[edinburgh bits]
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MAY 2002 VOLUME 12 ISSUE 9

Special issue: Networks

This edition of *BITs* concentrates on a number of significant developments on the networking front. The Funding Council is investing over £500K towards the upgrading of the Edinburgh and Stirling Metropolitan Area Network (EaStMAN), managed by Computing Services, and this will have significant knock-on effects on the University's EdLAN network. The new Medical School at Little France opens this summer, and a large injection of money from the Science Research Infrastructure Fund will result in a new very high speed research backbone constructed to support several leading-edge departments.

As if that were not enough to keep the EUCS Network Services Division busy, it has already started on the EdLAN Rewiring Project, convened a Wireless Networking Working Party, and set up the Incident Response Team to deal with the ever-increasing security problems. Finally, the UK Education and Research Network Association (UKERNA), which runs the national JANET network, is changing the JANET funding model, and has introduced much stricter contractual arrangements for the management of the MANs.

All in all we are entering a very busy period, as summarised in this issue of *BITs*, which will ensure that the University continues to have a world class network with excellent connectivity to the rest of the UK and the world.

Scott Currie (EUCS)

The Medical School at the New Royal Infirmary. The statistics of its network are impressive: there will be over 400 telephone points, and some 3,000 active 10/100Mbit/s data outlets, supported by 65 Ethernet switches connected in a star network to a core Cisco Catalyst 6509 via Gigabit-Ethernet connections. The copper cabling is estimated to be over 170km long, and to weigh some seven metric tonnes. The network is due to be in full operation by the end of May. See for yourself, at the superb **http://www.med.ed.ac.uk/location/eri/map.htm**

e-Science and the High Speed Network

There has been a flood of new applications which are enabled by the increasing connectivity between people: "… we are all connected to the Internet, how can we best interact to exchange ideas, collaborate on joint projects … how can we *do science?*"

'The Grid' has achieved prominence as one such method. Grids are 'super Internets' for high-performance computing, that is, worldwide collections of high-end resources such as supercomputers, storage, advanced instruments and immersive environments. These resources and their users are often separated by great distances and connected by high-speed networks. There is information about the UK's Grid activities at **http://www.grid-support.ac.uk/**

…continued overleaf

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e-Science continued…

Edinburgh's involvement with Grid applications includes GridPP, AstroGrid, Cosmo-Grid, GenGrid, Multi-Grid and ScotGrid.

But the Grid is not all. There is a bewildering array of projects which are focused on the exciting leading-edge of research and require high bandwidths: for example, access to high performance computing within EPCC at The King's Buildings, the SHEFC Brain Imaging Centre for Scotland at the Western General Hospital, and the SHEFC Centre for Functional Imaging Studies are important elements of research in Edinburgh and beyond. There are astronomical developments in the Virtual Observatory, CSEC and COSMIC, imaging in the Medical School at the New Royal Infirmary, Magnetic Resonance Imaging and Genome Micro Arrays…

What is the best way to support this kind of research?

A project has been funded to support a Virtual e-Science Centre, with an institute in this University, and a major component of this is the network. The Centre will specifically address the applications mentioned above, and involve UK- and world-wide groups. Details of the projects can be found at **http://umbriel.dcs.gla.ac.uk/NeSC/**

Very high network bandwidth is essential to support these applications. It is estimated that some end-systems may require dedicated access of at least 20 Gbit/s (Gigabits per second, *i.e.* 1,000 Mbit/s or Megabits per second) to the network in the not too distant future. This type of link will be unusual in a multi-disciplinary University network for some time to come, so a decision has been taken to construct a 'parallel e-Science universe' where research projects with very high bandwidth demand can be supported without perturbing the normal University traffic too much. This will shield the University from experimentation in the development of applications.

