Training Initiative Finalised To Close Skills Gap

After nine months of intensive work, the outline plan for introducing LINX accredited Internet engineer and technician training schemes has been finalised with the aim of securing sufficient skilled people to underpin the fast-expanding Internet infrastructure in the UK.

Now delegates at LINX 34 in August will be asked to demonstrate their commitment to the continuing development of the training programme over at least the next five years.

LINX training manager Hugh Spencer explained: "The LINX training working group was originally given a one-year deadline to initiate actions that laid the foundations for producing a continuing supply of graduate entrants into Internet engineering roles."

"Proposals are now in place for training modules that would allow universities to produce Internet engineers and for commercial training organisations to train Internet technicians. However, a longer-term commitment is now required to put those proposals into action."

"Universities need the security of at least a five-year cycle so are looking for that level of commitment from the industry. Realistically, it will take the equivalent of four man-years per annum to administer the training programme."

"In addition, we will be looking for volunteer scrutinisers to contribute the equivalent of four man-years per annum to monitor the work of the universities, based on a five-year inspection cycle with 40 universities being inspected each year."

Members attending LINX 33 in Paris were unanimous in their support for what has been achieved to date. However, a formal commitment to the programme's continuing development will be required at LINX 34.

In addition to the academic training initiative LINX - working in partnership with universities, equipment manufacturers and graduate placement agencies - will co-ordinate graduate work experience placements with our members. We will also maintain a database of accredited Internet engineers who have successfully completed the skills module.

Raza Rizvi, chairman of the LINX training working group, said: "The UK is facing an estimated shortfall of 20,000 network engineers and ISPs cannot afford to wait for a couple of years for a training solution to be developed by committees."

The LINX initiative has received enthusiastic support from universities, Angus Marshall, a lecturer at Hull University's Centre for Internet Computing, said: "There is substantial synergy between what LINX is proposing and the courses we have already developed."

Raza, who works as technical support manager with REDNET, added: "If we can encourage 20 institutions to adopt the LINX module and each train 30 graduates we could soon be generating 1,800 skilled Internet engineers annually."

"The Internet industry is still relatively young and has experienced tremendous growth. It is essential to secure sufficient numbers of skilled people to ensure that the UK succeeds in its ambitions to become a world-leading e-commerce environment."
MONITORING NETWORK PERFORMANCE AT LINX

LINX is one of 50 organisations around the world hosting a RIPE-NCC test traffic box to measure the quality of data transmission on the Internet. The box is part of the RIPE-NCC Test Traffic Measurements (TTM) project which aims to measure parameters that define the quality of connection between two points on the Internet. Currently they measure one-way delay and packet loss; other measurements are being developed.

Most of the boxes currently deployed are in Europe – hosted by exchange points, ISPs, national research centres and other places interested in network research – but there are five in the USA, one in New Zealand and one in Israel. The RIPE-NCC plans to double the number of sites during the course of this year.

Each box continuously measures the connectivity between itself and every other box, so at present the TTM project is monitoring approximately 2,500 connection paths.

All the data collected is available on a password-protected website to the organisations hosting the boxes. It can be used to check that networks are operating according to specification and to provide independent verification that service level agreements are being met.

Any LINX member can install a test box at its local site to monitor connectivity to LINX and the rest of the Internet. Each box costs £2,500 excluding shipping costs, installation and taxes.

Chris Fletcher, head of technology development at LINX, said: “Hosting the box on the LINX network means that members who have a test box can see how the path across their network to LINX is performing.”

LINX TO BACK ISP AND ASP EVENTS

LINX has agreed to endorse a programme of conferences and exhibitions linked to the technical and business interests of both ISPs and ASPs. Our involvement will help to raise LINX’s profile with non-members and will help the event organisers to promote their activities. It will also offer members the benefit of reduced-price entry to all the events.

