Internet Exchange ‘Points of View’

The IXP Industry
A Personal View from LINX CEO, John Souter

As we know, LINX is one of the world’s largest and longest established Internet exchanges, yet we are seeing almost unprecedented member growth at the moment (nearly 50 new applications for membership in 2007). What is stimulating this rapid growth?

In the early days of LINX - and most other exchanges, I suspect - membership was restricted to just ISPs (i.e. traditional ISPs, managing access networks).

Since at least the turn of the century, this restriction has been relaxed, and now a wide variety of networks and operators join and peer at exchanges. Looking back, I believe that some of the exchanges in Europe were slow in adapting because the access networks exercised control and were overly conservative. They were definitely held back by having restrictions on who could join and peer at that time.

So now we see a huge variety of networks at LINX, with the diversity trend starting with the BBC, one of the world’s largest and most used content providers, continuing with Yahoo and similar providers, then more generalised hosting providers and so on.

During my time at LINX, another big milestone was when Google joined. Of course, it was a very different Google in those days - but the enthusiasm to peer with them was very noticeable. Since then, we seem to have become more and more diverse, with gaming and gambling specialists, all kinds of media streaming, CDNs, DDoS mitigation specialists, software-as-a-service providers, advertising networks, etc.

This trend isn’t just visible at LINX (where there are now more than 250 connected networks), but is fairly universal throughout the major public peering points around the world.

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Global IXPs Invited To Speak At LINX Meetings

As a founding member of Euro-IX, the European Internet Exchange Association, LINX has long played a leading role in forging strong partnerships with other Internet exchanges, not just in Europe but around the world. Indeed, LINX processes are often used as a benchmark for new and developing Internet exchanges.

Daniele Arena of Rome-based IXP, NaMex, told us: “Formal and informal co-operation with other IXPs, and LINX in particular, has been essential to our growth. My personal visit to LINX 46 meeting in August 2004 created the idea to hold a NaMex meeting in Italy, starting a series of much-appreciated events. John’s presentation at the first NaMex meeting opened the doors of Italian IXPs to content providers, which hadn’t been allowed to join Internet Exchanges until then.”

It is a two-way process however, and there is always something new to learn for any Internet organisation. This is why IXPs such as NaMex are invited to LINX meetings to offer an insight into the way they work and operate. This is important because it helps in understanding the challenges faced in different regions of the world.

LINX Meeting IXP Showcase

LINX has invited many IXPs to present to the membership over the years including KIXP (Kenya), INEX (Ireland), NETNOD (Sweden), NIX.CZ (Czech Republic) and the German / Dutch cross-border exchange, NDIX.

The November LINX59 meeting will see TOP-IX, the Turin-based, Italian IXP join this growing list.

Simone Arena, who will be presenting on behalf of TOP-IX, commented: “We were delighted to be asked to speak at the LINX59 meeting. It is an important gathering of industry professionals and is therefore a great opportunity to build relationships and swap ideas.”

Read more about the LINX59 meeting by turning page 6 of this issue of HotLINX.

The IXP Industry ‘A Personal View’

Continued from page 1

Networks and operators clearly value the sense of being well meshed at an exchange and benefit from the low latency that can be achieved through peering. In addition there is the undoubted economic and community benefits which arise from exchange presence.

In Europe, public peering seems to be much more strongly established than in the USA. Some of this is clearly grounded in geography, but we like to think that part of it is because the larger exchanges such as LINX and AMS-IX have shown that high-capacity, high-reliability Internet exchanges are an attractive proposition. More recently, public peering has become better established in the USA, with recent entrant Any2 expanding the range and geographical scope of the availability of this.

As well as the existing relationship that we have with the larger USA-based Internet exchanges, I’m happy to say that Any2 and LINX are now exploring ways of working together to their mutual benefit.

Another way in which we are joined is through Euro-IX, the European (and increasingly, world) trade association of Internet exchanges. Any2 became the 4th US-based exchange to take advantage of associate membership of Euro-IX, and this shows their commitment to networking and sharing within the exchange community.

LINX is a founder member of Euro-IX, and I have served on its Board since its foundation.

