LINX Cuts Prices Again

More cost savings for members as prices are reduced for 2014

Please turn to page 6 to find out more.

Reseller News p13

Business Development Executive, Sheryl Francis, provides an in-depth overview of the LINX reseller programme, ConneXions, on page 13 of this issue of HotLINX.

Goodbye Derek p07

As LINX CTO Derek Cobb moves on to pastures new, HotLINX asks Derek to reflect on the key successes of his time overseeing the LINX network.

Ask the Expert p18

Member Relations Representative, Emma Saunders, answers a query regarding LINX member web portals in our Ask the Expert feature. Turn to page 18 to find out more.
Face Off

Board Update p06
In LINX News our Chairman, Grahame Davies, provides his regular Board Update. This time the focus is on the ongoing governance review.

Engineering p07
In our LINX Engineering section we say farewell to outgoing CTO Derek Cobb. We also look at the detail behind capacity upgrades at key LINX sites.

Public Affairs p06
The main topic covered by Malcolm Hutty in our Public Affairs pages is the call to US Congress by the Internet industry to limit NSA surveillance.

In the Spotlight p17
Martin Hannigan, Lead Architect at Akamai Technologies, talks to HotLINX about Open-IX, LINX NoVA and North American peering in general.

Inside Stories
Welcome to HotLINX36. Here’s a brief summary of the LINX industry and member news stories featured in this issue.

In our LINX News section we highlight the 10% price cuts on all port fees for 2014 as approved by the membership at LINX83. Meanwhile, in Industry News, we have an article on IX Reach’s deployment of Juniper MX hardware to facilitate 100G connections plus the results of a South American IXP study as conducted by ISOC.

We have a feature page on all three of our local exchanges, IXManchester, IXScotland and LINX NoVA, plus a round up of all the UK and International conferences to be attended by staff in the first quarter of the year.

Swedish IXP Netnod is the LINX Associate member in focus this time, with ‘Web accounts for member web portals’ the topic for our Ask the Expert feature.

We also take our usual look at the latest LINX member and technical statistics on our back page.

Internet Industry Tweets
Below are just a few of the Internet and LINX community related updates we’ve spotted on Twitter recently.

RIPE NCC @RIPE_NCC
Internet masterminds Vint Cerf and Robert Kahn speak to @nytimes about what lies ahead for the Internet in 2014 http://www.nytimes.com/2013/12/31/science/viewing-where-the-internet-goes.html

datacenter @datacenter
Open-IX opens certifications for data centers, Internet exchanges beyond NoVa, http://goo.gl/aigtPs

Telegraph Technology @TelegraphTech
10 New Year’s tech resolutions http://tgr.ph/1eUM58B

ARIN @TeamARIN

TNP Ltd @TNPLtd
Great to see the new LINX Internet Exchange in Scotland getting good coverage, peer-tastic @PulsantUK @LINX_Network http://www.bbc.co.uk/news/uk-scotland-scotland-business-24712749

LINX on Twitter
Keep up to date with LINX on Twitter using @LINX_Network

Do you follow?
You can also get LINX news on LinkedIn and Facebook via the quick links below:
www.linx.net/LNC/linkedin
www.linx.net/LNC/facebook
Past, Present & Future

20th anniversary year a chance to reflect but also to look ahead

By John Souter
LINX Chief Executive Officer

As we move into 2014 it’s only natural that we look back at the past 12 months to see what we’ve achieved. Last January we knew that there was a real chance we could be literally moving in to new territory by establishing our first overseas exchange, something that is coming to pass with LINX NoVA as I write this. This is in addition to our third UK exchange - IXScotland in Edinburgh, which opened in November 2013 - making 2013 quite a remarkable year for LINX.

In the last couple of months we’ve been working hard on getting LINX NoVA up and running and also liaising with US data centres to ensure the best possible footprint. In addition to this activity we’re also pushing through our application for certification as part of the Open IX initiative. Meanwhile, back in the UK, our local exchange programme continues apace with discussions on new sites to go with of those already established at IXManchester and IXScotland.

This Autumn has been a very busy time in other ways too. Among the other projects I’ve been devoting considerable time to has been the conducting of interviews and selection of a new LINX Chief Technical Officer. Derek Cobb, who has been with us for the last three years, will depart shortly. He leaves us with the network in a very strong and robust position after fantastic work with the infrastructure before the London Olympics and with subsequent enhancements since. His wealth of knowledge and experience has been vital and we wish him all the best for the future.