LINX is to become the endorsing body for:

COLO 2001 – 25 TO 27 JUNE 2001, AMSTERDAM

This three-day event will focus on colocation and hosting and will tackle finance and business issues, regulatory concerns and technical matters. Details of the event and of the discount for LINX members can be found on the LINX website at http://www.linx.net.

CARRIERS WORLD 2001 AND BROADBAND WORLD 2001 – 5 TO 7 SEPTEMBER 2001, CANNES

Now in its sixth year, Carriers World Europe is the longest established European forum for the carrier and bandwidth community. For the first time in 2001 the event will be co-located with Broadband Content World. The conference agenda will explore the synergies between the carrier and broadband industries. Details in the next issue of HotLINX or from http://www.carriersworld.com/Carrier_euro2001.

ISPECT2001 AND ASPECT2001 – 12 TO 14 SEPTEMBER 2001, LONDON


ASP WORLD 2001 AND STORAGE AREA NETWORKS WORLD – 7 TO 9 NOVEMBER 2001, LONDON

Details in the next issue of HotLINX or from http://www.aspworldnet.com/ASPWorldeuro_2001/

GLOBAL IP CARRIERS 2002 – 18 TO 20 MARCH 2002, LONDON

Details in the next issue of HotLINX or from http://www.carriersworld.com/GlobalIP_2002/
NEW APPOINTMENT STRENGTHENS ENGINEERING SUPPORT

The engineering team at LINX has been further strengthened with the appointment of Pui Hang Yuen as engineering support manager.

PN, as she prefers to be known, will head the engineering support staff of four people and will be in charge of day-to-day operation of the LINX facilities. Her responsibilities will include management of all routine maintenance work on LINX hardware, 24x7 emergency response and support of new and existing LINX member connections. She will also work with the research and development team to implement technology and infrastructure upgrades on the exchange.

Her appointment will permit Mike Hughes, head of network architecture, and Chris Fletcher, head of technology development, to revert to more "hands off" roles, helping us to plan for the future as we expand our facilities to cope with the rapidly growing levels of data traffic.

Mike will have particular responsibility for the design of the core network infrastructure, including deployment of future technologies such as 10 Gbit Ethernet and wave division multiplexing. Chris will take charge of developing new services such as multicast and IPv6. Both of them will be involved in representing LINX in national and international groups such as RIPE, NANOG and IETF.

PN said: "The stability of the LINX facilities is of crucial importance to our members. We need to maintain our reputation as a world class Internet exchange by meeting all the technical demands which our members place upon us."

PN previously worked in the Internet industry when she spent two years with Easynet. She was subsequently support manager with Atlantic Telecom and contact centre manager with iTouch, the digital arm of the Independent News and Media group.

Born in Hong Kong, PN came to Britain when she was five and obtained a degree in English and History at Roehampton, part of Surrey University. Her early career was spent with a dental manufacturer and a project consultancy working with utility companies.

NEWS IN BRIEF

HARBOUR EXCHANGE COMING ON LINE

Fitting out of our facility at TeleCity Harbour Exchange is set to give members another option for 1 Gbit connectivity at LINX.

Network engineer Andre Els, who has been in charge of the installation and testing of equipment, said: "Our initial facility at TeleCity Millharbour is very crowded but this new extension site - which will be linked to Millharbour - offers the same high level of service."

ROLAND PERRY TO CHAIR CONFERENCE

Roland Perry, LINX director of public policy, is to chair the second day of the IP Interconnection conference in London in June.

A number of speakers will explore the technical, operational, business and financial aspects of billing, service level agreements, quality of service guarantees and related issues. The audience is expected to include senior operational, financial and technical management from telcos, ISPs and carriers.

Details of the event are available from http://www.cf-telecoms.co.uk/pi. LIXN members are entitled to a 10 per cent discount off the delegate rate if the booking is made through LINX – e-mail cf-telecoms@linx.net.

ANOTHER NEW FACE AT LINX

As well as strengthening its engineering team LINX has been expanding its technical and administrative capacity in order to maintain a first-class service to members.