John Souter, LINX CEO
**Terrabit Milestone Broken By Euro-IX Members**

Euro-IX, the European Internet Exchange Association, is an organisation of Europe’s leading Internet exchange points. With more than 40 member IXPs and over 2,600 connected networks to these member IXPs, Euro-IX represents a major part of the European IP community.

It is perhaps not a surprise therefore, that the combined traffic statistics for Euro-IX members are huge but just how big are the numbers?

Of those IXPs that display publicly viewable figures, the combined Euro-IX European Member Aggregated Peak traffic officially broke through the one terrabit barrier in August.

The 1,019 terrabits per second figure represented a 15.59% rise on July stats and 71% up over the previous 12 months. In comparison Asian IXP traffic was up 5.86% over the month of July and US IXP traffic rose by around 8.44%.

This milestone is a tremendous achievement for Euro-IX members but it only tells half the story. In the intervening two months traffic has risen another 25% and is set to rise still further.

Formed in May 2001, the aim of Euro-IX has always been to further develop, strengthen and improve the Internet Exchange Point community.

Members combine their resources so as to co-ordinate technical standards across the continent, develop common procedures, and share and publish statistics and other information. The publishing of this information, in turn, gives all interested parties a better insight into the Internet exchange world.

Serge Radovcic, Secretary General at Euro-IX, said: “My studies of European non Euro-IX member IXPs and those Euro-IX members that don’t release public traffic stats shows another 184Gbps of traffic on our continent. This would in fact have taken the total European IXP peak traffic to over 1.2Tbps.”

**EPF2 Is Just Round The Corner**

Three of Europe’s leading Internet Exchange Points - LINX, AMS-IX and DE-CIX - are hosting the second European Peering Forum on 28 and 29 November 2007. The event, which is being held in Barcelona, Spain, will bring together 150 Internet industry professionals from the three IXPs respective Member organisations.

The aim of the EPF is to not only negotiate new peering relationships but also to focus on the operational aspects of the peering process. Look out for the next issue of HotLINX which will feature extensive coverage of this important event.

If you would like to know more about EPF2 please visit: [www.peering-forum.eu](http://www.peering-forum.eu)

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**Internet Exchange Points**

**A User’s Guide**

An Internet exchange point (IX or IXP)* is a physical infrastructure that allows different Network Service Providers* to exchange Internet traffic between their networks by means of mutual peering agreements.

Primarily, an IXP will allow networks to interconnect directly via the exchange rather than through other 3rd party networks. There are a number of advantages of direct interconnection including reduced costs, lower latency, and increased bandwidth.

A typical IXP consists of one or more network switches, to which each of the participating networks connect. Whilst a range of protocols have been used at IXPs in the past, today most are Ethernet based. Individual port speeds range from 10 Mbit/s ports seen in developing IXPs, to aggregated 10 Gb/s ports in areas with high network density such as London, New York and Tokyo.

Another advantage of IXPs is increased speed and lower costs. This is most noticeable in developing countries and areas with poorly developed long-distance connections. Costs for data transport can be as much as 10 to 100 times more than those paid by ISPs in North America, Europe or Japan so these regions typically have slower, more limited connections to the rest of the Internet. However, connecting to a local IXP may allow them to transfer data more cost effectively, while greatly improving the bandwidth between customers of the two connecting ISPs.

In Europe IXPs are typically mutual, not-for-profit organisations where its members collectively “own” the company. Operating costs are typically shared among all its members who will usually pay a monthly or annual fee. This is usually determined by the speed of the port or ports which they’re using or, less commonly, by the volume of traffic which they’re passing across the exchange.

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**EPF2 Extra**

For more information on the work of Euro-IX please visit: [www.euro-ix.net](http://www.euro-ix.net)

**LINX Extra**

For a comprehensive list of European IXPs please visit the Euro-IX website: [www.euro-ix.net/member/m/ixp/list](http://www.euro-ix.net/member/m/ixp/list)
Brussels Split On Functional Separation

EU Competition Commissioner Neelie Kroes and Industry Commissioner Günter Verheugen have united to attack telecoms Commissioner Viviane Reding’s plans to increase functional separation in telecoms incumbents.

