to be addressed, initially through a business continuity planning exercise.

The Computer Services office accommodation remains unsatisfactory for the purpose of accommodating an ICT service provider. It is laid out in a way which inhibits good communication, and it is all too easy for staff to work in inappropriate isolation. Furthermore, it does not have sufficient expansion capacity to allow for the reasonably foreseeable growth of the Computer Services team.

Discussion continued with the Vice-President for Physical Resources about the possibility of relocating Computer Services to new or newly refurbished accommodation, perhaps on the North campus. Such a move would also sensibly

provide additional computer room accommodation to spread the risk to the University's information resources.

In the meantime we closed the Desk Top Publishing computer suite, which had been located in the main Computer Services area. The space recovered will be used to accommodate the Computer Services team as it grows. The room will accommodate up to five staff.

4.2 Human Resources

At the end of the 2005/06 academic year Computer Services had a total of 54 full-time, part-time and seasonal staff on the payroll. Seven of these posts (13 % by number) were filled on a contract basis. With minor exceptions the process of absorbing core staff onto the permanent payroll has been completed. The 2004 Computer Services reorganisation has also been completed; this resulted in a number of grade changes, mostly from G2 to G3.

We are seeing new growth in contract and seasonal posts in Computer Services. This is generally coming at more junior levels in the department, with more postgraduate students supporting services for students during term time, and with student placements from NUI Galway, to the benefit of all concerned.

The strategic aim is to develop the knowledge and skills of the Computer Services team, enabling the department to use its own resources to meet the objectives which are set for it by its customers and to respond rapidly and flexibly to the changing circumstances of the University. We wish to see Computer Services staff spending less time on fixing operational issues and more time on developing services and on working with our customers to understand and respond to their needs.

We do engage the services of consultants and fixed term contract workers from time to time. This practice will continue where appropriate. However, the intention is to ensure that skills which are strategic to Computer Services provision will be brought in-house. This particularly applies to strategic issues around the infrastructure, such as network and security planning.

The table on the next page provides a five year rolling analysis of year end staff grades and status. These are based on the budget allocations for 1 October each year (and are therefore not strictly "Year End"). Future reports will build this analysis to present a five year rolling analysis.

Computer Services Year End Staff Status					
	2001/02	2002/03	2003/04	2004/05	2005/06
Year End Staff Posts By Status					
Permanent	26	23	25	31	37
Contract	9	10	11	5	7
Term Time workers	12	8	8	13	13
Vacancies	0	3	3	5	1
Total	47	44	47	54	58
Year End Staff Posts By Grade					
Director	1	1	1	1	1
Administrative Officer	3	3	4	4	4
Grade 5	6	9	9	9	10
Grade 4	7	5	6	6	5
Grade 3	4	6	6	8	16
Grade 2	6	4	5	5	5
Grade 1	8	8	8	8	4
Postgraduates/FAS	12	8	8	13	13
Total	47	44	47	54	58

The next table provides an analysis of year end budgeted manpower costs. This provides information about the changing profile of Computer Services and its payroll costs.

Year End Staff Budgets	2001/02	2002/03	2003/04	2004/05	2005/06
University					
Total Students (HEA Return)			14,368	15,088	14,468
Total Staff (HEA Return)			1,411	1,548	1,721
Computer Services					
Posts	47	44	47	54	58
FTEs	39	36	39	43	45
Ratio Posts:FTEs	119.9%	122.2%	120.5%	125.9%	129.2%
Average Grade by Post	2.5	2.9	2.9	2.8	2.8
Average Grade by FTE	3.0	3.5	3.5	3.5	3.7
Increase in Posts	n/a	-3	3	7	4
Increase in FTEs	n/a	-3	3	4	2
% Increase in FTEs	n/a	-6.4%	6.8%	14.9%	7.4%
Total Staff budget (€K)	1,427	1,630	1,992	2,283	2,473
Staff Budget Breakdown:		€K	€K	€K	€K
Rollover	n/a	1,575	1,921	2,213	2,438
Staff transfers to and from CS	n/a	0	51	0	0
New headcount in CS	n/a	54	20	70	35
Percentage Increases:					
Staff rollover	n/a	10.4%	17.9%	11.1%	6.8%
Transfers		0.0%	3.2%	0.0%	0.0%
New Headcount		3.8%	1.2%	3.5%	1.5%
Overall percentage increase	n/a	14.2%	22.3%	14.6%	8.3%
Budget cost per post	30,353	37,035	42,387	42,277	42,638
Budget cost per FTE	36,392	45,266	51,082	53,247	55,108
% Increase in rollover costs	n/a	10.4%	17.9%	11.1%	6.8%
% increase per post	n/a	22.0%	14.5%	-0.3%	0.9%
% increase per FTE	n/a	24.4%	12.8%	4.2%	3.5%



PART 2 – REPORTS ON OTHER ICT SERVICES

5 James Hardiman Library

5.1 Highlights

This year saw *e-knowledge* used successfully in full production mode. The period saw incremental improvement to all the main library systems. It also saw a major increase in the gross content mediated via the library, in particular, as funded by the IReL initiative.