Derek’s replacement is Richard Petrie who began his role at LINX at the beginning of the year. Many of you will get to meet Richard at the upcoming LINX84 meeting in February and I’m sure you’ll all join me in welcoming him as head of the LINX Engineering team.

Forward Thinking

You will have seen from this issue’s cover that we are now in our 20th year and there’s certainly an exciting time ahead. Our development programme is going well and new products and services are being worked on as we speak, in readiness for launch later this year. LINX has come a long way since its inception in 1994. With nearly 500 members and 7.5 Terrabits of connected capacity the exchange is in a very healthy shape. In an industry that changes as rapidly as ours there will always be challenges, but I am confident that LINX is ready to face them all and prosper.

Editorial

Archiving the LINX story through HotLINX

By Jeremy Orbell
HotLINX Editor

HotLINX has been been reporting on what’s been happening in the LINX community for many years now and in 2013 there was certainly plenty to talk about. Last year the network took great strides with ongoing upgrades to the London and IXManchester LANs and the introduction of two new local exchanges, IXScotland and LINX NoVA. Membership is now closing in on 500 and traffic figures have never been higher.

We will obviously cover the latest developments with these issues in this edition but let’s not forget it’s a time to look forward too, especially as 2014 is such a milestone year for LINX. The exchange celebrates its 20th anniversary in the autumn and much is planned throughout the year to mark the occasion. HotLINX has the lowdown of what’s in store in our centre pages.

Of course, HotLINX will be on hand to report on everything that’s happening in the LINX community during 2014 so look out for updates and announcements on the LINX website. You can also send your comments to us at hotlinx@linx.net.

A happy new year to you all!
LINX NOC Services Contract Awarded to Allegro Networks

When LINX announced plans to launch LINX NoVA, it knew that it had to provide at least 5 to 8 additional hours support cover beyond the end of the UK working day. This led to a more fundamental review of how LINX operated its NOC services.

Since establishing its first out-of-hours, outsourced NOC in April 2010, peak traffic has grown from 600Gb/s to 1.89Tb/s. There’s been a huge jump in private interconnect connections, 10Gb/s services had doubled and a move towards 100Gb/s has become more commonplace. In addition, LINX’s first IXs outside London, at Manchester and Edinburgh, as well as LINX NoVA, have also been established.

It was decided that the LINX NOC should become 24x7 operation, dealing with Tier 1 network monitoring and member service requests with LINX engineers remaining as the on-call Tier 2 team. The NOC would also need to be able to deal with remote hands services at the new local IXs as there are no short term plans to employ staff at these locations.

It was decided that evolving the current outsource NOC was the most cost-effective approach and an RFQ (Request for Quote) was issued due to the extension in scope required.

Six potential partners entered the three-stage process and after presentations and site visits, it was decided to select Allegro Networks as its NOC Outsource Partner.

LINX CTO Derek Cobb said: “We believe that the facilities Allegro offer, for both the main NOC and on the disaster recovery side, give LINX the best chance of delivering a successful solution for our members. Their understanding of LINX and the peering scene, plus the capability and commitment of all their staff, means we can enter into this partnership with confidence. We are now working closely with Allegro to bring the new NOC into service. There are dependencies on the OSS programme and on completing training on LINX processes, but the early progress has been good and we are hopeful that we will be open for service in early February.”

IX Reach deploys Juniper MX hardware to facilitate 100G connection to LINX

LINX member and reseller partner IX Reach has deployed new Juniper MX hardware on its connection to LINX. The equipment, chosen in partnership with Alternative Networks, will allow customers to benefit from faster provisioning and virtually instant upgrades at LINX over IX Reach’s network.

Rob Parker, Head Network Architect at IX Reach, commented, “Our network is constantly growing. Using the most up to date hardware and technology ensures we can deliver unwavering connectivity in an industry where both short lead times and the highest uptime possible are key.”

This development means that IX Reach has become the first ConneXions partner to connect at 100G speeds.