Paul Doukas has joined LINX as a technical administrator. He will be assisting with website administration, updating internal database systems for sales, marketing and regulatory contacts, and giving support and technical assistance throughout the organisation.

HOTLINX SET TO BE A BEST-SELLER

HotLINX has a long way to go before our circulation reaches the same level as the daily tabloid newspapers - but since the launch of LINX's new website earlier this year we have added more than 200 names and addresses to the distribution list.

LINX sales and marketing manager Vanessa Evans, who edits HotLINX, explained: "When we redesigned the website we included a form on which people could ask to be added to the HotLINX circulation list. We have been receiving four or five requests each day.

"It is very flattering to find that so many people are interested in having regular news from and about LINX."
The IEEE standard for 10 Gigabit Ethernet – which offers the potential for a ten-fold increase in the volume of Internet traffic which we can handle without massive investment in new infrastructure – should be complete by September of this year. This was the view put forward by Brett Fravel of equipment vendor Extreme Networks at LINX 33.

In a keynote presentation on this new technology he told members that the 10 Gigabit Ethernet Alliance formed by leading equipment vendors had been able to speed up the standard-setting process by providing a forum for standards committee members to talk outside the committee. Brett believes that the IEEE standard will be formally approved by March 2002, leading to the widespread adoption of the technology.

Although 10 Gigabit Ethernet will permit "end to end" use of Ethernet across the Internet – including metropolitan area and wide area networks (MANs and WANs) – the new standard will have some significant differences from those for earlier versions of Ethernet. Most important of these are the facts that 10 Gigabit Ethernet will function only over optical fibre and that it will operate only in full duplex mode (meaning that collision protection protocols are unnecessary).

Ethernet is the world's most widely installed LAN technology. Almost all network traffic today starts out as Ethernet and Internet protocol (IP) data. Current standards deal with transmission speeds up to 1 Gigabit per second (1 Gigabit Ethernet). The new standard will potentially permit ten times the current volume of data traffic to be carried on existing optical networks.

International Ethernet standards ensure that equipment from different manufacturers can be interconnected. The Institute of Electrical and Electronics Engineers (IEEE) standard for 10 Gigabit Ethernet will use the IEEE 802.3 Ethernet media access control (MAC) protocol and the IEEE 802.3 Ethernet frame format.

Before a standard is formally adopted by IEEE it must gain support in separate ballots of members of the sponsoring committee at IEEE and members of the working group charged with drawing up the standard. In both ballots the standard is only approved if 75 per cent of those polled cast their votes and 75 per cent of those voting support adoption of the standard.

The 10 Gigabit Ethernet Alliance consists primarily of leading networking hardware companies such as Cisco Systems, Extreme Networks and Foundry Networks – all of which are suppliers to LINX. Its role includes supporting the development of the IEEE standard for 10 Gigabit Ethernet, promoting convergence and interoperability amongst its members' equipment, and accelerating the adoption and use of the new technology.

For more information visit: IEEE 802.3ae (10 GigE) Task Force home page: http://grouper.ieee.org/groups/802/3ae/index.html 10 Gigabit Ethernet Alliance: http://www.10gea.com/

However, the standards committee has been careful to ensure that 10 Gigabit Ethernet will not only work with earlier Ethernet standards but also with other networking technologies such as SONET.

With the majority of current network traffic being packet-switched data rather than voice, the widespread adoption of 10 Gigabit Ethernet is expected to help convergence between networks originally designed for voice and newer data-centric networks.

LINX is already gearing up to implement 10 Gigabit Ethernet as soon as the standard is approved (see HotLINX issue 3). Mike Hughes, LINX’s head of network architecture, said:

“Our most recent switch purchases should be capable of supporting 10 Gigabit Ethernet simply by adding new interfaces.”