The core of the network, which is being purchased through a Science Research Infrastructure Grant of some £1.6m, will be Cisco Catalyst routers at The King's Buildings and Appleton Tower, connected by a dedicated 4 Gbit/s link, and with links to the main EdLAN network. 10 Gbit/s interfaces will be supported on this core, and if—or when—the demand for such high-speed interfaces warrants it, we will augment the network with next-generation hardware.

Some projects will require high speed access to SuperJANET for data transfer, and we must ensure that this does not interfere with (or be interfered with by) normal University traffic. Therefore a private 1 Gbit/s SuperJANET link has been funded for the project; its first use will be to support the ScotGrid project, and we envisage that this link will increase to 10 Gbit/s and beyond.

There is a lot to learn from the deployment of such a network to support these special applications. The University will be at the leading edge of the support for such high volume traffic, and the means by which it can be prioritised across the local and the wide-area global networks.

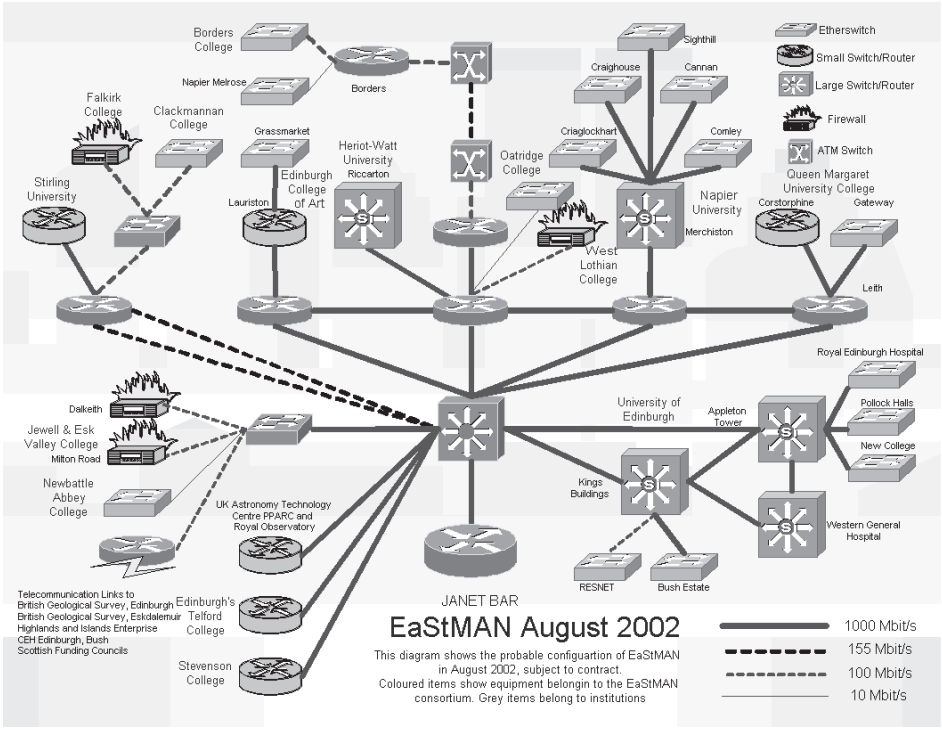
George Howat (EUCS)

EaStMAN Upgrade

The Edinburgh and Stirling Metropolitan Area Network—EaStMAN—was first developed in 1995 as a cost-effective way of delivering the Joint Academic Network (JANET) to the Higher Education institutions in the south-east of Scotland. The network benefited multi-site institutions, including Edinburgh University, by enabling cheaper high speed communications to the outlying sites. Further Funding Council initiatives extended the network in 1997, and last year all the local Further Education colleges were connected. EaStMAN is also used by other UKERNA customers—such as the British Geological Survey. See **http://www.eastman.net.uk/**)

EaStMAN consists of fibre cables around Edinburgh and various telecommunications links outside the city, and was provided by Thus, formerly ScottishTelecom. This contract is due to terminate in July 2002, so the past year has seen a major project to redesign the network, bid to the Funding Councils for the capital investment required, and undertake a full European Journal procurement for supply of the new network. The result is a grant of over £500,000 to build a core network running at 1 Gbit/s which will be installed between June and August this year.

