LINX Captures World Title!

London Internet Exchange (LINX) can now claim world leadership with volumes of Internet traffic exceeding 69 gigabits per second - more than any other independent Internet hub on the planet.

Other exchanges come close to LINX for volumes of data passing through the public exchange - now peaking at 48 gigabits per second. However, LINX also provides facilities for private peering between members.

This adds an estimated 20 gigabits to the peak total, giving an overall figure of 69 gigabits per second. Meaning LINX is now handling more data than comparable competitors, such as AMS-IX, JPNAP and even the largest exchanges in the USA.

Founded by five UK ISPs in 1994, LINX has been at the forefront of new technology to keep ahead of the phenomenal growth in Internet usage over the past decade. In particular, in 2002 it was the first Internet exchange to introduce latest 10-gigabit Ethernet, giving a 10-fold increase in Internet transmission capacities.

Visit www.linx.net/statistics to see latest traffic volumes.

Science Museum to Exhibit LINX Switches

LINX switches dating from the exchange’s foundation in 1994 are to go on display at the Science Museum in London after being accepted by the museum’s donations committee. The two Cisco switches will form part of an exhibit in The Digitopolis Room.

LINX chairman Grahame Davies said: "It is an interesting reflection on the speed of development in the Internet world that 10-year-old equipment can be considered a museum piece. "However, these switches are a tangible link with the momentous occasion when LINX began to operate at the dawn of the commercialisation of the Internet.

See page 6 for more information.
LINX members declare war on Unsolicited Bulk Messaging

LINX regulation officer Malcolm Hutty said: "This represents an ever tougher approach to the senders of UBM. ISPs are not just trying to avoid their own users sending UBM, we want to put the the senders of UBM out of business altogether."

"The vast majority of UBM now originates outside Europe but this new initiative by LINX members will help to make life more difficult for the senders of UBM."

Many UK ISPs already close web sites advertised by UBM under their terms of service. However, because most of these web sites are hosted in the overseas countries where the UBM also originates, the success of this new initiative depends on LINX pressuring ISPs overseas into adopting more rigorous practices.

"The recommendations of that first BCP have proved to be effective. If we hadn’t adopted it, e-mail would have become practically unusable by now," said Malcolm Hutty.

"For example, in 1999 nearly 20% of UK mail servers were 'open relays' which could be used to send UBM but by 2003 less than 1 per cent of UK mail servers were open relays. Closing open relays was a key element of the original BCP’s recommendations.

"ISP have taken action under the BCP to withdraw e-mail services or even Internet access for those who send UBM. In fact, ISPs have also applied this sanction against each other if they knowingly fail to take action to prevent UBM by their customers.

"Adoption of the BCP and this type of sanction against those sending UBM has helped to reduce the problem. According to recent research, less than 1 per cent of UBM now originates in the UK and less than 20 per cent in Europe as a whole." ....continued

Internet service providers (ISPs) have declared war on e-commerce UBM web sites in a new 'get tough' policy. Shutting down these web sites is intended to remove the financial incentive to send UBM. The decision to extend the battle against UBM onto web sites was taken by ISPs belonging to the London Internet Exchange (LINX), which handles more than 90% of the UK's Internet traffic.

At an extraordinary general meeting, LINX's 170 members - including most major ISPs operating in the UK plus others from continental Europe, the USA and Asia - agreed to a new series of measures to curb those involved in UBM activity. This initiative tackles those involved with UBM who host their e-commerce web sites with a reputable ISP while sending UBM from another network. ISPs' anti-UBM policies will now also target web site owners even when the site owner uses a third party to send the UBM itself.

LINX is also calling on ISPs to take down web sites used to sell UBM tools, such as CD-ROMs containing millions of illegally-collected e-mail addresses.

"We will be working to spread this standard beyond the UK at RIPE, Euro-ISX and elsewhere. We shall also be asking for support from the UK government at WSIS (the World Summit on the Information Society), OECD and other international forums."

LINX Extra
LINX has long had a leading role in combating UBM. In 1999 LINX developed a code of best current practice (BCP) for ISPs to apply in dealing with UBM. In 2000 the LINX BCP was adopted by RIPE (Réseaux IP Européens) - the community of organisations and individuals operating Internet networks in Europe and beyond. Because it was carefully drafted in technology-neutral terms it continues to represent current best practice despite technical developments by those who send UBM.