Extreme Networks' Black Diamond switches – like those from other major hardware vendors - are ready for adoption of the 10 Gigabit Ethernet standard.
TRAINING INITIATIVE TARGETS ENGINEER AND TECHNICIAN SKILLS

The LINX initiative designed to solve the skills shortage in the Internet industry is progressing on parallel tracks to achieve accredited qualifications for both engineers and technicians.

The LINX Accredited Internet Engineer (LAIE) will aim to increase the number of suitably skilled candidates available to fill network engineering posts in the ISP industry whilst the LINX Accredited Internet Technician (LAIT) will aim to increase the number of suitably skilled people available for other technical posts.

"Since our ISP members will be the direct beneficiaries of this project it is essential that they provide input and support during these crucial planning stages," said LINX training manager Hugh Spencer.

The LINX website (www.linx.net/noncore/training) includes a detailed questionnaire that is designed to identify clearly the staff and training needs of the industry. In addition to asking about specific knowledge and skills shortfalls among graduate recruits, the questionnaire seeks to discover why more graduates, especially females, are not attracted to careers as Internet engineers.

"We need to make a career in the Internet industry more attractive to graduates," said Hugh. "Many female graduates who achieve high scores in aptitude tests are not attracted to the industry and we need to change that."

Hugh also wants ideas from members about the funding of a training portal that will provide essential information for students, graduates, universities, ISPs and qualified engineers in providing, acquiring and improving the skills that the industry requires for the future.

Initially, the portal will be used to match undergraduates and graduates to training places offered by LINX members, as a source of relevant training material, as a bulletin board providing solutions to engineering problems, and for a news service on training matters.

Eventually, the range of services could be expanded to help ISPs recruit staff and to give universities details about skills needs and sources of further training.

Meanwhile, Hugh - together with working group chairman Raza Rizvi and LINX head of technology development Chris Fletcher - is finalising specifications for the LINX accreditation scheme.

"It is obvious that the short courses provided by commercial training organisations cannot produce people with the same high level of skills that we expect from a university-trained engineer," said Hugh. "So we are looking at parallel accreditation systems that are appropriate to the intellectual, practical and management skills of engineers and technicians."

The group training project team is working to tight deadlines and hopes that the LINX modules will be introduced to the syllabus at several universities this autumn. "We want the portal site to be up and running prior to the accreditation system going live, so it is essential that we agree how it is funded," said Hugh. "The options include offering recruitment and banner advertisements or making subscription charges."

"We want LINX members to give us their views."

TECHNICAL CENTRE SEeks ISP CO-OPERATION ON INTERCEPTS

The government's National Technical Assistance Centre (NTAC) wants to work in close co-operation with ISPs as it develops systems for the lawful interception and decryption of Internet traffic, says Head of NTAC Ian Humphreys.

Mr Humphreys has told LINX that he expects NTAC will be in a position to introduce a pilot trial on traffic intercepts later this year and will achieve full operational capability by July 2002. It will ultimately have 50 members of staff and be based at Thames House - the MI5 headquarters - "because it's the most secure location we could find."

He emphasised that NTAC is not part of MI5 but is a Home Office department drawing staff from a wide range of agencies.

Mr Humphreys, who acquired experience of major crime investigation during five years as head of CID with Kent Constabulary, assured LINX members: "Our preferred solution is to work with ISPs. We are very much in listening mode."

He said NTAC was accountable to the law, to the Interception Commissioner, to the Standing Commission on Interception and to an agency steering group. However, he also reminded members: "I understand that the issue of lawful interception is a small part of your business but you have obligations under the law, as I have. I would very much prefer to work in co-operation and build good relationships to meet those obligations together."
**Facing The Challenges Of The Future**

LINX faces enough potential projects suitable for an organisation ten times its 20-person staff size. Chief Executive Officer John Souter told delegates at LINX 33 in Paris.

In a presentation setting out his first impressions since becoming CEO in March, he said that a healthy financial surplus had been accumulated.

He anticipated membership applications from some ‘strong prospects’ with demands for additional ports. Other possibilities included the introduction of new or alternative services, demands for private peering, the take up of multicast and the introduction of IPv6.