In design terms, the new network shows three major developments from the old one. First is the demise of Asynchonous Transfer Mode (ATM) technology. In the 1990s, ATM was seen as the core technology for networking, particularly for carrying voice and video as well as data, and it still is for wide area networks—all of the world's major telecommunication companies, such as BT and Worldcom, have ATM at the core of



A schematic diagram of EaStMAN. In the online version many components are links to further information. See **http://www.eastman.net.uk/eastman0802.htm**

their networks. In local and metropolitan networks, however, Ethernet—which has now been around for 20 years—has continued to develop, and wins hands down on cost and simplicity.

Second, as the figure above shows, the fibres round the city have been re-allocated to enable each institution to link its own sites directly, without using the EaStMAN backbone. This makes it much easier to apply network security features and simplifies the administration of EaStMAN itself.

Third, the design develops the Internet concept of 'Points of Presence' (POPs), which are convenient locations where EaStMAN equipment can be located closer to the sites which need to be connected. This means shorter telecommunications circuits and less recurrent expenditure, at the cost of more equipment and more management overhead.

There is a POP at each institution in the city. There will be two POPs outwith Edinburgh—one in the Borders (Galashiels), to which Borders College and Napier University's Borders General Hospital offshoot will connect. The Stirling POP will connect Clackmannan and Falkirk Colleges as well as Stirling University. All the other institutions will link via the major POP at The King's Buildings, where the central router and the link to JANET will also be located.

Perhaps the greatest benefits from the new EaStMAN will be seen by the Further Education colleges. The two smallest, Newbattle Abbey and Oatridge Agicultural College, will see a speed increase from 2 Mbit/s to 10 Mbit/s. All the other colleges will see their connection speeds rise from 2 Mbit/s to 100 Mbit/s, with the exception of Edinburgh's Telford and Stevenson Colleges which will benefit from the city's fibre infrastructure and connect at 1 Gbit/s. The direct benefits for Edinburgh University are outlined in the following article about EdLAN.

The new network has been procured within budget, and indeed the recurrent costs which the institutions have to bear have been reduced. The transition from the current network to the new one is a major logistical challenge, which will occupy particularly July and August this year.

EaStMAN management

Coincidentally with the EaStMAN upgrade, UKERNA—the organisation which runs the national JANET network—has implemented a much more formal contractual arrangement to deliver the JANET service with all the UK Metropolitan Area Networks.

The Metropolitan Area Networks are now to be called Regional Partner Academic Networks (RPANs). The more formal arrangement is designed to ensure that each RPAN delivers a consistently high level of service, and meets the JANET Service Level Agreement (**http://www.ja.net/documents/sla.html**).

Apart from keeping lots of lawyers happy, this has resulted in a more formal arrangement for members of the EaStMAN consortium, as many of the risks and obligations are shared. This has kept lots more lawyers happy, and there is now a formal EaStMAN Consortium Agreement, with a Management Board on which every Higher and Further Education institution has a seat.

It is always beneficial to examine and formalise the way things are done, and part of the transition from the MAN to the RPAN involves just such an examination. This will be complete by September and will result in a set of procedures and clearer interfaces which will result in a more efficient service for all.

Scott Currie (EUCS)

EdLAN: changes in the University's network

This summer will bring significant changes to the University's EdLAN network, some resulting from the EaStMAN replacement and some from local and national initiatives. The major ones involving e-Science and the New Medical School have separate articles; the remainder of the changes are outlined here.

As in EaStMAN, the existing Asynchronous Transfer Mode technology will be removed. The new EdLAN backbone is based on 1 Gbit/s (1,000 Mbit/s) Ethernet links, with the capability of moving to 10 Gbit/s Ethernet when it arrives.