5.2 e-Knowledge e-Resource Portal.

The purpose of e-Knowledge is to assist students more effectively navigate and exploit the scholarly information environment. e-Knowledge became the default route for the discovery of e-Resources in September 2006. It is now the path to 305 major scholarly databases, all accessible from home, together with 12,157 electronic journals and 346,000 e-books. With, on average, over 1000 unique logins per day, and with e-Resource utilisation up substantially, we believe it has been a very successful addition to the electronic services available from the library.

5.3 Library Access Control system and Campus smartcard

In conjunction with Computer Services and the Buildings Office work has commenced on defining the requirements for a library access control system. This system will utilise a campus smartcard mooted as a replacement for the current student/staff identity card. In addition to controlling access, the system will give comprehensive statistics on library occupancy and utilisation.

5.4 EndNote Support

Library staff took over from Computer Services in providing support for EndNote software to staff and students. Activities included initial training of staff in Information Services and Library Systems, development of print and Web documentation and presentation of training to a number of groups in all disciplines. EndNote support has proved highly complementary to training in other electronic resources and demand is steady.

5.5 e-content additions

Electronic resource provision continues to expand, influenced particularly by the IReL initiative. While e-journals have been the focus of attention, and now total over 27,000 titles, it is noteworthy that the number of e-books has reached 346,000 and is approaching our holdings of printed monographs (398,000).

5.6 New Content Management System (CMS)

The change in library website design to accommodate the campus web templates afforded us an opportunity to change the way the site is produced. The previous site, utilised an embedded Perl templating system, not easily used by non-technical staff. We now utilise an open source product called OpenCMS to control and simplify web editing with mixed results. While the addition of standard content is simplified, the development of new functionality for the site is greatly complicated and we are actively seeking to find how this can best be addressed.

5.7 Metadata enhancement

Over 100,000 new cataloguing records were added describing the *Early English Books Online* (EEBO) collection. Another 22000 records describing the legal treatises on US and British law published from 1800 through 1926 via Gale Thompson's *Making of Modern Law* collection.

Library catalogue and e-Knowledge Records describing our ever increasing collection of hardcopy and electronic journals were enriched with descriptive and holdings metadata from the MARCIt service as part of regular monthly knowledgebase updates to SFX, a component of our e-Knowledge service.

5.8 Server Migration to Computer Services

So far, six library Linux servers have been migrated to Computer Services. In addition three new high specification IBM blade-servers have been acquired with a view to application migration and permanent location within Computer Services secure server room.

5.9 Self Service Loan and Return

We now have four self-issue stations enabling library users conduct loan transactions even when the library issue desk is closed. These are very popular with users and we are approaching 50% of all loan transactions being performed by this route.

5.10 Automated Patron Load and Conversion routines rewritten

Nightly feeds from MIS of new and updated registration details are now automatically converted to Aleph's Patron Load Information Format (PLIF) XML format and uploaded without any human intervention following a rewrite of our Patron Load routines. The impetus for this work was to accommodate changes to Aleph's input format.

5.11 Institutional Repository Proposal

Exploratory work commenced on the establishment of an Institutional Repository (IR), for the long term storage and dissemination of the intellectual output of the



University. This work took place preparatory to the submission of a proposal under the Strategic Innovation Fund (SIF) for the establishment of institutional repositories (IRs) in each of the IUA member institutions and a single national portal, populated from the content harvested from the local IRs, which would offer additional services. This initiative will cover a range of publications, but will concentrate initially on peer reviewed papers and theses.



PART 3 – DETAILED COMPUTER SERVICES REPORTS

6 Computer Services Reports

6.1 Strategic Coordination

Computer Services has a responsibility to provide leadership to the university at large on strategic and policy aspects of the delivery of ICT services. The focus for this work is the Strategic Services section, led by Pat Dempsey.