> "The recent changes that have been made in our staffing structure mean that we are again able to have people whose job it is to keep not just abreast of new technology but ahead of it—and advise us on how best to deploy or exploit it," he told HotLINX.

> "I think we need to continue pioneering new technology in the way that I know we have done in the past. LINX has an international reputation as the first exchange point in the world to deploy Gigabit Ethernet over a metropolitan area network and the first to offer Gigabit connection to the exchange."

> "We do not have to be the first with every new technology that comes along in future, just in order to say that we were first—but we do need to embrace new technology swiftly where it provides real benefits to our members."

He told LINX 33 that he believes there are commercial and technical threats but it is difficult to quantify them. The introduction of the 10Gbit Ethernet standard will help to clarify the future.

He added that with almost 7G/sec being handled by LINX facilities he was planning an investment in monitoring tools and considerable effort was being directed to process improvement work.

Meanwhile, he was working on a totally fresh approach to the 2001/2002 budget process that would be based on clearer assumptions with improved management reporting and clear project lists for all managers.

He believed, though, that LINX’s mutual not-for-profit structure was a strong concept that underlined its success. "We have been a test-bed of many of the issues facing the worldwide Internet industry and I sense other organisations are now following our example," he said.

"Many of our members compete with one another—but at LINX they work together for the good of the industry. I do not think that could happen if we were a commercial organisation.

> "I hope to foster an atmosphere of mutuality in which colleagues from across the industry can continue to work together on technical and legal issues affecting the Internet."

He praised the work of the ‘strong and committed’ staff and said that the organisation’s engineering professionalism was a core strength.

---

**MoU Overhaul Under Way**

A complete revision of the LINX Memorandum of Understanding (MoU) is being carried out in time for presentation of the new document to delegates at LINX 34 in August.

Announcing the revision at LINX 33, chief executive officer John Souter explained that the present document had become illogical and difficult to understand because of a catalogue of ‘bottom-up’ policy making. In fact, one recent applicant for LINX membership was unable to understand the application process because he was trying to fulfil the requirements of a paragraph that no longer existed, John said.

He told members that he believes the current Memorandum of
Pushback Offers Hope Of Ending DDoS Attacks

LINX is urging the Internet industry to back research into a mechanism which could stop or limit distributed denial of service (DDoS) attacks of the sort which have temporarily crippled several leading ISPs, portals and websites in recent years.

Steven Bellovin and a team at the AT&T Center for Internet Research in the USA are investigating the use of a technique which has been named 'pushback' to control both DDoS attacks and the associated problem of 'flash crowds'.

The technique requires the use of routers which employ mathematical algorithms to identify particular characteristics of the traffic which is causing problems. The routers identify where this traffic is coming from and pass a request to the 'upstream' router to restrict or block traffic possessing these characteristics.

If such routers were widely deployed across the Internet the offending traffic could effectively be 'pushed back' to its original source and contained there, preventing it from spreading into other parts of the network.

Mike Hughes, head of network architecture at LINX, said: "It is early days yet but the initial research looks very promising. It is often the case that hackers and 'script kiddies' swiftly find a way around technologies which are supposed to restrict their activities - but pushback looks to be pretty future-proof. It is adaptive and can be used to identify the real nature and source of traffic from a DDoS attack.

"Peering points such as LINX, where networks join, are ideal places for implementing pushback. Implementation, however, would need to be by our members rather than by LINX as we do not operate at the IP level."

In a DDoS attack, the attacker takes control of a number of computers from which he or she bombards his or her target with a flood of data traffic. Links to the target become so congested that other traffic is effectively denied access. Flash crowds, which occur when a large number of users try to access the same server simultaneously, produce the same effect. In both cases, traffic can 'spill over' from the congested links into others, leading to a general degradation of Internet services.

There are well-established mechanisms for coping with such congestion when the problems arise from traffic having a common source or destination address - but DDoS attacks arise from a multitude of different computers and are therefore difficult to identify.

