

## **UK MAN Managers Group annual report 2003/2004**

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The UK MAN Managers Group is made up of the people with a responsibility at a senior level for the day-to-day operation of the UK academic regional networks and the associated companies and consortia.

This report covers the academic year August 2003 to July 2004, during which time the Group met four times. The Convenor was Dave Vinograd, the Deputy Convenor was Phil Brady from the North Wales MAN and the Secretary was Mick Kahn from London Metropolitan Network. The Group has worked closely with UKERNA to ensure the effective delivery of the RPAN contract and the JANET service.

The principle areas of activity during the year were:

- Development of a model publication schema for the Freedom of Information Act
- Consideration of the Regional Aggregation Boards
- Review of the RPAN contract
- Input into the SuperJANET5 requirements analysis phase
- Written response to UKERNA about how to improve end to end reliability
- Establishment of new arrangements for sponsored connections
- Support to UKERNA in the SLA negotiations with the JISC
- Working with UKERNA to improve the development process
- Liaison with the JISC Chairs of MANs Group and UCISA NG
- Consideration of fibre taxation

The remainder of the report covers the activities of individual regional networks.

### **AbMAN**

Technical development has focused on the implementation of IPv4 multicasting, using an alternative topology to that originally proposed. A BEACON was also installed as part of the UKERNA initiative. The need to develop a native IPv6 capability, in line with JANET development policy, has also been recognised, and a scoping team has been established to prepare for AbMAN's adoption of IPv6.

A Disaster Recovery Plan was written and this provoked a study of the AbMAN infrastructure, in particular those changes that might be necessary to minimise the impact of a disaster at the primary MAN core/JANET access site. An intermediate solution is proposed that centres on the creation of a second core, which it is hoped will be useful preparation for improved resilience coming from the SuperJANET5 programme.

### **ClydeNET**

ClydeNET has had another successful year comfortably meeting and indeed exceeding the RPAN operational targets. Outages on ClydeNET are primarily due to site-specific issues relating to power.

ClydeNET was one of the three RNOs selected by UKERNA for formal audit and secured general approval of the governance, administrative and operational processes and procedures of the ClydeNET Consortium.

ClydeNET provided a comprehensive response to UKERNA's request for a forward look for the period 2004-2009. More immediate plans were developed for implementation in 2004/05 including:

- integration of the four WeSSNET FE Colleges fully into ClydeNET on expiry of the telecomm and equipment contracts that WeSSNET hold
- providing a link between Glasgow and Edinburgh to provide an element of business continuity should there be catastrophic failure at either the ClydeNET or EaStMAN primary JANET access site.

### **EaStMAN**

The infrastructure supporting the Edinburgh and Stirling Metropolitan Area Network (EaStMAN) has been very stable over the last year with no changes in the community or major changes in equipment. However, there is an ongoing project to address issues observed with electrical power stability at the major EaStMAN PoPs and some institutional sites. UPS equipment is being provided to assist in smoothing over power surges and to accommodate short outages. Work is also ongoing to remove the last remaining ATM connection in EaStMAN and to support inter-PBX telephony links over the EaStMAN IP network. In the future QoS issues will be studied and addressed.

The SuperJANET BAR connection at University of Edinburgh has always been recognised as a possible single point of failure. In consideration of this and a similar situation at Clydnet, a link is being installed between Edinburgh and Glasgow to carry the RN's traffic in case such a failure should occur at either site. This link has been funded through eScience initiatives.

### **EastNet**

The EastNet Consortium and UKERNA agreed that it would be mutually beneficial to transfer the telecommunications service contract for EastNet to UKERNA. The legal work to achieve has been started.

### **FaTMAN**

FaTMAN was launched in 1995 and had a major upgrade in 2002. To mark both the upgrade and the incorporation of six local Further Education Colleges as full members of the FaTMAN Consortium we decided to celebrate. A 'FaTMAN Reformed' launch was held at Dudhope Castle, Dundee on 19 November 2003. External speakers included John McCann, Deputy Chief Executive of the Scottish Further Education Unit, Robert Skey from the Scottish Executive who gave a presentation about the new Scottish Schools Digital network and Phil Smith, Director of Business Development at Cisco Systems UK. The meeting was closed by Sir Clement Freud who, with his usual good humour, painfully explained how computers were to blame for the loss of the only job he ever really wanted (as an MP). The event details and presentations can be found at: <http://www.fatman.net.uk/launch/welcome.htm>

The year also saw the appointment of a person with specific responsibilities to support the FaTMAN network infrastructure and to provide advice and support for network related issues in Further Education Colleges in Northern and Eastern Scotland (supported by funding from the JISC Regional Support Centre for Northern and Eastern Scotland. See <http://www.rsc-ne-scotland.ac.uk/> for further details).