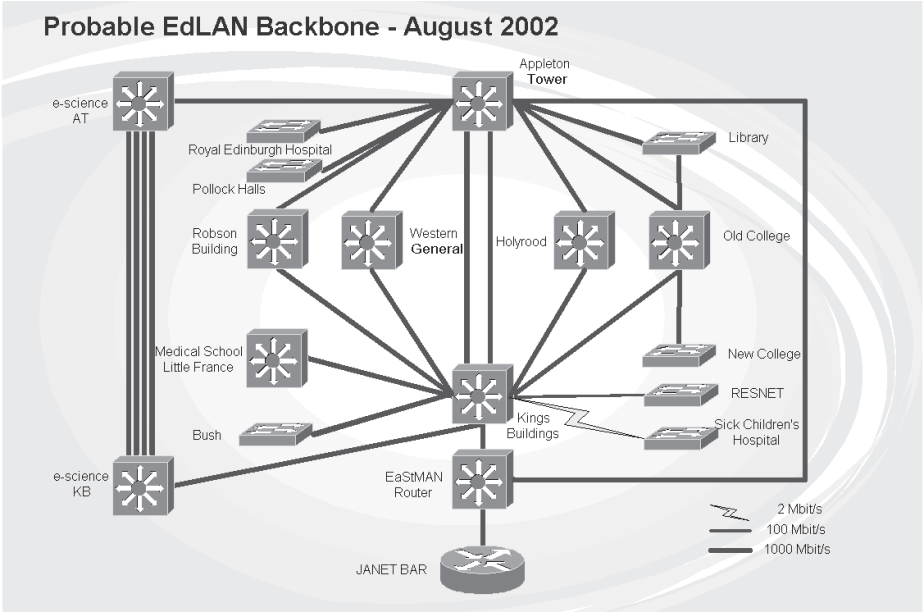
The New College and Pollock Halls MAN sites will be brought back into the main University network, and upgraded from a shared 100 Mbit/s link to a direct 1 Gbit/s one. The Western General Hospital already has a new backbone switch (as a result of last summer's upgrade at Appleton Tower) and a 1 Gbit/s link to the Tower; the existing ATM circuit will be used to give a second connection to The King's Buildings. The Moray House site will be taken off EaStMAN as it can now be served by our own fibres. The link to the Bush will transfer from an ATM base to a 1 Gbit/s link, and the link to the Royal Edinburgh Hospital will be provided by EaStMAN at 1 Gbit/s. The existing 100 Mbit/s link to ResNET will remain as it is.

There has been a late and unexpected grant from the Funding Council to all institutions to enable them to take advantage of the higher SuperJANET speeds. We will use this for a new router at Old College to take more 1 Gbit/s interfaces, moving the current router to Moray House, and to enhance network management facilities.

Our plan is to connect as many sites as possible to both Appleton Tower and King's Buildings routers, which have 1 Gbit/s connections to EaStMAN; this in turn will have a 1 Gbit/s link to JANET—compared to the 155 Mbit/s link we have today. The multiple connections will provide extra resilience.

By September, when all of these changes will be complete, the University will have a more manageable network which is cheaper to run, with excellent connectivity to JANET and beyond.

Scott Currie (EUCS)



Clickable EdLAN map: **http://www.ucs.ed.ac.uk/nsd/edlan0802.htm**

EdLAN rewiring programme

For some years, EUCS and Estates & Buildings have been suggesting a central fund to enable the University's data network infrastructure to be brought up to date.

Large parts of EdLAN were wired in the early 1990s using 'thin-wire' Ethernet cables—a technology which has been superseded by 'unshielded twisted pair' wiring (UTP). Unfortunately around 20% of the University's networks still have a large element of the 'thin-wire' cabling, and with the growth in usage, this now presents significant performance problems.

The second major technical advance has been the change from shared networks to 'switched' networks, where etherswitches provide each outlet with 10 or 100 Mbit/s, rather than PCs having to compete with each other for the network. This significantly improves performance and is the standard to which we should aim throughout the University.