“Functional separation” requires dominant companies to separate - but not sell - their network infrastructure from their services division, and give competing providers access to the infrastructure on equivalent terms. Viviane Reding has cited the experience of functional separation by BT in the UK as a model for the rest of Europe.

Kroes and Verheugen believe Reding’s proposals would create bureaucracy and harm investment, saying that functional separation “is not only superfluous but also damaging. Functional separation does not prevent discrimination of alternative operators”.

They also attack Reding’s proposal to establish the European Regulators Group (ERG) as a body with pan-European regulatory powers: currently the ERG is just a discussion forum for national regulators.

Reding will need to convince fellow Commissioners, the European Parliament and particularly the Council of Ministers if she is to push her new Directive through. Some commentators feel she has an established pattern of seeking bold headlines and generating controversy, before returning to the negotiating table with slightly more modest proposals once the dust has cleared.

RIAA Success In Jury Trial

Litigation, Intellectual Property

The RIAA has won the first ever jury trial brought against an Internet user for copyright infringement by filesharing. A Minnesota jury awarded damages of $9,250 per song shared against Jammie Thomas, for a total of $222,000.

The jury rejected Thomas’ claim that the RIAA had not proved she was behind the keyboard, and that some hacker could have been using her PC remotely.

The RIAA usually tries to force a settlement rather than go to court, and this verdict will certainly convince many to accept their offer even while they maintain their innocence.

Dr Tanya Byron Statement

Content issues, Child protection

Dr Tanya Byron, the TV nanny who will run a Department for Children Schools and Families (DCSF) Information and Families (DCSF).

Runereaders and Kremelinologists will be poring over the statement to see whether she intends to stick strictly to “to help parents regulate access to inappropriate material on the Internet”, the brief given by the Prime Minister, or whether she intends to stake a claim for wider Internet content regulation, in the name of child protection.

Commenting on the case, attorney for the record companies Richard Gabriel said chillingly, “This is what can happen if you don’t settle.”

‘In Brief!’

The Latest Stories on the LINX Public Affairs Website

This column features the latest news in the world of Public Affairs. Please visit: www.publicaffairs.linx.net/news to read the stories in full.

Ofcom releases consultation on Next Generation Access

Competition & Markets

Ofcom has released a consultation paper on its policy for regulating Next Generation Access Networks. The deadline for responses is 5th December.

A PDF of the report can be viewed from the LINX Public Affairs website: www.publicaffairs.linx.net/news/2006

Dangerous Words

Content Blocking

Search engines should stop people searching for “dangerous words” like b*mb, g*nocide or ter**rism, EU Justice and Security Commission Franco Frattini said in a Reuters interview. ISPs should also block access to information about explosives and bomb-making.

Google Calls For Privacy

Consumer Rights, Privacy and Investigation

Google is calling for global standards to protect the privacy of Internet users. Google’s Chief Privacy Officer Peter Fleischer has told the UN Educational, Scientific and Cultural Organisation (UNESCO) that governments should act to introduce common privacy standards.

TV Links closes in link copyright controversy

Intellectual Property

TV fansite TVlinks.co.uk recently closed following action from the Federation Against Copyright Theft backed by Gloucestershire police. TVlinks.co.uk did not actually host any copyright material, but did contain links to infringing content.

The case raises interesting questions about the limits of liability for merely subscribing to infringing content, rather than actually conducting it.

Google is calling for global standards to protect the privacy of Internet users. Google’s Chief Privacy Officer Peter Fleischer has told the UN Educational, Scientific and Cultural Organisation (UNESCO) that governments should act to introduce common privacy standards.
Member & Partner News

If you have a LINX Member or Partner query please email sales@linx.net

Around The World In 40 Ways with the London Internet Exchange

LINX has long been at the forefront of the Internet in Europe so as it expands, it is of no surprise that networks from further afield continue to want to peer here.

Membership has already passed the 250 barrier and is still rising but where exactly do these members hail from?

As the Internet is such a global concept, it is not always easy to pinpoint a specific ‘home’ for a network operator. However, always up for a challenge, our new Business Development Executive, Jennifer Atherton, has compiled as comprehensive a list of countries as humanly possible.

