Computing in Informatics

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The Division of Informatics was created in 1998 from the the former departments of Computer Science (Kings Buildings), Artificial Intelligence (Forrest Hill and South Bridge) and Cognitive Science/HCRC (Buccleuch Place). Prior to the formation of the Division, each of these three departments had their own well-established computing services. Discussions are still ongoing as to the what model of computing provision will best meet the Division's needs for the future, so the three computing services will continue for the near future.

This document attempts to summarise the three computing services.

Computing within Informatics is obviously different from computing within most other planning units - it is the subject being taught and researched as well as being a tool to aid those activities. This has an effect on the computing service provided within the Division. The computing service aims to be state of the art and hence is constantly evolving.

Because the EUCS has, of necessity, taken a more conservative line on the services they have provided, they have been unable in the past to provide the facilities (with the exception of wide-area networking) the Division has required. As a result, with a few exceptions, the Division has been self-sufficient in terms of computing resources. However, in the light of decreasing staffing levels and increasing demands, a more careful look at how the Division might make more use of EUCS facilities is being made. Indeed, EUCS have been supporting the computing infrastructure (using Windows NT) for the KB-based Divisional administrative staff since Autumn 1998.

1 Developments over last 12 months

The Division is encountering severe difficulties in retaining and recruiting experienced computing staff (and, indeed, academic teaching and research staff). The KB site has particularly suffered, with two CO resignations and two COs moving from full to part time working. There are currently five CO vacancies across the division.

The 1999/2000 Computing in Informatics statement reported that the Division had decided to develop a new common infrastructure to support commodity Unix computing. This project, known as DICE, started in March 2000 and was expected to take around two years. Unfortunately progress on the project has suffered greatly due to the loss of staff at the KB site; the project mainly involves KB based COs and these COs have had to take on much of the work of the departed COs.

The Division was recently successful in bidding for a medium sized (around 128 nodes) Beowulf cluster from the recent EPSRC Special Equipment Initiative. It is expected that this will enter service around Easter 2001.

The network at the KB site has been completely rewired with 100baseT to the desktop and gigabit fibre interconnecting the three hub sites. The network is based on HP ProCurve switches and makes heavy use of VLANs; each one of the nearly 600 access points is capable of being connected to one of 15 VLANs.

The network was completely funded inhouse, with the Division's technicians performing all 10km of wiring.

An increasing number of staff are using VMware on Linux PCs to run Microsoft Windows and Office. We see this as the cheapest way (in support terms), for us, of providing access to Microsoft software.

2 Management

The management of the Division's computing support is split between the forming of policy and day to day management.

Policy is formed by the Computing Policy Committee, consisting of the Computing Executive Group (CEG) and academic representatives from the teaching organisation, the graduate school and the research institutes.

Computing support is managed by the Computing Executive Group (CEG), which consists of four senior ADs (Paul Anderson (KB), Ken Dawson (FH/SB), Jeremy Olsen (BP) and Alastair Scobie (KB)) and the deputy head of Division (Stuart Anderson).

The three computing services at FH/SB, BP and KB are managed by Ken Dawson, Jeremy Olsen and Alastair Scobie respectively. Although the computing services are managed along the old departmental lines, direct teaching, teaching support and research support is mostly coordinated at Division level.

3 Computing Staff

The Division employs :-

- 23 AD (Computing Officer) posts.
- 5 baseline CD (Computing Support Officer) posts.

Five of the AD posts are currently vacant.

Although the number of AD posts sounds large, normally only about 60% of the available effort is involved in providing the Divisional computing services. The remaining 40% is directly involved in teaching and research support. However, as there are currently five vacant posts some of the teaching support is being performed by postgraduates students employed as ”teaching assistants”.

Four and a half CD posts jointly provide centralised ”faults” and ”support” services, both online and front-desk, at each site. They also carry out many of the routine day to day tasks of running the service. The remaining half CD post provides administrative support - ordering kit, maintaining the inventory and maintenance contracts.

Technicians maintain the physical fabric of the KB computing facilities. They liaise with suppliers over broken kit which is under maintenance, fix kit which is not under maintenance and install and maintain the physical networks. This work is undertaken by COs and CSOs at the other sites.

The title **Computing Staff** is intentionally used in place of **Support Staff**. Computing Officers have, at least at the Informatics KB site, always been directly involved in teaching (especially) - in certain cases more than some AT grade staff.

4 IT based activities

As *computing* is subsumed by *Informatics*, the academic discipline of the Division, it is not judged appropriate to list all the Division’s computing activities in this section. Detailed information on the teaching and research of the Division can be found at *http://www.informatics.ed.ac.uk*

5 Computing Facilities

The principal computing platform in the Division is Solaris on Sun workstations. Over the last couple of years, however, the KB site has completely moved over to a Linux PC platform for commodity Unix computing. It is the intention that this transition will continue into the other Divisional sites as a result of the DICE project.

Windows NT and Windows 95 are primarily used for administrative computing at both KB (managed by EUCS Science Support team) and FH/SB. There is a small undergraduate lab of Microsoft NT PCs at KB, loosely managed, which is mainly used for teaching particular applications that aren’t available under Unix platforms. There is also a small community of Windows NT postgraduate users who rely on supported infrastructure services.