IPX Study Results

New Study Reveals How IXPs Spur Internet Growth in Latin America

The Internet Society (ISOC) recently published the results of a study that demonstrates the far-reaching economic and societal benefits of establishing IXPs in emerging markets. Commissioned by ISOC and conducted by Professor Hernan Galperin of the Universidad de San Andrés in Argentina, the study examined critical cost and performance benefits of IXPs in Argentina, Brazil, Colombia, and Ecuador – leading countries in Internet growth in Latin America.

• Since 1998 nine IXPs have been established in Argentina connecting over 80 network operators. Internet transit costs have been reduced from USD $500 per Mbps per month in one city to about USD $40 per Mbps per month.
• In 2004, an initiative by Comitê Gestor da Internet was launched to establish IXPs across Brazil. To date there are 22 IXPs in operation, covering 16 of Brazil’s 26 states.
• In Ecuador, international transit costs hover around USD $100 per Mbps per month. Local traffic can now be exchanged at the IXP in Quito (NAPEC) for as little as USD $1 per Mbps per month. Without an IXP, operators would exchange local traffic through international transit routes and the additional wholesale costs for local ISPs would be USD $7.2 million per year.
• By exchanging traffic locally, and by installing content caches at NAP Colombia, local ISPs were able to reduce dependency on international routes, thus reducing costs and increasing service reliability.
What they’re saying

**Faster Internet for Scots**
Scottish Government Cabinet Secretary, John Swinney (28 October 2013)

“We are delighted to welcome the establishment of a dedicated Internet Exchange Point for Scotland which will speed up Internet access for businesses and individuals. This industry-led IXP will allow internet service providers to securely pass traffic to each other in Scotland, enhancing the digital offering both within and outside of Scotland. I also want to recognise the key contribution of LINX, who have worked with the industry and Scottish Government to make this happen. Along with our investment in next generation broadband and measures to increase digital participation, this investment represents a further step on Scotland’s journey to becoming a world leading digital nation by 2020.”


**The European Invasion**
Stacey Higginbotham (3 December 2013)

“So the European-style Internet exchange is hitting US shores. The result should be more competition, and perhaps cheaper transit costs for the giants of the Internet. As consumers this may not ever result in lower bills, but more competition and lower pricing at all of the connection points of the Internet can only be a good thing. Making the market for bandwidth more efficient is something that benefits everyone in the long term.”

[http://gigaom.com](http://gigaom.com)

**METRO2C Alliance Adds Internet Exchanges in the UK & Ireland**

The METRO2C Alliance, a collaboration of Europe’s leading connectivity providers, data centre operators and Internet Exchanges founded by Sea Fibre Networks, a carrier neutral, sub-sea telecoms provider, has added LINX, IXManchester, IXScotland, INEX and CNIX to its METRO2C ecosystem. The METRO2C Alliance recognises the essential role Internet Exchanges play for carriers and enterprises alike and has added the IXP’s to its METRO2C interactive map.

Diane Hodnett, CEO of the Alliance’s founding member, Sea Fibre Networks, said: “The UK and Ireland have a world class digital environment for attracting and supporting the European Headquarters of large tech companies such as Google, Microsoft and Facebook. The METRO2C Alliance aims to promote critical infrastructures (data networks, data centres and Internet exchanges) that are vital for the continuity of the digital economy.”

For further information on the METRO2C Alliance and to view the interactive map please visit the METRO2C website: [www.metro2c-alliance.seafibrenetworks.com/index.html](http://www.metro2c-alliance.seafibrenetworks.com/index.html)

**IXP Comments**

**LINX**

“The METRO2C Alliance website is a great resource for networks wanting to better understand how LINX’s UK Internet exchange points can be reached and we are pleased to be working with them to promote LINX in London as well as IXManchester and IXScotland.”

Ben Hedges, LINX Head of Marketing & Business Development

**INEX** (Internet Neutral Exchange)

“Developing a central database of the various options available to network owners is a positive idea and we are delighted to add INEX to this resource. For those with IP traffic, we are keen for them to see INEX as a good option for peering and being on the METRO2C Alliance’s webpage is one way of raising our profile to ensure that happens.”

Eileen Gallagher, INEX Head of Marketing

**CNIX** (Cork Neutral Exchange)

“I am delighted to announce CNIX’s involvement in the METRO2C Alliance. We believe that connectivity providers, data centres and Internet exchanges must work together to deliver the content that is now generating more bandwidth than ever.”