Jennifer said: “One of my key roles as Business Development Executive is getting to know more about LINX members and how they operate. Researching the make-up of the membership was an interesting process and clearly demonstrates what an important organisation LINX is in the Internet world.”

LINX has members in over 40 countries and territories. For scale reasons the map above has been split into six distinct regions - the Americas, Europe, Africa, Middle East, Asia and Oceania - which gives some indication as to the reach of the LINX exchange.

It is interesting to note that while a large proportion of members come from the traditional LINX heartland of Europe, the gap with the rest of the world is beginning to close. Nearly a quarter of all members are now based outside Europe with those in North America equating to 14.7% with a further 7.5% coming from Africa, the Middle East, Asia and Oceania.

TeleclyGroup Begins Fit-Out Of Additional Space In City Of London Data Centre

TeleclyGroup, who floated on the London Stock Exchange in October, has announced that work has started on fitting-out an additional 550 square metres of hosting space at its Oliver’s Yard data centre in central London.

The expansion comes ahead of the planned opening of TeleclyGroup’s new 2kW per square metre data centre, Powergate, in west London, scheduled for Q2 2008.

The facility expansion will be available for customer occupation from Q1 2008 and will support services of up to 1.5kW per rack. A dedicated high-density suite was completed at Oliver’s Yard earlier in the year.

Mike Tobin, CEO of TeleclyGroup, says: “We’re expanding the Oliver’s Yard data centre in response to ongoing demand from TeleclyGroup customers for a range of services at our City-based site. The additional capacity will provide customers with the highly secure, connected environment they require to support the growth in their business objectives.”

New LINX Members in 2007

July - November

Below is a list of new members connected since the beginning of July 2007. It is an ever growing list which includes a number of new territories thus expanding the global reach of the LINX network still wider.

Bezeq (Israel) www.bezeq.net
Bit BV (Netherlands) www.bit.nl
Comstar (Russia) www.comstar-direct.ru
DoubleClick (USA) www.doubleclick.com
Freshtel (Australia) www.freshtel.net
Intelepeer (USA) www.intelepeer.com
Inuk (United Kingdom) www.inuknetworks.com
LocalPhone (United Kingdom) www.localphone.com
Murphx (United Kingdom) www.murphx.com
Paltel (Palestine) www.paltel.net
Peerex (United Kingdom) www.peerex.net
Qwest (USA) www.qwest.com
Scotnet (United Kingdom) www.foremost.co.uk
Server City (United Kingdom) www.servercity.co.uk
UK Broadband (United Kingdom) www.ukbroadband.com
VeriSign (USA) www.verisign.com
Yacast (France) www.yacast.fr
LINX Meeting Focus

Are you interested in presenting at a future LINX meeting? Please email pr@linx.net

LINX58 Meeting Another Resounding Success!

LINX58, held at the Goodenough College in London in August was again well attended by LINX members. In addition to the regular LINX staff presentations on technical, commercial and regulatory issues there were many other informative talks to be heard.

There were overviews on LINX services, DDoS, BENTO, routeservers, multicast, IPv6 and the LINX Dual LANS and well-received presentations by associate member, RIPE and Richard Clayton who again provided his ever-popular SpamHINTs update.

INUK presented on “Delivering IPTV over broadband networks” which was followed by news from LINX Partner, NetSumo and a lively open session with the LINX board.

The meeting was sponsored by Foundry Networks and Infoblox, who we feature on page 7 of this issue. Foundry will be profiled in depth in the next edition of HotLINX.

LINX59 Preview

LINX59 will take place on the 19th and 20th of November. It is again being held at the Goodenough College with another packed programme with something for everyone.

One session which is sure to create a lot of interest amongst the delegates is the return of the Peering Confabulation. This is a forum designed to give LINX members an overview of peering policies of other members.

Other presentations include fibre hygiene and cleaning by John Taylor of Glimmerglass and Mac minis as routers by Fubra’s Brendan McLoughlin.

The guest LINX Partner and IXP are Telecity Group and TOP-IX respectively while there will also be an ISC update from Keith Mitchell.

Following a LINX Board Q&A, LINX59 will end with the 2008 budget presentation and EGM session.