FaTMAN has again been very reliable and offers all members institutions an excellent connection to JANET and the Internet. Occasional problems with loss of service to Further Education institutions connected via LAN Extension Services have been rigorously pursued by the Regional Network Operator (University of Dundee), the MAN Management Committee and suppliers.

FaTMAN has been examining ways to improve resilience both within the MAN and with our connection to JANET. We therefore made a case to UKERNA for two connections from the MAN to JANET as part of the SuperJANET 5 procurement. This reflects the general belief that wide area network connectivity is fundamental to the orderly running of higher and further education organisations. We have participated in the UKERNA planning for SuperJANET 5. FaTMAN has been represented on the Scottish MANs Co-ordinating Group and the UK-MAN Manager's Group.

In the coming year we will continue the work to improve the resilience of FaTMAN and will keep a watchful eye on opportunities where member institutions might fruitfully collaborate to improve existing network related services and to introduce new ones.

### **Kentish MAN**

The network was built as a 155 Mbit/sec ATM ring using microwave radio technology, Unfortunately the risks associated with the use of radios had been underestimated and the reliability was affected by bad weather, trees growing into the line-of-sight and, disappointingly, the failure of component parts of the radios themselves. Parts of the ATM ring have been replaced with leased lines to improve reliability and resilience.

Funding for developments has come from the Kent New Technology Institute (KNTI), backed up by the Learning and Skills Council South East, to improve access from Further Education establishments and from UKERNA to fund some 'Quick Wins'. Existing FE Connections were all migrated to LES10, in some cases involving a move of the 'B' end. Two FE Colleges were connected to the Kentish MAN for the first time. The Executive Committee produced a five-year business plan which was submitted to UKERNA to aid in national planning for SuperJANET5. Part of this plan has come into being with the provision of some SuperJANET4 funding, from HEFCE via UKERNA, to install some Gigabit links. These will connect the Canterbury campus of the University of Kent with the Universities at the Medway campus at Chatham, which is shared with Canterbury Christ Church University College and the University of Greenwich. Two new Gigabit links will connect from here to Kent County Council EIS at Maidstone and also extend westwards to the Avery Hill campus of the University of Greenwich (Eltham, SE London). This project is scheduled for completion during Q1 2005.

These injections of capital funding have started the process of improving both resilience and reliability of the network, but as the county of Kent is an expensive area for networking and the provision of HE is spread over many campuses with only three primary sites providing income from UKERNA under the current formula, the

running costs that fall to the members are quite large and will increase dramatically with the coming on-stream of the Gigabit links.

A new website was produced during the year and it contains the company's Publication Scheme, as required under the Freedom of Information Act 2000. Work is ongoing to provide a members' area on the website.

Canterbury Christ Church University College provides the Network Operations Centre (NOC) for the Kentish MAN and the annual fee is subject to review.

To summarise, it has been a busy year in which successive developments of the network have overlapped one another. Kent MAN Ltd looks forward to improved networking in 2005 and a possibility of working more closely with other public sector bodies in the county in the future.

### **LeNSE**

Over the past year the LeNSE network has continued to operate smoothly and effectively with one exception: during September 2003 we suffered a usually high number of FEI link failures due to both BT circuit failures and un-notified "BT scheduled maintenance" periods. A meeting with our suppliers and senior BT managers has not appeared to resolve the problem, as this September 2004 has been just as bad.