Private Interconnection drives LINX traffic growth

Private interconnection - the direct exchange of traffic between two members - has been the fastest growing component of LINX's total traffic over the past two years since this facility was first offered.

Large ISPs have traditionally exchanged traffic with their peers using a mixture of private and public peering.

Public peering using Internet exchanges such as LINX offers considerable advantages, allowing just a single connection to an ISP's hardware to act as a link with a large number of peers - with all the technical management handled by the exchange.

However, where two ISPs are exchanging large amounts of traffic between themselves, it often makes technical and commercial sense for them to do so directly rather than via an exchange.

Establishing such private peering connections is not always straightforward. In addition to the legal and contractual issues there are issues of hardware provision and maintenance to sort out.

In 2002 LINX began to offer a managed private interconnection (PI) service to simplify some of these issues for its members. LINX provides and manages infrastructure that facilitates these bilateral connections between members.

For members with points of presence at some LINX sites (Telehouse North, Telehouse East, Redbus Harbour Exchange Square and Redbus Sovereign House) the service is based on the installation and maintenance of 16-core bundles of single mode fibre between the member's rack and the LINX PI rack within the same building. In TeleCity Bonnington House and TeleCity Harbour Exchange Square the service is based on 12-core fibre bundles.

Similar PI services are available between LINX sites. Because LINX is buying this type of connectivity in bulk, it can offer members prices lower than those normally available directly from the suppliers.

Strict limits on quality issues such as loss of signal are monitored and maintained on all LINX-managed PI services.

Since the launch of the service 34 members have signed up for it, some of them establishing PI with a number of other members.

The rate of growth of PI traffic has been so great that it has had an impact on traffic on the LINX public exchange. After years of massive annual growth in traffic, the rate of increase on the exchange has recently slowed down as more and more data is carried by PI.

LINX recently amended the way it presents traffic data on its website to take account of this changing trend. The graphs now show the aggregated traffic that flows across all LINX switches and sites, together with a measure of the additional traffic that flows bilaterally between members across the LINX PI service.

PI uses a passive infrastructure which means there is no direct measurement of traffic flow by LINX. However, members provide data on traffic flows on a voluntary basis.

LINX sales and marketing manager Vanessa Evans said: "We have been deliberately conservative about the way we represent this aggregated data, showing PI as a fixed percentage of traffic on the exchange. This will normally give an underestimate of the proportion of LINX PI to public peering traffic at any given instant."

However, there are some statistical drawbacks to this approach. Vanessa added: "Calculating the PI traffic as a fixed percentage of the exchange traffic means that any dips in public peering traffic (for example, when switch maintenance is going on) will be mirrored in the LINX PI statistics. In practice, of course, the opposite is likely to happen."

Because of the continuing growth of PI traffic, LINX will be regularly updating its presentation of the data, based on input from members.
New members expand global Internet community

New members from Greece, Estonia, Russia and South Africa have expanded the LINX global Internet community into new territories with a consequent increase in the number of world Internet routes available through its member networks.

OTE Globe
OTE Globe is a wholly owned subsidiary of Hellenic Telecommunications Organization SA (OTE) and provides international wholesale Internet data, bandwidth and voice services to carriers and multi-national carriers (MNCs), with a special focus on Southeast Europe and the Middle East.

OTE Globe managing director Anastasios Angeloglou said: "Membership of LINX represents significant cost and operational benefits for us because it provides more direct international connections for our customers. Our decision to join LINX supports our long-term objectives to offer more competitive, world-class services to our customers."

Elion
Elion is the largest telecoms and Internet business in the new EU member country of Estonia.

Chairman and chief executive officer Valdur Laid said: “Joining LINX is an important move in our strategy to maintain our leadership in providing added-value solutions to the communication and business needs of our customers. We have made a massive investment in latest telecommunications infrastructure and joining LINX will give our customers faster and more efficient Internet connections with the global Internet community.”

Elion is the market leader in fixed network calls, in Internet subscriptions and data communication solutions, and it has made a powerful entry into the IT market. Elion owns Estonia’s most popular Internet search engine and subject catalogue NETI.

ReTN
ReTN has offices in St Petersburg and additional facilities in Moscow.