The key focus areas for the Strategic Services team for 2005/06 were:

- Leading specific investigations into technology solutions. These included a Campus Portal, Campus Card solution and the Web Content Management System (CMS). These projects are championed by Computer Services but involve all university wide service providers, including the MIS Office, Library and CELT
- To develop and evolve the Web Services in the university, working closely with the Vice-President for Strategic Initiatives & External Affairs (SIEA), the Marketing and Communications policy committee, and the Web Directorate.
- Identification of a roadmap and strategy for a University authentication and Identity Management solution. An Identity Management tender process was initiated in conjunction with the Procurement Office.

Identity Management encompasses technologies including password management (synchronisation and self reset), user provisioning and access management. It enables and maintains user access to ICT resources. This includes the creation of the user entity (functionality typically found in a HR application), authorisation and permissions (SSO and password management functionality), and a single point of administration for de/provisioning accounts (as in provisioning). This all has the potential to enable process improvements across the University. In the shorter term it will allow single login to all student and staff applications.

- Evolution of the university's storage area network (SAN). The SAN is a dedicated, centrally managed and secure information infrastructure built around multiple servers and disk arrays. It is connected via high-speed fibre links that allow for connection of almost unlimited heterogeneous systems and peripherals. The SAN is a key university resource as it can perform round-the-clock data backup and restore tasks at high speeds. The SAN provides for reliable services by protecting against failures and will enable future development of a centralised backup solution which will protect teaching and research data.
- There is increasing demand within the University for continuous service availability on a 24X7 basis. Business continuity describes the processes and procedures the university puts in place to ensure that essential functions can continue during and after a disaster or business critical situation. Business continuity planning seeks to prevent interruption of mission-critical services, and to re-establish full functioning as swiftly and smoothly as possible. The

first step in business continuity planning is deciding which of the university's functions are essential, and apportioning the available budget accordingly. The issues around business continuity are being explored and a project has been initiated to provide initial programme definition and to deliver a business continuity solution across the IT service provider across the campus.

- Implementation of system to provide PC suites information. This project focused on a recommendation in the Quality Review of Computer Services in 2004/05. "To provide more information for student users of the PC suites", using dynamic visual displays of real-time PC suite status information. The project goals were to provide more information for management and users of the PC suites, using historic and dynamic visual display of real-time PC suite status information. The requirement is for the collection and display of PC suites capacity and utilisation information. The principle is that Computer Services should be able to provide basic information on the aggregated PC suite capacity and utilisation by time of day and also by individual PC suite. A software solution was specified, trialled and procured to display textual based information on PC suite usage and available PCs.

6.2 Student Computers

The planning, provisioning, and maintenance of the student computing environment was managed by the Projects section of Computer Services, headed at year end by Brian Ensor (covering for Sinéad Ní Fhaoláin).

6.2.1 Computer Suites

There is an annual technology refresh of in the PC suites. This includes provision of new hardware on a three year cycle, the general maintenance of existing suites and systems, and new software builds to address the patching of software and to satisfy new requests from academic staff members.

We managed the provision of 360 new computers, of which 155 were in University open access suites and 205 in departmentally funded suites. Use of the latter is normally restricted to students of the department concerned. We also managed the provision of 11 new printers, moving towards standardisation across the printer inventory. At year end we supported 1391 computers, of which 591 were in open access suites and 801 were in departmental suites.

We closed one open access suite, the Desktop Publishing suite. This contained only nine computers. We released the space for use as Computer Services office accommodation.

We opened a number of new open access and departmental suites, and took on the management of others. Development of these suites was marked by strong partnerships with the customer departments concerned. The suites included:

- **Medical Informatics** 22 new computers and two laptops configured to support requirements for the growing medical informatics program. Special

software (NetOps) was also implemented to assist in the remote sharing of essential medical device monitoring. One of the computers was installed as a mobile unit for connecting to remote medical devices and broadcasting the view back to the classroom.

- **Political Science and Sociology** 13 new PCs and 1 monochrome network printer configured for basic suites support.
- **Child & Family** 10 new PCs (5 per classroom) and 1 monochrome network printer were configured for basic suites support.
- **Civil Engineering Wireless** 15 new PCs and 1 monochrome network printer configured with a special software build for support of Civil Engineering coursework.
- **Civil Engineering Projects** 40 new PCs, 1 monochrome, and 1 Colour network printer configured with a special software build for support of Civil Engineering coursework. This was completed as a cooperative project between Computer Services and Civil Engineering. Prior to this change, this suite was under management by Civil Engineering directly and connected to an isolated LAN. The change resulted in additional cabling and connection of the suite to the NUIG campus network. Additionally, the suite moved to full support by Computer Services.
- **CELT Language Lab (AMB119/AMB118)** 42 new PCs and two monochrome network printers configured with a special software build for support of Multimedia Language Learning managed through CELT. This was a joint refurbishment project between Computer Services and CELT. The replacement of an old analogue language learning system and rebuild of an existing digital learning suite to support new Sanako software and hardware was the core requirement. The joint effort resulted in two premium class learning centres focused on language learning managed under a shared support agreement between Computer Services and CELT.