The following new RSPAN nominated connections were added to the LeNSE network:

- 2Mbps to National Centre for Young People with Epilepsy (NCYPE), Lingfield, Surrey
- 2Mbps to RNIB Redhill College, Surrey
- 17Mbps to ESA, Infoterra Ltd, Farnborough, Hants
- 2Mbps to Fortune Centre for Riding Therapy, Christchurch, Dorset
- 4Mbps Portsmouth City Council A&CL, Portsmouth, Hants

The following circuit orders are still in the process of installation:

- 2Mbps to NERC Space Geodesy Facility, Herstmonceux, Sussex
- 4Mbps to Poole Adult Learning Centre, Poole, Dorset

A lot of preparatory work was conducted by LeNSE in response to UKERNA's revised tariffs for Sponsored JANET connections (now changed again this September). During April 2004, LeNSE agreed to take-over Southampton University's final sponsored connection, Winchester College.

As part of our network development plan, the following upgrades or new services were introduced over this period:

- Southampton and Portsmouth universities were upgraded from 155Mbps to Gigabit Ethernet in September 2003;
- UCC, UCW and SIAD were upgraded from 34Mbps to 45Mbps in May 2004;
- New UPS systems were installed in three core nodes to protect FE core access routers;
- An IPmc beacon was activated in November 2003;

- An experimental IPv6 service was delivered to researchers at Southampton University during June 2003. LeNSE successfully obtained its own IPv6 address space during this process;
- QoS experts from Southampton University and LeNSE continued to contribute to the UKERNA QoS Pilot project up to its completion in August 2004;

LeNSE actively participated in the UKERNA-RNO planning activities for the new SuperJANET5 procurement project and the LSC funded FE bandwidth upgrade project. Part of the SJ5 project involved exploratory discussions with LMN and Kentish MAN on potential RNO-to-SJ5 resilient link options, but neither were found to be practical.

The LeNSE non-JANET internet service continued its modest growth, with Brighton & Hove CC now receiving a 24Mbps service from LeNSE.

### **London Metropolitan Network**

The network has been stable and very reliable with no significant operational issues during the year. There has been a steady stream of new connections to specialist colleges and adult & community learning providers. A number of FE colleges have upgraded the bandwidth of their connections. A connection has been established to a commercial ISP which has facilitated LMN's first non-JANET connection to the Royal School for the Blind. The only major operational development has been the planning of a second connection to SuperJANET from the Imperial College London PoP to avoid a single point of failure for the whole network at ULCC. This is scheduled to be operational in October 2004.

The staff development programme has again been very successful with seven events, many fully subscribed, including a London Networkshop. IT Directors Forums have been established for both the HE and FE sectors.

The most significant developments have been in value added services. A pilot network backup and restore service was piloted with InTechnology plc (ITO) over a period of six months. This was successful in every respect and a full service has been launched. Four organisations are already using the service. A high speed interlink between LMN and the ITO network has allowed the service to be delivered over the LMN member's existing links resulting in significant savings on line costs as well as a discount for the member and a commission for LMN. The experience of the pilot process itself was also very positive and will provide a strong model for future service development.

### **MidMAN**

During the past twelve months, the major highlight has been the successful transition (October 2003) of the MidMAN HEIs to the replacement network service.

The MidMAN replacement is a managed network service provided by the West Midlands Networking Company Ltd, a company established by the Regional Development Agency, Advantage West Midlands (AWM) for networking purposes. The replacement service is the outcome of a successful joint procurement between MidMAN, the regional consortium of LEAs (WMNet), and AWM. The joint approach is an exemplar of broadband aggregation and the benefits to MidMAN

include good regional coverage thereby providing cost effective bandwidth (especially in the more remote regional areas). The benefits of the new MidMAN network service are being extended to regional FE (and similar) Colleges both in the context of direct MidMAN action and the recently announced LSC FE College Upgrade programme.

With effect from 1 July 2004, MidMAN has invested in a Technical Co-ordinator post. The provision of such a post both reflects an attempt to resolve the potential priority 'conflict' between MidMAN and HEI activity for HEI based technical staff, and ensures that MidMAN can, in a technical sense, exploit the capabilities of the underlying managed network service to the full.

### **NIRAN**

All Northern Ireland's FE colleges and HE institutions are now linked to a new high-speed broadband network delivering significantly higher network capability. Thanks to agreements between NIRAN Limited Company, NTL Business Ltd and UKERNA, the NIRAN network now extends to twenty-three education and research institutions in the province.