Spokeswomen Olga Sherstneva said: “Joining LINX is a further stage in ReTN’s strategy to be an active and innovative company that provides high quality services at competitive prices across the full range of voice, data, Internet and other telecommunication services.”

In January ReTN opened a second discrete route between Moscow and London, providing total carrying capacity of 1,244 megabytes per second (Mbs) and providing onward connections to New York.

OJSC RTCOMM, a second Russian ISP, has now become a LINX member.

Internet Solutions
Internet Solutions is South Africa’s leading virtual private network provider.

Chief operating officer Johann Pretorius said: “The decision to become a full LINX member is an extension of our strategy to maintain market leadership by providing our customers with world-class infrastructure and cost-effective, value-added services.

Internet Solutions was founded in 1993 and established its first fibre optic link into the USA the following year. In 1997 it became part of technology giant Dimension Data, established its first point-of-presence in New York and launched the first South African Internet-based virtual private network (VPN) service. In 2000 it merged with VPN provider OmniLink.

The company has received a score of customer-nominated awards and in 2002 it became the first Cisco Certified Managed Security Service Provider outside the USA.

The growth in membership in new territories offers the prospect of further expansion in the ‘LINX from Anywhere’ service under which LINX members can provide non-members with a virtual presence on the exchange without the hardware and manpower costs of having their own connections in London.

LINX sales and marketing manager Vanessa Evans added: “We are pleased to welcome new members from territories where we have not previously had indigenous ISPs because it increases our global representation.”

Other new members
Big Pipe, BIS, Burstfire Networks, Caladan Communications, CORE ISP, Gyon Internet, Hotchilli Internet, KeConnect Systems, managedNet, Merula, Peer 1 Network, POBOX, RTCOMM, SkyMarket, Spietha, TM Net, TransTeleCom, Utransit International Carrier and Virtual Internet.
LINX has signed partnership agreements with two major telco operators in the USA - telx and Terremark Worldwide Inc. The agreements extend the LIX from Anywhere service under which LIX members with international facilities offer other ISPs a point-to-point Ethernet connection. The connections terminate in a dedicated Ethernet port, with an individual IP address controlled by the customer's router at LIX. Under the partnership deals, the USA end of the link can be hosted at the telx and Terremark interconnection facilities.

As a telx partner, LIX was able to participate in the telx Customer Business Exchange, a unique invitation-only networking event on 23 April in New York. LIX can also cross-market its partnership offerings within the telx communications marketplace. Many LIX members already have a point-of-presence at the telx and Terremark facilities and could offer the 'tunnelled', totally secure, connections needed for a customer ISP in the USA to establish a virtual presence in London.

Jamie Dos Santos, chief marketing officer of Terremark, said: "Becoming a LIX partner enables us to extend the range of services that we offer to our customers globally, as well as opening up new relationships with LIX's members."

LINX sales and marketing manager Vanessa Evans said: "LIX membership offers real benefits to American ISPs. Offering an integrated tier-1 facility in Miami, the NAP of the Americas.

The LIX agreement means American ISPs can establish a ‘virtual presence’ at the LIX exchange in London via connections at telx and Terremark. LIX members can also establish a point-of-presence in the USA, using the trans-Atlantic connections of companies with a presence at telx and Terremark.

The agreements extend the LIX from Anywhere service under which LIX members with international facilities offer other ISPs private point-to-point Ethernet connections. The connections terminate in a dedicated Ethernet port, with an individual IP address controlled by the customer's router at LIX. Under the partnership deals, the USA end of the link can be hosted at the telx and Terremark interconnection facilities.

Hunter Newby, chief strategy officer at telx, said: "Smaller ISPs in the USA are going to be particularly interested in LIX from Anywhere because there are considerable costs involved in deploying staff to install, manage and maintain hardware in the UK. With LIX from Anywhere, they can connect to LIX from telx in New York."

"At the same time, the deal between LIX and telx offers opportunities for LIX members to obtain cost-effective transit across the Atlantic."

Hunter Newby said: "Being a LIX Partner allows us to get closer to European ISPs thinking of making a move into the USA."

The 45,000 sq ft telx facility at 60 Hudson Street, New York, provides network access to more than 150 network providers and enterprise customers.