6.2.2 Wireless Computing

The student computing environment has extended beyond the PC suites to incorporate the wireless clinic services. This service, previously handled by the User Support Centre, was transferred to PC Suites support. The clinics facilitate the connection of student owned devices that meet published minimum standards to the campus network. This includes the verification of system software readiness, registration, and configuration. The number of devices registered during the year was 2615.

6.3 Teaching & Learning Support

The student computing environment is a platform for enhanced academic services and applications. The planning, development, provisioning of these teaching and learning technologies was managed by the Projects section, headed at year end by Brian Ensor.

6.3.1 Software Request Process

We worked hard to refine the software request process, by which academic staff make clear their requirements for software to be installed in the computer suites. The process guides the handling of academic staff requests including the licensing, build, quality testing, and delivery of the required application. It is therefore essential that this process be robust and accurate. Substantial improvements were successfully introduced.

6.3.2 Licence Management

Many of the applications distributed in the computer suites depend on server based license validation schemes. At the end of the academic year there were six license servers managed by different people and using various operating systems.

A project has been initiated to rationalise this situation. This will involve commissioning three new load balanced license servers, and conducting a migration project, with completion due by September 2007. All licensing will be under one management domain with standardised build and support. Additionally, fault tolerance will be built in (where the application permits) to prevent failure within the suites and build a base for the exploration of enhanced network license services.

6.3.3 Server based applications

Not all the PC suite applications are locally installed. Some require either a 'back-end' server or a "network launchable" capability. A number of these exist within the Language Labs in the Arts Millennium building. Examples include CAN8 and Sanako where a server hosts all or part of the required feature sets.

At the end of 2005 a number of these services had been implemented following departmental request and had been installed in an incremental fashion. The implementations were not standardised and did not follow a uniform support structure. These applications have been either re-configured to utilise standard infrastructure for suites support (Novell File Cluster) or are identified as candidates for migration. The identified migrations are pending as the services in place have been reviewed and are currently supported effectively.

The most significant "back end" service is Blackboard, which is supported cooperatively by CELT and Computer Services. The maintenance, patching, and disaster recovery of this systems is under the remit of Computer Services. The current system is under review with an upgrade to the Enterprise edition planned for 2007.

6.3.4 Central Linux Service (LEAS)

The development of a Linux Environment for Academic Studies (LEAS) was a large accomplishment in 2006. We had provided Windows/Linux dual-boot PCs, but these did not deliver satisfactory service levels. This was due to a combination of limited skills and complexity of build. The use of dual-boot suites also limits the potential advancement of specialised imaging technologies that support more rapid response to change requests in applications deployed to suites.

The development of the LEAS system was conducted in a joint effort with the Cairnes Business School and the departments of Experimental Physics and of Mathematics. The resulting service is provided to academics for term time support of their coursework and allows students to access their Linux specific applications from any location on campus. This also frees the students and academics from being limited to specialised locations and relieves the pressure on those suites when required for instruction.

6.3.5 Printing

The network print service (iPrint) has been updated and expanded to support a number of new wireless printers, departmental printers and new suites. The service has undergone an in-depth review with identified actions taking place. In progress include the duplication of the current print service onto a more robust server and the clustering of the print server to address fault tolerance. Macintosh printing has also been added to the offered print service with Linux to follow. Vista printing is pending as the vendor has yet to provide a suitable driver. The expansion of the service also includes the introduction of ePayments which provides for online payment of print credit. The necessary accounting procedures have been developed, documented, and agreed with appropriate departments to support this initiative.

6.3.6 Assistive Technology

We provided technical support to Assistive Technologies by supporting the PC Suite, managing the Sick Bay examinations, and the distribution and management of laptops issued to specified students. The distribution of laptops increased by 20 in 2006 and the complexity and variety of software continues to grow. The requirement for supporting such technology requires specialised training and focused delivery of technical tasks to ensure that the requirements of the user base are met to satisfaction. This role has been supported by Computer Services in good faith by the provisioning of two days per week, but demand frequently surpasses capacity. Issues that increase the time spent on this effort include the attendance at special training sessions and conferences in order to conduct the duties required. All other Irish Universities (UCC, UCD, TCD, NUIM, UL, and DCU) have at least one full time person in the role of Assistive Technology Technical Support. This service requires a full review with a recommendation for a post that can focus on this specialised support field.