Apple Macs are only widely used at the BP site, by researchers, COs and administrative staff. It is likely that the administrative applications will move to Windows NT. Macs are not supported at either KB or FH/SB.

The Division has two small clusters of SGIs for research and graphics related teaching, including an SGI RealityStation.

The following table lists all the Division’s computing hardware by category, as of November 1999. All Windows machines have eXceed installed for access to Unix servers. Almost all Linux laptops also run Windows.

	Total	KB	FH/SB	BP
Linux clients	232	220	12	
Linux laptops	28	28		
Linux servers	15	15		
Sun clients	282	38	164	80
Sun servers	58	29	19	10
SGI clients	6	6		
Windows clients	94	40	23	31
Windows servers	2	1		1
Mac clients	45	0	5	40
Total	762	377	223	162

5.1 Staff facilities

Academic and academic-related staff can normally expect an entry-level Sun workstation (FH/SB and BP) or a Linux PC (KB). Staff may use research grant finance

to upgrade their workstation or PC to a more powerful machine and/or to purchase a Linux laptop. A small number of staff use Macs, mainly at BP.

An increasing number of staff are using VMware on Linux PCs to run MS Windows and MS Office.

Administrative staff use Windows NT PCs at KB, Windows 95 PCs at FH/SB and Macs at BP.

5.2 Undergraduate student public lab facilities

The undergraduate teaching labs are listed in Appendix A. There are also a number of specialised labs with small numbers of machines with attached hardware (eg robot arms).

Although notionally groups of public machines are allocated to particular groups of users, effective use of the workstations dictates that the configuration of exactly which group is allowed onto which group of machines changes as course deadlines come and go.

Only AI1 and AI2 classes have timetabled lab sessions in Divisional labs. All other labs are open access. The CS1 lab uses a booking system due to the size of the class.

Students taking the CL1h service course have timetabled classes in the ATL4 central lab, to which the Division has contributed

5.3 Research student facilities

The Division has recently adopted a goal of one workstation per research student FTE (not MSc). Because of the differing layouts of the Division's buildings, at some sites this means personal office machines and at others labs of machines.

This goal has been reached at the KB site thanks to the use of cheap PC based Linux machines. The other sites are still largely based on more expensive Sun machines and so will probably not reach the one to one goal until a division wide Linux provision is in place.

5.4 Network structure

The Division has a twisted-pair (TP) ethernet network. The KB site was wholly wired and subsequently maintained by in-house technicians. The other sites paid contractors to install wiring. Virtual LANs (VLANs) are in heavy use at all sites, with many spanning across the four sites over EdLAN.

The South Bridge site is still largely based on 10baseT. It is hoped to upgrade this to a 100baseT switched network this academic year.

5.5 Divisional database

The Division has developed a central database which covers staff and student records, course details, student marks, staff publications, events and inventory. There are over 140 database tables with a total of around a million records.

6 Future plans

The Division decided, last year, to develop a new common infrastructure principally to support commodity computing but also to aid management and integration of specialised systems. The intention is that this infrastructure should be flexible enough to underpin any model of computing service or services the Division should eventually agree on. It is also hoped that the infrastructure will be usable by other Unix based departments. This project started in March 2000.

There is an increasing demand for support for Windows platforms. Our opinion is that large scale management of Windows machines is hard. We do not have any spare effort to develop a management infrastructure for Windows alone. It appears more appropriate for us to use a University wide technology for Windows and we are hoping that the new EUCS Windows 2000 project can be a collaborative project to which we can contribute. In the meantime we are using VMware on Linux PCs for simple Windows/Office provision.

7 Political problems

- The Division is having *severe* difficulties in recruiting and retaining experienced staff at this University's salaries. We have seen in recent years, while recruiting new staff, some evidence of other universities appointing staff to higher grades than similar staff would be appointed to here.

- EUCS priorities seem to be still orientated to providing public facilities and end-user support and we feel that EUCS are not responsive to departments, such as ourselves, who largely provide their own computing facilities. We would like to see much greater collaboration on designing and producing systems, such as directory services, that would integrate the various computing services of the University.

Appendix A Undergraduate labs (1999 figures)

A.1 School of Computer Science

CS1 (125 FTEs)	40 x Linux PCs (Celeron 433-128Mb)
CS2 (58 FTEs)	28 x Linux PCs (P200MMX-64Mb)
CS3 (56 FTEs) / CS4 (52) / MSc (29)	35 x Linux PCs (Celeron 400-128Mb)
	5 x Linux PCs (P200MMX-64Mb)
	5 x Linux PCs (PII-233MMX-64Mb)
	10 x Sun SS4-128Mb
	4 x Sun SS5-64Mb
CS4/MSc projects	10 x NT PCs (Pentium 200 to Celeron 400)
CS4/MSc projects	5 x SGI O2-128Mb
SLI MSc	8 x Sun Ultra10-128Mb
	3 x NT PCs (Celeron 400-128Mb)

A.2 School of Artificial Intelligence

AI1/AI2 (100 FTEs)	5 x Sun Ultra1-64Mb
	12 x Sun SS4-64Mb
	12 x Sun SS4-64Mb
AI3/AI4 (55 FTEs)	14 x Sun Ultra5-128Mb
	9 x Sun Ultra1-64Mb
MSc (50 FTEs)	13 x Sun Ultra5-128Mb
	8 x Sun Ultra1-64Mb