LINX Extra
LINX and Terremark, together with Lucent, are to co-host an invitation-only forum for peering managers from ISPs and other exchange users from 4 to 7 March 2005.
LINX - Central to the History and Future of the Internet

The story of LINX parallels the development of the Internet in the UK. Back in 1994 the World Wide Web was in its infancy and Internet exchange points were a novelty with only a handful in the entire world.

Even the concept that Internet Service Providers (ISPs) should co-operate and share infrastructure to mutual benefit was novel. In this environment, representatives from the UK’s five domestic ISPs - PIPEX, BT Internet Services, Demon Internet, EUnet GB and UKERNAJANET - agreed to create LINX based on two guiding principles:

- LINX should be neutral to its members
- LINX should be independent of any one provider

Less than two months after the concept was agreed - and with a total absence of contracts, lawyers and paperwork - LINX became operative when the first Internet traffic was transmitted through its switches on 8 November 1994.

In the decade that followed, the growth of LINX has reflected the phenomenal growth in volume and importance of Internet traffic, as more people have gained access to more data from more sources than could have been imagined at the dawn of the Internet Age.

By 2004, 52 per cent of households in the UK (12.8 million) could access the Internet from home, compared with just nine per cent (2.2 million) in mid-1998. In addition, e-commerce is now seen as vitally important to economic growth. In recognition of its significance in the future performance of the economy, the UK government set itself the target of making the UK 'the best environment in the world to do e-commerce.'

New peaks in volume of Internet traffic crossing LINX switches have been succeeded so rapidly that previous records appear puny when compared with today's figures. Just five years ago traffic was peaking at 2.5 gigabits per second - more than 250 times its original total capacity. Two years later it had quadrupled to 10 Gbit/second.

In order to keep pace with such phenomenal growth LINX has pioneered the introduction of new technologies.

LINX adopted one-gigabit Ethernet standards ahead of even the large US exchanges and in 2002 it was the first exchange to introduce 10-gigabit Ethernet standards.

Today the LINX membership numbers more than 170 leading Internet Service Providers (ISPs) and content delivery service providers from the UK, mainland Europe, USA, Africa and the Far East. Its facilities at eight London-based co-location 'tele-hotels' carry 90 per cent of UK Internet traffic and its members' networks provide access to more than 50 per cent of global Internet routes.

It is not difficult to predict that Internet traffic will continue its rapid growth. Clearly, LINX will play an equally vital role in the future of the Internet as it has done in its history.

Science Museum to Exhibit LINX Switches

This is LINX’s very first switch - a Cisco Catalyst 1200 (serial number 62007011) which is soon to become an exhibit in the Science Museum in London (see front page).

Switch No 1 has eight 10 megabit ports and was connected on a ring with another Catalyst 1200 (Switch 2) and a Cisco 1100. It was given to LINX by PIPEX and installed by PIPEX engineers.

Less than two years later LINX was also using a Catalyst 5000 (serial number: 66024714) which was the first 100 megabit-capable switch deployed at any Internet exchange anywhere in the world.
LINX@10 Birthday Party

LINX ‘party party’ at RIPE 49

“The best industry party ever” was how one reveller described LINX’s tenth anniversary celebration in Manchester in September.

LINX brought forward the date of its anniversary from November to September so that the party could coincide with the meeting in the UK of RIPE (Réseaux IP Européens), an international forum which ensures the administrative and technical coordination necessary to enable the operation of the Internet within Europe.

To mark the visit of RIPE delegates from across the continent, LINX invited them all - plus LINX members and guests - for a night of celebration in the Tiger Tiger nightclub.

Josh Snowthorn (Temernox), Paul Rondek (RIPE NCC), Eric Troyer (Switch & Data) enjoy a puppet show from Anna Vassali from Hekas Online (Photo: Paul Thornton)

Dancing the night away at the LINX 10th anniversary party (Photo: Will Hargreave)

Keith Mitchell, James Aldridge and Rob Blokzijl were among the guests at the LINX@10 party (Photo: Joel Rowbottom)

Satanica and Belinda (the snake) do their best to win Bert’s heart (Photo: Joel Rowbottom)

Dave Knight of RIPE NCC ‘swipes’ a momento of a memorable night (Photo: Steve Wilcox)

Group hug for Cara Mascini (AMS-IX), Steve Wilcox (LINX Council) and Eric Troyer and Sheila Peterson (Switch & Data) (Photo: Will Hargreave)

Olaf Kalsman of RIPE NCC takes to the floor (Photo: Joel Rowbottom)
LINX meeting sponsors go the extra mile

As we complete our tenth year, we look back over the past 12 months of LINX member meetings at the sponsors who have helped make these occasions such a great success.