Last summer, the University's Central Management Group (CMG) approved the creation of a fund of £250K per year for five years, top-sliced from all Faculty and Support Groups, to bring the wiring up to the new standard.

After consultation, the C&IT Committee approved the first 18 months' rewiring work at its March meeting. The plan is at **http://www.ucs.ed.ac.uk/ucsinfo/cttees/citc/2002-03-07/paperL.html**

Work has already started, and indeed, interim work in the David Hume Tower is complete.

Obviously this amount of work will put some strain on both the Network Services Installations Team and Estates & Buildings, but we expect it to lead to a reduction in demand for new installations in the future.

Scott Currie (EUCS)

Network charging

The changes to EaStMAN and EdLAN obviously have an effect on the cost of running the network and hence on what is charged to departments. I am delighted to report that most of the change has been beneficial, *reducing* the recurrent costs, particularly the telecommunications costs to those sites on EaStMAN. The ongoing costs of the e-Science equipment is being met from the e-Science grants, so normally this would lead to a reduction in the EdLAN maintenance charges.

However, the UK Joint Information Systems Committee (JISC), along with the Funding Councils, has decided to replace the JANET networking charging scheme (which charged for bytes received over the transatlantic link) with a new scheme from this coming August. Unfortunately the new scheme was rejected by just about everybody and the whole cycle has been started again. In the meantime it has been confirmed that the charge for 2002/3 will simply be a 35% uplift on the 2001/2 charge, *i.e.* Edinburgh will pay £56,000. For future years the JISC is trying to identify a metric for apportioning the charge that will be acceptable to a large majority of institutions.

As the transatlantic traffic can no longer be measured, the Communications and Information Technology Committee decided at its March meeting that the 2002/3 charge should be met by adjusting the EdLAN maintenance charges. The savings made on EaStMAN are being used to cushion the effect, so the maintenance charge will only rise by some 4.3%, and of course there will be no traffic charges.

Just what will happen for 2003/4 is anybody's guess!

Scott Currie (EUCS)

Wiring up the Medical School

The Medical School at the New Royal Infirmary (NRIE) in Little France is an ambitious project which co-locates medical staff and researchers with the teaching hospital, and thereby their teaching and clinical roles. The Medical Faculty's 600 clinical students will make use of the library, teaching and administration accommodation. Activities in the research laboratories will link with the medical specialities found in the NRIE. Details of the building and activities are at **http://www.newmedicalschool.ed.ac.uk/**

As anyone involved with a new installation knows, it is important to get the network infrastructure as right as possible first time round: just consider the problems in University locations which pre-date the data networked world and have suffered the subsequent continuous upgrade, especially with regard to number and nature of data outlets! A world class School requires world class network communications facilities.

Many University staff from many departments have been involved in the painstaking work of producing detailed specifications and rolling out the network at the Medical School—from the numbers of cables to their type, estimating cable lengths, specifying (sometimes battling over) space requirements and the amount of electrical power required, and so it goes on.

In order to future-proof the School's communications infrastructure, there is also the opportunity to connect data outlets with fibre instead of copper, thus allowing for very high bandwidth provision (more than 1 Gbit/s) to the desktop if required. It is likely that the Medical School (and the following Research Institute) will need high bandwidth to some data outlets as applications join and become part of the e-Science network, described earlier in this issue of *BITs*.

The high speed connection back to EdLAN at The King's Buildings is already installed and in service; running at 1 Gbit/s, it supports staff already on-site within the New Royal Infirmary itself. This fibre link can support 10 Gbit/s and upwards, as may be required when the new Research Institute appears next door to the Medical School.

An important advantage of the new network is that the collaboration between the University and the Lothian University Hospitals Trust allows authorised staff to gain access to medical records, images and so on in the Trust network: people no longer need to have two PCs on their desks, one on each network, as they did in the old hospital.