6.4 Staff Computers

Computer Services, through the Customer Services section, has responsibility for developing, delivering, monitoring and maintaining services for academic and academic support staff. This group includes permanent, temporary, and honorary academic staff, research students, and certain administrative staff. Desktop support activities are undertaken by the Field Services team.

The Field Service Team provides a one to one, on site, technical installation, configuration and troubleshooting service. This involves resolving significant computing problems for users, covering a wide range of possibilities including

hardware, software and network configuration. The Field Service team also provide advice on hardware and software issues and provide advice and coaching where necessary. Field Service technicians assess machines they visit to ensure they comply with relevant policies and standards including anti-virus and software policies.

During the academic year 2005-06 a total of 3409 calls were logged to and successfully dealt with by Field Service; this represents a notable increase of almost 30% over last years figure. Over 1,200 new devices were connected to the University network.

During 2005-06 we continued to take an active role in promoting and developing the Registrar's Computer Scheme under which permanent and long-term contract academic staff are provided with computers. Following a review of the scheme undertaken in 2005 information on entitlement and ordering procedures have been greatly streamlined with a comprehensive set of related information published on the department's website.

The following table shows the number of machines that were purchased under the Registrar's scheme during the academic year:

Staff PC Scheme Allocation Summary 2005-06

	PCs	Laptops	Macs	Printers	Scanners
Dell	54	23			
Fujitsu Siemens	7	2			
Screenway			1		
Galmac		1	1		
CK Business				39	2
Total	61	26	2	39	2

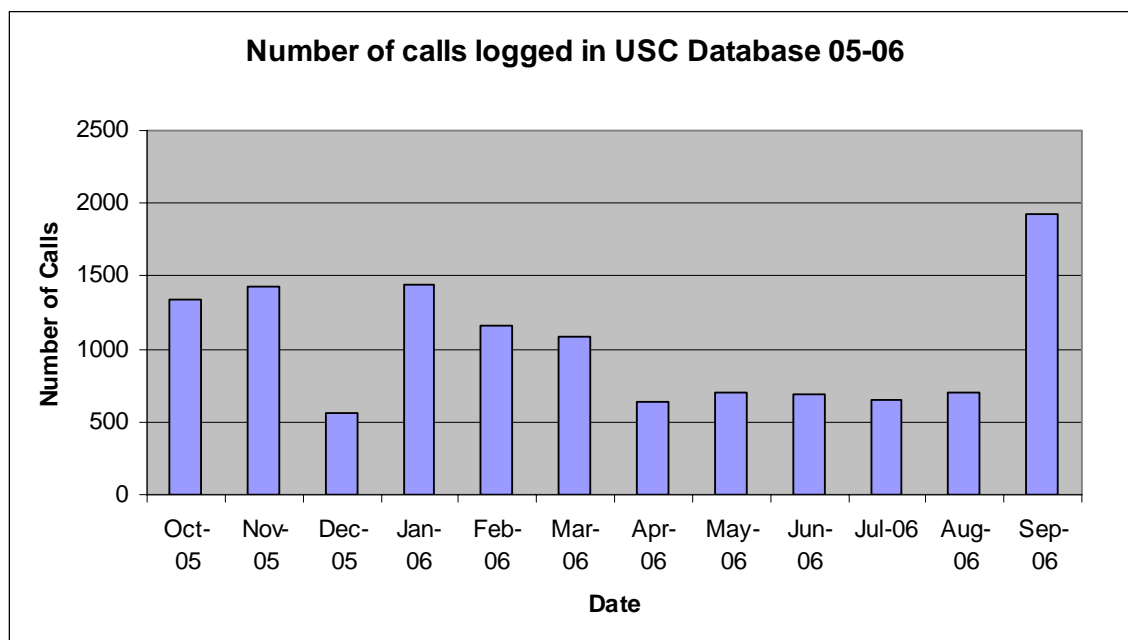
Staff levels remain a significant issue with the Field Services team. The team is comprised of six FTEs, with a remit to support over 2,000 staff and over 1,700 research postgraduates. Support ratios are therefore far from optimal, and the ongoing challenge for the team is to identify technical solutions and standardisation initiatives which facilitate a reduction in lead time for on-site call-outs to staff desktops. While further progress was made in this respect, response times remain less than satisfactory from a customer perspective.