This reflects a significant piece of work on the part of NTL in establishing the infrastructure, and by Queens University Belfast which has configured all the routing equipment and co-ordinated the switchover to the new circuits and routers. The NIRAN network is now delivering a high-speed broadband network to:

- 16 Further Education Colleges;
- 4 Higher Education Institutions;
- Department of Agricultural and Rural Development Training Colleges;
- The Armagh Observatory;
- The Economic Research Institute for Northern Ireland.

Prior to the implementation of the NIRAN initiative, the vast majority of all NI JANET connected sites, including all the FE Colleges, have been connected to JANET and the Internet via 2Mbit/s circuits. NIRAN, however, will deliver true broadband network connectivity to JANET and the Internet – with minimum speeds of 10Mbit/s, rising to 34Mbit/s, 100Mbit/s and 1000Mbit/s for some sites.

The benefits to the Northern Ireland community are considerable and early feedback has been extremely positive about the benefits of the new arrangements.

### **SWERN**

SWERN has broadened its user base in the past year adding connections to:

- 9 specialist colleges;
- 7 academies on NHS sites in the north of the Region used by UWE and Bristol students;
- the Met. Office's new site at Exeter;
- the WEA in Exeter;
- and a high-speed e-science collaboration connection to Hewlett-Packard Labs in Bristol.

Our work with UKERNA to add a second BAR and SWERN boundary router with diverse routes from the other PoPs paid off on several occasions, most notably when all the interface and supervisor boards were stolen from one of our boundary routers in January, but also during scheduled and other interruptions to our inter-PoP telecomm links. We have started a programme of building a fully resilient backbone with new PoPs neighbouring existing ones, offering sites a second point of connection.

A general upgrade of our PoP equipment to add capacity and improve reliability and manageability has been carried out, together with increases in connection speed for all HE sites but one to 100Mbps.

Our planning for development and SuperJANET5 has started with discussions with telecomm and equipment suppliers; Analysys have been engaged to advise on novel (to SWERN) telecomm services such as long-haul point-to-point rented fibre links.

### **SWMAN (Run by Welsh Networking Limited)**

2003/4 has been a welcome period of relative stability and so we have been able to concentrate our efforts on:

- improving our monitoring capabilities
- agreeing improvements to the configuration of our microwave links to improve their resilience
- pressing our router manufacturer to remedy defects found in the operating system
- adjusting our network to cope with mergers of FECs and HEIs
- starting the preparation for our coming 2005/6 re-procurement.

In common with other MANs serving rural areas, we find that there is little choice of telecommunications providers for many of our links and so prices are often high. To fit within our funding, SWMAN was designed as a linear backbone extending from Newport to Aberystwyth. This has led to problems in our ability to meet the RPAN SL2 target and we are grateful for the help from the Welsh Assembly Government and from UKERNA which has enabled us to improve our resilience capabilities.

### **YHMAN**

The YHMAN core, replaced Summer 2004, is based on leased optical fibre circuits which are supplied and maintained by Kingston Communications plc on a 10 (+2) year contract worth £4.5M. Links into Hull are leased ethernet circuits for commercial reasons. Direct access to optical fibre allows for scaling bandwidth at low cost as demand increases and provides a flexible transmission platform over which a range of services can be offered. Access circuits for client organisations such as HE, FE, 6<sup>th</sup> Form and Specialist Colleges, Adult and Community Learning, and others are being migrated to ethernet services to the most convenient regional connection point (point of presence).

The initial IP service on the core network is a true "Metrolan" with ethernet and layer 2 switching throughout. Routing to and from the national JANET network is at Leeds, again using optical fibre links. The network is configured in multiple rings for resilience with "spanning tree" being used for continuity of service in the event of the

failure of a single link. For privacy and robustness, the traffic for separate sites (or site clusters) are carried on separate VLANs.

The optical fibre is implemented as point-to-point circuits using Adva FPS 2000s to drive the link. These are DWDM (Dense Wave Division Multiplexing) devices capable of transmitting multiple laser light signals through 80km or more of optical fibre. Each signal is of different wavelength, a different colour or lambda. Each lambda runs at 2.5Gb/s and can carry two 1Gb/s ethernet links.