George Howat (EUCS)

Foad Boroujerdi, George Howat and Malcolm Bell of EUCS Network Services, and Allan Woods of the Medical Faculty, on site in the new Medical School.

Wireless Networking

It is already clear that wireless networks are a useful adjunct to the wired University network and will increasingly be procured. Consider, for example, the convenience of being able to bring a laptop to a meeting and use it to connect to the Internet without having to deal with cables and sockets.

Unfortunately, they bring with them several complex issues, including physical interference with each other and network security. To address those issues, the Communications and Information Technology Committee (C&ITC) set up a Wireless Working Party, which gave its final report in March: see **http://www.ucs.ed.ac.uk/ucsinfo/cttees/citc/2002-03-07/paperD.pdf**

This report should be read by anyone considering the purchase of a wireless network. The report is lengthy and complex, reflecting the subject matter, but it is worth drawing out a few of its conclusions:

"The careful introduction of wireless networking to the University is to be encouraged. The Working Party believes that an information and education programme—particularly involving good practice with an awareness of the issues of security and the user's obligations under the Computing Regulations—may alleviate some security issues on those networks. We therefore recommend that a minimum set of standards be adopted."

"Existing wireless network installations should be subject to a security audit."

"The EdLAN attachment policy should state that all wireless networks within the University are to be registered."

"EUCS should investigate and implement access gateways which use scalable authentication and authorisation and eventually support that service."

"EUCS should be able to offer and publish technical advice on best practice, deployment and some general product features."

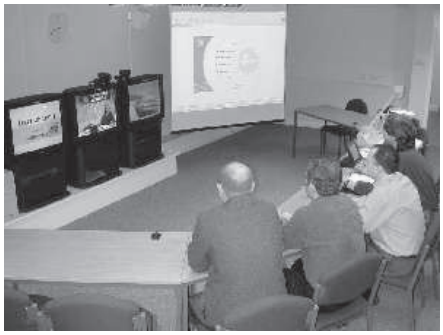
"EUCS should support a network access architecture which facilitates secure wireless network access."

Clearly, there is a great deal of work which Computing Services has to do to arrive at a set of clear policies, registration system and advice. While this work is under way, the other demands on us this summer mean that a lower priority has been assigned to wireless networks, and it is likely to be the end of the year before we can offer 'best practice' guidelines. In the meantime please do inform us of any wireless networks you wish to install and *do* read the report—you might think twice!

George Howat (EUCS)

The videoconferencing service

The Scottish MANs Video-Conferencing Network (SMVCN), managed by Computing Services, has been in operation for four years, providing high-quality images and sound for the 17 Higher Education institutions in Scotland. The three studios in Edinburgh University are used for teaching, collaboration and administration with academic institutions, both nationally and internationally, and with commercial partners. Videoconferences can either be point-to-point or have multiple participating institutions. Information for University users is at **http://www.ucs.ed.ac.uk/nsd/vidconfuoe.html**



The SMVCN is about to move to a new network technology, due mainly to four important issues in supporting it into the future: the videoconferencing interface equipment—'Cellstack' CODECs, which code and decode the audio and video signals for the network—require a significant amount of ATM bandwidth to operate and therefore scales very poorly, it is proprietary, the equipment has reached the end of its life, and there is a general move away from ATM to ethernet. Indeed ATM is not present in SuperJANET4 and, as can be seen from the EaStMAN and EdLAN articles, will largely disappear locally this summer.

In order to continue the service, the SMVCN Futures Group recommended the replacement of all Cellstacks with H.323 international standards-based CODECs operating at the highest quality. The decision to use H.323 aligns with the Internet Protocol (IP) solution(s) adopted across JANET.

The Funding Council has provided a grant to enable each institution to implement the new technology in at least one studio. EUCS will be providing additional funding to allow three studios to continue at the University. An OJEC procurement exercise resulted in a framework agreement to purchase Tandberg CODECs for the 17 HEIs, and any other Scottish JANET-connected site can join this.