6.5 User Support Centre

The User Support Centre (USC) is the primary contact point for all queries, requests and fault reports to Computer Services. It was staffed during the year by two full time and four part-time staff. Some staff shortages were experienced, and temporary staff were used where possible to bridge the gaps.

The User Support Centre is a busy office with a great deal of foot-fall and electronic traffic. The total number of logged support calls for this period was 12,148 which represents an increase of approximately 9% over the same period last year. Additionally, there were 18,156 drop-ins and 9,903 telephone calls to the Centre.

The following graph indicates the monthly variation in the number of support calls logged by the User Support Centre during the period October 2005 to September 2006:



6.5.1 Software licensing

Computer Services acts as a central point for the purchase, licensing and distribution of general use software, and of software used for teaching in the PC Suites. We also provide an advisory role to members of staff purchasing specialist software for their own research, business and teaching requirements.

Some 150 separate software applications are licensed for use in the PC Suites; approximately 100 more are used on a freeware or shareware basis. General use software, such as MS Office, EndNote and WinZip are distributed to all PC Suites and staff desktops, while specialist software applications are distributed to particular PC suites and academic departments in accordance with teaching needs and licence terms.

During 2005/06 we renewed our Campus contract with Microsoft to licence the use of their core operating system and desktop software (Windows, Office, Publisher, Project, Visual Studio and Visio) both on campus by all users, and through the purchase of a “work-at-home” option. The latter allows permanent members of staff to use this software off-campus. New site licenses were purchased for PDF Converter, to facilitate the creation and editing of .pdf documents, and NVIVO, the industry-leading software solution for qualitative research activities.

A new University policy on support from central funding for the purchase of software came into operation from October 2005. The policy states that the University will

contribute to software costs on a sliding percentage scale, depending on the extent to which the relevant software product is available for general use in the University.

The main advantage of adopting this policy is that there are now transparent rules for allocating central University funding towards the purchase of software, and that central funding is contributed in accordance with known demand for software. Software products are classified into different licence bands, according to the extent to which they are available for use across the University and their value for money. For example, the Microsoft Office suite of software is categorised as “Category A: Universal Use”. It is therefore fully funded by Computer Services. On the other hand specialist software in use within only one department or unit is categorised as “Category E: Specialist Use”, and there is no contributory funding from Computer Services on behalf of the University.

Funding decisions made during 2005/6 were in accordance with this policy. Of significant note was the purchase of the site license for NVIVO, which was categorised as “Category B Widespread Use” and therefore 50% of the ongoing cost of this license is funded by Computer Services on behalf of the University with the remaining 50% funded by the Arts Faculty.

We have also been working with units to review “legacy” licensing arrangements with a view to ensuring that existing funding models are in line with the key principles of this policy. As a result, the requirement to fund certain specialist applications has reverted back to the using departments, and other software licenses have been dropped or scaled back appropriate with current customer needs.

6.6 Network

The planning, provisioning, and maintenance of the University's network is managed by the Infrastructure Services section, headed by Andrew Butler.

6.6.1 Wireless LAN (WLAN) Service

During 2006 the decision was made to carry out a major upgrade to the University's wireless LAN system. Previously each wireless Access Point (AP) was unmanaged, acting like a dumb shared network port, rather than an intelligent point of access onto our network. This meant the intelligence to connect to the network had to be manually configured onto each laptop requiring access.

Students and staff therefore needed Computer Services assistance in order to access the network. Students had to come to “Wireless Clinics” held throughout the year. This is highly inefficient, both for Computer Services and the end user.

The upgraded infrastructure will convert the APs from dumb to intelligent ports, that will grant access based on certain criteria being met by the user requesting access. The process is dynamic. First time users will have their laptop automatically checked to ensure that operating system patches and anti-virus software are up to date. If it fails these checks to user will be denied access and directed to a special website to

update their software. Subsequent visits will be straightforward, unless the laptop require updating.

All this is done automatically and will not require attendance at a wireless clinic. The clinics will be phased out, with support being provided to individual users on an ad-hoc basis as required.

The system design was being finalised in Autumn 2006 with a view to go to tender before the end of the year. This project represents a major investment of time and money. It will form the bedrock of future wireless service developments, the scope of which is expected to expand rapidly in the coming years.

6.6.2 Campus Wired Network Remediation

In January 2006, the University recruited a Network Architect into Computer Services. The remit was to provide the highest standard of technical leadership for our the network infrastructure, which is the bedrock for all our ICT services.

The current network of several thousand nodes had grown organically during the University's recent period of rapid expansion. The design of the network lacked formal strategic structure and planning. It had been found wanting with respect to performance, security and integrity, both during the 2003 "Blaster Disaster" and during the two day service break during November 2005.