Dates Set For 2008 LINX Meetings

The dates for the next four LINX meetings have been provisionally set taking us all the way to the end of 2008.

Check the panel below for the list of meetings and venues for each event and put them in your diary today. Further details will be made available in the member area of LINX website and future editions of HotLINX in due course.

**LINX60** - 11 & 12 February
Goodenough College, London

**LINX61 AGM** - 19 & 20 May
Goodenough College, London

**LINX62** - 18 & 19 August
Goodenough College, London

**LINX63 EGM** - 17 & 18 November
Goodenough College, London

Introducing You To... Tucows

LINX59 Sponsor

Tucows is proud to be the sole sponsor of LINX59. Tucows is strongly committed to serving our customers in the United Kingdom and we’re excited to have this opportunity to meet some of the leading providers in the UK at LINX. With close to 1,000 resellers of Tucows services in the UK, we recognize that the UK is, and will continue to be, an important and growing market.

Tucows has a long history in Internet years. From our origins as a software download site, and then as one of the first domain name Registrars, we’ve always championed the rights of Internet users and continue to work to make the Internet better and more useful.

As the largest wholesale provider of Internet services like domain names and hosted email, Tucows gives our resellers the tools and services they need to provide high-quality services to their users. Freed from the hassles of operating and maintaining complex systems and infrastructure on their own, our customers are able to better focus on meeting the needs of their customers.

We look forward to meeting you at LINX59.

For more information on Tucows please visit: services.tucows.com

Don’t Miss Out - Tune Into the LINX59 Webcast

It is nearly five years since LINX began webcasting its first meeting during LINX41.

If you are unable to attend a LINX meeting for any reason the webcast is a great way to keep in touch. The stream can be accessed by members only via an authenticated link on the LINX website. The image quality is excellent and you can be involved in discussions via the IRC channel on the day.

LINX Extra

Do you have an opinion on the meeting webcast facility? Send any comments to: info@linx.net
LINX Meeting Sponsors

IP Performance Ltd, a specialist Network Infrastructure and Systems Integrator focusing one of its three verticals on the ISP sector, have sponsored two of LINX’s recent meetings, LINX51 and LINX57.

Specialising in IP Access and Connectivity technologies, Network Security and Network Application performance enhancement, IP Performance partner with a number of key vendors. These include Alcatel-Lucent, Allot Communications, Avocent, Barracuda Networks, Bluecat Networks, Blue Coat, ConSentry Networks, Extreme Networks, Huawei Datacom, Juniper and NetFort Technologies.

An engineering-led and technology-driven organisation, IP Performance pride themselves in being subject matter experts in the products they propose in their solution designs. IP Performance are active in publishing journals, technical briefs, white papers and case studies. The company also exhibits at, and sponsors, conferences and technology tradeshows in each vertical market in which it operates.

IP Performance count several LINX members among their customers, and value and appreciate the opportunity to network with members at the meetings, allowing for a free flow of information, ideas and opinions. IP Performance were privileged to host a session at LINX 51 on their involvement in the largest (to date) LLU rollout, as well as to present on Blue Coat solutions for url filtering, anti-virus and Caching, in the core.

“Being able to sit in on some of the sessions is invaluable in understanding the technical and business drivers affecting the IXP and broader ISP communities”, commented Pierre Ketteridge, Pre-Sales Engineering Consultant.

The break periods allowed IP Performance to showcase some of their vendor partners’ products and solutions (Allot Communications’ NetEnforcer DPI appliances, Avocent Infrastructure Management products and Huawei Datacom’s access and core IP switching/routing portfolio at LINX57).

LINX Meeting Return Ticket for IP Performance

If you would like more information on IP Performance and their range of services please visit www.ip-performance.co.uk or email info@ip-performance.co.uk.

Core Network Services From Infoblox

The LINX58 meeting in August at the Goodenough College was sponsored by Infoblox. Infoblox delivers the only platform designed to provide utility-grade core network services.

Core network services – including domain name resolution (DNS), IP address assignment and management (IPAM/ DHCP), authentication (RADIUS) and related services – are essential for all networks and applications. Without core network services, IP-based networks and applications grind to a halt.