The transition from ATM to H.323 videoconferencing in Scotland is planned for next month. The initial result will be a scalable videoconferencing service, capable of connecting direct to compatible systems world-wide across the IP network. Gateways to ISDN and multi-point videoconferencing will be provided as part of that service.

John Martin (EUCS)

New Library services

The University Library is currently trialing two major interdisciplinary electronic information services:

Academic Search Premier is the world's largest scholarly, multi-discipline, full-text database designed specifically for academic institutions, covering nearly all areas of study. Full text is available for 3,260 publications, and abstracts and indexing for over 4,250 journals, many dating back to 1984.

Oxford Reference Online: The Core Collection brings together 100 language and subject dictionaries and reference works—containing over 60,000 pages—into a single cross-searchable resource.

Comments are welcome. Links, and a form for feedback, are on *Library Online* at **http://www.lib.ed.ac.uk/lib/news/trialsnew.shtml**

QuestionPoint

The Library is participating in the beta-test of an electronic reference product called *QuestionPoint*. This is like a call management system for reference librarians. It is designed to be used by library consortia: we are taking part with the universities of Birmingham, Liverpool, Newcastle and Nottingham, and the National Library of Scotland. Our consortium, led by the University Library, represents CURL (Consortium of University Research Libraries) and is one of many taking part worldwide.

The system allows us to route enquiries between consortium members, and, if necessary, to all global members. It provides a 'knowledgebase' of questions and answers, and a 'chat' interface for real-time communication.

The service is available at **http://www.lib.ed.ac.uk/lib/qpbeta/**

Further details are available from **Simon.Bains@ed.ac.uk**.

Simon Bains (EUL)

Digital object management

The University Library is planning to procure a 'Digital Object Management System' (DOMS).

The function of the DOMS is to enable seamless access through a single interface to a range of digital resources—including teaching resources, Web sites, images and image collections, multimedia objects, electronic journals, and library catalogues—and tracking the IPR for these objects. Information is available at **http://www.lib.ed.ac.uk/lib/news/domspec.shtml**

We welcome comments on this from colleagues, by mid-May, please.

Sheila Cannell, John MacColl (EUL)

EDINA to hold Code-Point

The EDINA Digimap service, which delivers Ordnance Survey maps and data to UK Higher Education, is to hold the OS Code-Point dataset. This provides a precise geographical location for each postcode unit in Great Britain, of which there are some 1.6 million. Each postcode unit, such as KY12 8UP, contains an average of 15 adjoining addresses. The inclusion of Code-Point in Digimap allows users to search for a map location using a postcode. The data can be downloaded for use in application software such as a GIS.

For more information contact EDINA (email **edina@ed.ac.uk**) or look at the Ordnance Survey at **http://www.ordnancesurvey.co.uk/**

Emma Sutton (EUCS)

NAG updated

The NAG Fortran library on **holyrood** has been upgraded to Mark 20 and compiler options have changed for linking the library. Details of this and documentation for all NAG products available from EUCS are at **http://www.ucs.ed.ac.uk/tsd/programming/nag/**

John Blair-Fish (EUCS)

BCS: Ethical issues in IT

Prof. Simon Rogerson, Director of the Centre for Computing and Social Responsibility at De Montfort University, will talk on 'Ethical issues in IT' on 8th May, at 6.30pm at the Royal Pharmaceutical Society, 36 York Place. All welcome.

David Muxworthy (EUCS)

Discounts on Microsoft training

Members of the University get 20% discount on the cost of ITS/EMWAC courses, reducing the price of a week-long course from £850+VAT to £680+VAT. These are official Microsoft courses which can be tailored to local needs, so are very flexible; details are at **http://www.itservices.org.uk/courses/**

For more information please contact Vanessa Ranaldi (email **VRanaldi@ITservices.org.uk**, tel 0131 226 3200, fax 0131 226 1882).