The objective is to convert the current flat Layer 2 switched network to a hierarchical Layer 3 routed network, with an architecture rather like the Internet itself. Remediation started in summer 2006. This upgrade programme is expected to be the largest investment programme for Computer Services for at least the next three years.

The first migration took place in the Clinical Sciences Institute. It involved the introduction and configuration of new network hardware. This project also included laying a replacement fibre optic link from Clinical Sciences to Computer Services, making good the ravages of several years construction work on the UCHG site. It also included provision of a diverse routed backup fibre connection through Galway's Metropolitan Area Network. This was managed on our behalf by HEAnet. The outcome was a network configuration which was resilient, more secure; more reliable and very much faster.

The second upgrade, in the Martin Ryan Institute, was planned to take place towards the end of 2006.

6.6.3 Remote Site Access

During summer 2006, a new Virtual Private Network (VPN) service was introduced to provide full network access to remote sites across the public Internet. All that is required is a broadband ADSL connection. The first sites to utilise this service were at the MRI laboratories at Carna and the Acadamh site at Inverin. Each site requires modest hardware (a router at both ends of the connection to manage the VPN traffic) and a very cost effective ADSL line.

It is planned to connect more of the University's remote sites during 2006/07 using this new service, subject to service availability. This initiative also enables significant cost savings at some sites that are currently connected via very expensive dedicated links. These can be replaced by low cost ADSL broadband connections.

6.6.4 Video Conferencing Service

For many users, particularly CELT, the standard of our videoconferencing service had not met the standard expected. The main cause was poor network design. This had prevented the effective use of "Quality of Service" (QoS) technical standards to deliver traffic to units across the network.

Significant time was invested during the year to provide an effective Quality of Service implementation across the campus. Significant hardware investment was also required, as most of the switches to which videoconference units were attached needed to be upgraded. Many of the units had been converted by the end of the academic year, with the remainder planned to be converted during 2006/07.

6.7 eMail

The planning, provisioning, and maintenance of the eMail infrastructure which serves the academic community is the responsibility of Andrew Butler.

6.7.1 Active Directory Infrastructure

Active Directory (AD) is a technology which underpins eMail services across the campus. An AD working group was set up jointly by Computer Services and the MIS Office. This group drafted an agreed Service Level Agreement to govern the interaction between the two offices and the development of the University's AD infrastructure. This will be critical to the future development of a number of services such as eMail and Blackboard. This working group have input to other campus wide initiatives such as an Identity Management solution and a fully integrated campus wide AD infrastructure.

6.7.2 Exchange Rollout to Staff

By Autumn 2006, over 70% of the University's 2,500 academic and academic support staff eMail users had been migrated to the new staff eMail service. This is based on Microsoft Exchange and replaces our antiquated VMS based system.

The migration process became efficient and seamless, with users migrated in batches of 50 to 100. The team Computer Services invested significant time and effort in developing the migration process both at the server and on the client side. This project has been very successful and NUIG staff now enjoy the use of a modern, highly reliable eMail solution. (The reliability comes from the AD infrastructure, the Exchange servers and the associated AD infrastructure, which run in a High Availability clustered environment).

All users now have access to groupware tools such as global calendaring, address books and resource booking. During 2007 it is planned to initiate the development of additional AD based collaborative tools such as Sharepoint.

6.8 Data Centre Services

These services include provision of the basic data centre infrastructure (accommodation, power, air conditioning), support of the servers and services which are provided from the data centre, and integration and support work to ensure that these services work effectively with the desktop and end-user services provided by other parts of the organisation. This service area is the responsibility of Andrew Butler.

6.8.1 Core Novell Servers

Novell Netware and associated products provide the technology base for shared file and print access in the computer suites, and for the distribution of software to the suites.

During 2006 our Netware servers were attached to the University's new Storage Area Network (SAN), thereby providing user access to extremely scalable and highly reliable hard disk storage (HDD) infrastructure. During the summer we carried out design work to upgrade the Netware infrastructure to configure a new high availability Netware Cluster to host all of the core services for students. The cluster will consist of six servers. Failure of any one will result in no loss of service to the user. The services that will run on the cluster include home drive access, application data access, shared data access, suites application delivery, printing and suites imaging services. This investment is a major step forward in delivering higher reliability for our core student services.