LINX43 in November 2003 was jointly sponsored by Riverhead Networks and Isode. Riverhead made an informative presentation on the subject of DDoS while Isode CEO, Steve Kille provided an enlightening look at a number of anti-UBM techniques. Both presentations provoked lively debate amongst the members present.

Riverhead (www.riverhead.com), now owned by Cisco Systems, provides purpose-built solutions to detect and defeat all known DDoS attacks. Designed for service provider and enterprise environments, Riverhead's field-proven products utilise patented technologies and algorithms to perform deep-flow packet analysis that identifies and removes malicious packets while allowing legitimate transactions to flow at wire speeds in excess of 1 Gigabit per second.

Isode (www.isode.com) builds and provides high performance email messaging and directory products, using open standard protocols. Its M-Vault and M-Switches are used around the world by ISPs, multinational corporations, governments, and universities directly, and via a worldwide network of partners. Its products are also ideal components to embed as part of an OEM solution.

At LINX44 in February, Fortinet provided a very interesting presentation on UBM hardware solutions.

Fortinet (www.fortinet.com) has an award-winning series of ASIC-accelerated antivirus firewalls that are the latest generation of real-time network protection systems. They detect and eliminate the most damaging, content-based threats from email and Web traffic such as viruses, worms, intrusions, inappropriate Web content and more in real time - without degrading network performance. Fortinet offers a full range of network-level services - firewall, VPN, intrusion detection, traffic shaping, antivirus and content filtering.

In May it was Foundry Networks which sponsored LINX45. Ivy Hsu's presentation on Foundry's development and support for IPv6 was well received and yet another excellent item on a packed agenda.

Foundry (www.foundrynet.com) produces a comprehensive, end-to-end suite of high performance Ethernet Layer 2 and Layer 3 switches, metro routers and Internet traffic management products for healthcare, financial services, universities, entertainment, government and technology enterprises as well as for metro and ISPs. All Foundry products provide a consistent, easy-to-use, cohesive network management interface including a command line interface, web based GUI and SNMP based integration with industry standard management platforms.

For the LINX46 meeting in August, the attendance was especially good. Peter Draper, technical director from sponsors Bedrock Networks gave his presentation on the company's eagerly awaited Juniper J-series routers.

Bedrock (www.bedrocknetworks.com) offers service providers, public sector, higher education and enterprise high performance WLAN/LAN/WAN, network security and content delivery solutions. These solutions are supported by a comprehensive range of networking services including design consultancy, health checks and network audits, security testing, implementation and management, technical assistance and e-support.

Want to know more?...

If you and your company are interested in sponsoring a future LINX member meeting please contact LINX sales & marketing manager, Vanessa Evans, at vanessa@linx.net

Growth leads to 25 per cent price cut

Growth in members and traffic volumes means that LINX can cut member fees and transmission charges by an average of 25 per cent compared with last year without jeopardising investment in new infrastructure.

At LINX 46 members decided to cut fees and charges to a level that will generate an income of more than £4 million for the coming financial year.

That provides sufficient income to purchase new hardware amounting to more than 20 per cent of turnover, although total capital expenditure should be considerably less than in recent years.

Chief executive John Souter said: "A higher than expected take-up of new ports, together with more new members than we predicted, means that we are generating additional surplus.

"In the past year we have purchased all the necessary equipment to upgrade every single switch, commenced the upgrading of core routing equipment and set aside money for work to provide additional protection against distributed denial of service (DDoS) attacks.

"As a result, we have scope to reduce the amount we charge members for each port they have connected at LINX, the amount we charge for the traffic which flows through the ports, and the basic membership fee. We are also able to reduce rack space charges and the joining fee for new members.

"On a like-for-like basis, all members should see a reduction in the order of 25 per cent of the cost of being at LINX, compared with the previous year. Cash flow projections show that we will still have adequate reserves to meet foreseeable challenges."