There are, however, certain common elements to the data packets causing the problems which allow them to be identified. They can then be blocked or accorded only limited bandwidth.

Details of the research are available at:

Understanding does not always say what it means or mean what it says.

The LINX ad hoc committee (LAHC) meeting on 11 May had endorsed the concept of the revision with reasonable consensus. The committee had been presented with three documents: a proposed re-draft, the rationale for the re-draft and a tracking document to ensure complete traceability.

A further re-draft will be produced for consideration at the next LAHC meeting in June and it is hoped to present a final draft for formal adoption at an extraordinary general meeting at LINX 34 at the Copthorne Tara Hotel on 20 and 21 August.

An additional explanatory document, lacking legal power, may also be produced to assist understanding.

For details see http://www.linx.net/private/members/lahc
LINX At The Heart Of Online Child Protection Debate

With public concern growing about the online activities of paedophiles, LINX is at the heart of the debate within government and law enforcement agencies about how the real and perceived threats can be dealt with.

Roland Perry, LINX director of public policy, represented the views of ISPs at a recent meeting with UK Home Secretary Jack Straw. It came just days after the Internet Crime Forum (ICF) produced a paper on this topic which was warmly welcomed by Mr Straw.

The paper focused on the specific issue of paedophiles using Internet chat facilities to target children. It made a number of proposals, including better education for juvenile chat users and their parents, more police resources, a labelling scheme for classifying chat services, and research to develop more user-friendly technical solutions to the potential dangers of chat.

Many of the ideas which the ICF proposed were endorsed by Mr Straw at his meeting with LINX and other groups. He plans to establish a task force to help secure implementation of some of these ideas and has promised government funding for education programmes.

LINX has played a key part in the ICF's deliberations on potential child abuse and other issues. Roland Perry is the ICF vice-chairman and webmaster, LINX chairman Grahame Davies and director Clive Feather are both members, and so are a number of representatives of LINX member ISPs. LINX has helped the exchange of ideas and documents through online facilities and hosts the ICF website.

Roland, who was also a member of the ICF subgroup which produced the chat paper, said: 'It is important to keep the debate focused on the key issues. For example, there has been a lot of talk about newsgroups and whether certain of them should be closed down – the Internet Watch Foundation is currently leading a public consultation exercise on this issue.

In general, though, newsgroups are not a primary channel of communication between hardcore paedophiles. Inappropriate use of chat rooms, however, does seem to present some real and immediate dangers and the ISP industry is keen to play its part in tackling these.'

Roland believes there will inevitably be a drawing together of measures to combat potential child abuse via the Internet and the codes of practice currently being drawn up to implement key sections of the Regulation of Investigatory Powers Act. LINX has been heavily involved in providing advice to the government on what is technically possible and commercially feasible in the interception of electronic communications and tracing the senders and receivers of messages.

IWF Expands Education Role

The Internet Watch Foundation (IWF) is intensifying its campaign against the misuse of the Internet with the appointment of an education officer.

IWF chairman Roger Darlington has secured additional sponsorship for a full-time appointment and would like to see initial efforts channelled into persuading computer retailers to provide advice and the development of a poster campaign in school IT departments.

Earlier this year the IWF's deputy chief executive Ruth Dixon chaired a study by the Internet Crime Forum that urged parents to exercise greater supervision of children who use chat rooms.

Mr Darlington said that the Ofcom White paper published in December was 'very supportive' of the IWF's work, which is being expanded to include criminally racist material.

He said IWF's success since its launch in October 1996 could be measured by its involvement in the removal of 28,000 child pornography images from the Internet. While the IWF handled 8,039 reports in 2000 - an increase of 65 per cent from 4,889 in 1999 - the number of items hosted in the UK and taken down fell by 75 per cent, from 10,189 in 1999 to 2,498 last year.

He has thanked LINX for being the largest single contributor to IWF funds and the only supporter that had increased its contribution in the previous year.