Gill Kirkwood (EUCS)

In-depth course for Mac OS X administrators

Following last month's Apple/Scotsys presentation on Mac OS X, EUCS is arranging a week-long course for OS X administration and OS X server, at the very reasonable rate of about £400 per person, at a time in June to suit the participants. For more information please contact **Gill.Kirkwood@ed.ac.uk**.

Gill Kirkwood (EUCS)

WISARD, and no mistake!

I regret that I located Bruce Johnson in MIS rather than Registry in last month's *BITs* article on WISARD.

In token of this regret, I remind readers that all academic staff who interact with students, and their admin support also, will find WISARD useful. You can apply for WISARD and get instructions at **http://www.registry.ed.ac.uk/wisard/**

Nick Stroud (EUCS)

Graphics & Multimedia

Refurbishment of the Graphics & Multimedia Resource Centre (GMRC), in JCMB room 3901 at The King's Buildings, is complete and we are open again with enhanced facilities in a much more pleasant environment. For technical and contact details, visit our new Web site at **http://www.graphics.ed.ac.uk/gmrc/**

The primary video, audio and music systems now occupy a studio of their own in JCMB room 2901. To see what they can do, come and see—

Internationally acclaimed video

Last summer, an expedition of kayakers from Edinburgh, armed with miniDV camcorders, paddled some of the best whitewater in Norway. From their extra-ordinary footage, a twenty-minute film *The Opening of the Third Eye* was edited and produced at the GMRC. It is now on show around Britain and abroad.

In December, some of the group filmed a paragliding/kayaking expedition to Nepal's Madi Kohla River in the Himalayas. The resulting film, *Flying Fish*, was again edited and produced—with music—at the GMRC. It was finished just after Easter and is now attracting interest from a number of TV networks.

You can watch both these films on **15th May**, at 1pm or 2pm, in Appleton Tower lecture theatre 4; and **16th May**, at 1pm, in JCMB lecture theatre A at The King's Buildings. Admission is free. After the KB showing, you are invited to visit the Resource Centre's video and DVD production facilities. To whet your appetite, see **http://boombox.ucs.ed.ac.uk/ramgen/gmrc/trailer.rm**

John Wexler (EUCS)

The 2002 Milner Lecture

The Laboratory for Foundations of Computer Science presents Prof. Martín Abadi, University of California, speaking on 'Security protocols: principles and calculi,' at 4.30pm on 22nd May, in Room 175, Old College. Details are at **http://www.lfcs.ed.ac.uk/milner/**

This is a public lecture, open to all. It is one of a range of events comprising the University of Edinburgh Informatics Jamboree, 22nd to 24th May. Details will be given at **http://www.informatics.ed.ac.uk/events/jamboree/**

Ian Stark (Division of Informatics)

May holidays

EUCS observes the Victoria Day holiday on 20th May and the May Holiday on the 21st, so there will be no services to the University on those days: reception and user support will be closed and services such as **holyrood** and EdLAN will run unattended.

The Main Library will be open and its open-access computing labs supervised from 9am to 5pm. The KB Centre and Greenfield Suite computing labs will be accessible 24 hours a day to those with entry cards.

David Muxworthy (EUCS)

University spin-out produces e-learning digital repository

If you can produce small grains of e-learning material (handouts, Web pages, diagrams, slides, interactions, question sets, *etc*), and store them in an inter-operable way, then sharing them with colleagues brings enormous savings in time and effort.

Intrallect, a spin-out from a research group in the University's Meteorology Department, has just released one of the first digital repositories in the world to be entirely Web-based so that it can be used anywhere. This is **intraLibrary**, which complies with all emerging educational technology standards and meets IEEE LOM, SCORM and IMS metadata as well as SCORM and IMS content packaging standards.

A 30-day free trial version of intraLibrary is available at the Intrallect Web site at **http://www.intrallect.com/**

Charles Duncan (Meteorology)

Edinburgh BITs

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Contributions to *BITs* are welcomed from all readers.

Copy deadline for June BITs:

Thursday 16th May