Conventional approaches to delivering these services, typically a variety of stand-alone or ad hoc software applications on general-purpose servers, have management, security, and resiliency shortcomings that can compromise network and application availability. Infoblox addresses these shortcomings with its simple, secure, and reliable appliance-based approach that includes unique database and grid technology, enabling devices to be linked together in a grid and managed as a unified system.

Infoblox products reduce costs and network complexity, and provide high availability and easy disaster recovery. The platform supports advanced applications like VoIP and wireless and helps companies build identity-driven networks that integrate identity into the fabric of the network for security and compliance.

Infoblox solutions are used by hundreds of organisations worldwide, including many of the Fortune 500. The company is headquartered in Santa Clara, California, and operates in more than 30 countries.

If you would like more information on IP Performance and their range of services please visit www.ip-performance.co.uk or email info@ip-performance.co.uk.

LinX Extra

For more information please go to: www.infoblox.com. To contact them direct please email info@infoblox.com or telephone them on +1 408 625 4200.
Staff News

Jennifer Atherton Joins the LINX Team
Sales & Marketing

LINX has appointed Jennifer Atherton as Business Development Executive.

Jennifer, a Nottingham University graduate, will support new member recruitment and communications activities, reporting to Sales & Marketing manager Richard Yule.

Richard said: “Jennifer’s arrival coincides with a period of unprecedented growth at LINX. She has already met many of the members having attended the recent LINX58 meeting and we see her contribution as key to strengthening future communications with prospective and existing members.”

Jennifer told us: “As an non-profit organisation at the heart of the Internet industry, LINX really appealed to me. They offered exciting prospects and the opportunity to be part of a close-knit, well-organised team. I am really looking forward to my future experiences of working for LINX and getting to know its members.”

HotLINX editor gets on his bike and does a runner

Jeremy Orbell, designer and editor of HotLINX, recently completed the 2007 London Duathlon.

The event, which consists of a 5K run, a 10K cycle and another 5K run, was held on Sunday 9th of September in London’s Richmond Park.

Jeremy said: “It was tough but also great fun and in a wonderful setting too. I must, however, give special thanks to LINX Senior Network Engineer Rob Lister for the loan of his bike without whom, none of this would’ve been possible.”

Raising over £100 for mental health charity Mind, (www.mind.org.uk), Jeremy clocked a time of 01:41:51.

Have Your Say On The New LINX Member Forum

We are pleased to announce the launch of the forum feature on the LINX website. It is located in the member area and can be accessed via the menu link using your LINX login.

We have structured the forum with a number of sections including technical, public affairs and more general LINX topics. It is already been used by members and we hope you will enjoy and find value in the discussions that develop there.

The panel opposite gives an overview of the individual forum sections. As ever, feedback and suggestions for improvement are welcome.

The LINX Engineering team has been strengthened by the appointment of Daragh McGrath as Network Engineer.

Daragh’s Internet career began in 2000 at Eircom.net, Ireland’s largest ISP. He was rapidly promoted to Senior Analyst, before moving on to become a deputy Team Leader of the residential support team of 100 agents supporting over 500,000 customers.

From residential, he moved into Corporate Support, his first real introduction to hands on Cisco networking. This gave him a good grounding to move a year later into Eircom’s site implementation team, installing and supporting networks for small companies up to global corporates, right across the country.

Following 18 months on Eircom’s Network Operations team, Daragh decided it was time for a new challenge which led to him joining Digiweb, a rapidly growing wireless ISP. Digiweb were in the process of building up their access network, purchasing and rolling out a shiny new datacentre - something Daragh is quite proud to have played a key role in - and building Ireland’s first 4G mobile network.

One of Daragh’s tasks whilst at Digiweb was to evaluate bringing the ISP to LINX. Whilst looking for membership prices, Daragh noticed the Network Engineer position advertised, and thought it too good an opportunity to turn down. The rest is history.

Outside of work, Daragh’s passions are travel, photography, rugby, sailing, and eating in as many top notch restaurants as he can afford!

To visit the LINX Forum please go to: https://www.linx.net/forum
(LINX Member log-in required)