6.8.2 Linux Programming Environment

A new Linux programming environment service (LEAS) was developed during the summer of 2006 for introduction during 2006/07. It allows students to "tunnel" into different Linux environments (such as command line, application interface and true desktop interface) from a standard Windows desktop, typically in a computer suite. The technical solution uses a client agent coupled with Linux terminal services, allowing a server to spawn multiple "virtual terminal" sessions to multiple clients simultaneously.

This is a major achievement as reduces the need to develop and deploy "dual boot" suites. These suites require substantially more development and support effort, and have proved very troublesome in practice. The Linux virtual server provides a complete and rich Linux programming environment that requires only the administration of a single server.

6.8.3 Computer Suites Imaging Upgrades

A key component of the summer 2006 computer suites technology refresh was the use of IP multicasting. This technology allows deployment of a new software build to a

suite in a matter of minutes rather than days. Multicasting allows a single IP packet to be sent to many recipients at the same time. Our application of this technology is to send one image from our imaging server to a computer suite. The image is sent to each computer in the suite simultaneously.

This is a major improvement in our software distribution process. It is much more efficient and allows us to improve our flexibility and deploy new services that may require suites to be re-imaged at short notice.

6.8.4 High Availability Linux Clusters

During 2006 we developed a Linux cluster solution that will initially be used to host the University's website. The website cluster will consist of six servers, two redundant machines at the "front end" managing traffic flow and four clustered web servers at the "back end". In addition to being highly available, this solution will be able to balance workload between the four back end servers. The new web cluster is due for deployment during 2006/07.

The same solution will be used for our four Internet proxy servers. This was also due for delivery during 2006/07.

6.8.5 Operational Improvements

Significant progress was made during 2006 in improving the effectiveness of Computer Services data centre operational support team. This included the development and deployment of new monitoring tools and technologies (such as CACTII, Ganglia and CISCO Works), as well as the development of tighter operational processes to monitor and react to unplanned events. This includes tighter definitions of Support Levels, improved lines of communication, more clearly defined demarcation of responsibilities and more clearly defined escalation procedures and contact points.

This effort will continue into 2006/07 with the introduction of mechanisms such as SMS alerts and the adoption of collaborative tools such as Sharepoint to assist in the direction and management of operational processes. The aim is to develop an operational environment that incorporates internationally accepted best practices, and that can meet the needs of the University. The customer expectation is that services will remain available at times over and above the traditional hours of coverage. Achieving this is an on-going effort and will inevitably involve development of modified work practises. This is expected to require organisational change which will be delivered in line with the provisions of the "Towards 2016" national agreement.

6.9 Web Services

Computer Services has a Web Services team which reports to Pat Dempsey. The work of the team is overseen by the Web Directorate. Concerns include current analysis, proposed improvements, and the creation and implementation of Web Policy, Standards and Best Practices.

The key focus areas for the Web Services team for 2005/06 were:

- Following widespread consultation the new design for NUI Galway's homepage and Web pages was implemented in late 2005. Initially, the home page and primary navigation page was converted to the new design. Throughout 2006, more and more of the existing Web sites were converted to the new design. Converted websites then managed their content using Content Management System (CMS). The rollout continues on a unit by unit basis and specialised training was provided on effectively managing and maintaining the new template and 'look and feel'.
- Provision of Web training, which is arranged through the Staff Training & Development Office. These sessions cover how best to maintain and update university Web pages while also providing an introduction to systems and services provided by the Web Services team.
- Further investigation into the possible introduction of a commercial Content Management System (CMS). This would standardise and simplify the process of manipulating live Web content while simultaneously enforcing the University Web policy and also improving the reliability of the University Web presence.
- A new hardware platform was sourced and purchased to replace the existing single server that was running the entire university's Web presence. Plans are at an advanced stage to implement a hardware clustered environment.

Hardware clustering (sometimes called operating system clustering) is a hardware-based method of turning multiple servers into a cluster (a group of servers that acts like a single system). As a rule, a hardware cluster is created by installing a number of blade servers on the machine that will control the cluster. Each of the blade servers functions independently of the others, although they all respond to the same requests. The operating system of the controlling server is responsible for monitoring the cluster and performing administrative tasks, such as deciding when failover is necessary and assigning the load of a failed node to a functioning server.
- The Web Services team is currently making good progress to develop the university Web site. The goal of the group is to produce an excellent Web site which is attractive to its users, has relevant and timely content, is easy to use and maintain, and utilises internationally recognised best practices.

Other projects which the Web Services group conducted or participated in included:

- Top level page reviews
- Courses system
- Usability and usability testing
- Searching the Web site
- Staff intranet
- Template review and integration
- Quality



- Focus on placement for awards
- Help Web site / pages for Web Services