Jerry Sweeney, CNIX Director
LINX Governance Review
The review of the governance of LINX, previously recorded here, is now under way with Howard Fisher, LINX COO, running the process with a subcommittee of the board assisting him.

Following a selection process, Howard has engaged with KPMG to assist us with this project. Their input will include a wide ranging analysis of existing practices, documentation, terms of reference and control mechanisms. This will be followed by a detailed examination of board function, composition, performance and effectiveness. All stakeholders will be consulted including the board, LINX Senior Management Team and the membership. This will be followed by a workshop to bring together all input and a presentation to the Board, led by Howard and supported by the subcommittee, is anticipated for February. I'll bring an update to the membership list and the quarterly meeting with progress at that time.

This means we will miss the opportunity for any constitutional change to be implemented by the AGM in May and thus we will reset expectations accordingly with a revised timescale. It is important that this process is thorough to ensure that sound proposals for a critical aspect of the organisation’s structure can be brought to the membership for discussion and, ultimately, sanctioning.

10% Price Cuts to Port Fees Agreed for 2014
Following approval at the LINX83 EGM in November, LINX has implemented 10% price cuts on monthly port fees over its two London peering LANs and on 10G ports at IXManchester. Ports at IXScotland will be free for the whole of this year; and at IXManchester prices below 10G remain at zero until the end of June. There are no port fees to pay at LINX NoVA up to 10G with prices for 100G available on application.

LINX CEO John Souter said: “These price cuts demonstrate our long-standing commitment to reducing costs for our members. We have always been a mutual not-for-profit company and we will continue to focus our efforts on re-investing any profits we have back into the exchange whilst continually improving on our network standards.”

The new prices, which took effect from the 1st January 2014. Full details of the new fee structure can be found here: www.linx.net/govern/servicesfees

Board Update
Chairman’s Report
LINX Chairman, Grahame Davies
Engineering Update
Equinix and Interxion Capacity Upgrades

By Mike Hellers, LINX Network Engineering Manager

During the weeks before our network freeze we managed to complete a series of network capacity upgrades on the Juniper LAN in London.

Capacity to our PoP in Equinix (EQ4) has been upgraded from 8x10Gbps to 16x10Gbps, allowing the provision of a number of additional 10G member ports. Despite having to delay the maintenance work twice following unexpected issues with our passive DWDM connections, the upgrade was completed without impact to member services.

Similar work has been done to upgrade our capacity to Interxion (INB), from 4x10Gbps to 8x10Gbps. This will provide us the needed capacity ahead of the major network changes, which will be happening around March 2014. Interxion is going to become our first Core network node outside of the Docklands area. This is following a number of requests for large capacity at that site.

Having a Core node outside of the Docklands area will also allow us more flexibility in the long term.

“Goodbye Derek!”

It is with regret that we announce that after nearly three years of sterling service, Chief Technical Officer, Derek Cobb, has decided to leave LINX for pastures new. Derek has overseen some massive changes in the network during his time as Head of the Engineering department and there’s no doubt the network is well placed to serve the membership for many years to come.

Derek told HotLINX, “It has been an incredible time to be at LINX. There have been challenges but I am delighted with what we’ve accomplished. The most obvious challenge was the migration of the primary LAN from Brocade to Juniper in 2011, but the work to build a year’s capacity in 4 months on both LANs ahead of the 2012 London Olympic Games, needing a change out of the Juniper LAN core and an almost complete rebuild of the Extreme LAN was just as stiff a task.

The launch of the UK IXPs in Manchester and Edinburgh, and the impending launch of our first non UK IX in North Virginia, have been highlights, alongside the refresh of our IT platform, network OSS and our plan to revamp our NOC in early 2014. Throughout this, the LINX staff have given me fantastic support, making all these achievements possible through their hard work and dedication. It’s been a wonderful three years for me and I’d like to thank LINX and the LINX members for what has been a wonderful experience.”

LINX Availability Metric
LINX Engineering now publishes a service metric for all three LANs based on the flowmon tool. Information on flowmon has been presented at LINX member and Euro-IX meetings before and a description of how the metric is calculated can be found in the members area of the LINX website.

www.linx.net/members/support/metric-explanation.html

LINX In Brief
IXManchester Member Meeting being held alongside UKNOF event

A two day Manchester peering and networking event is to be staged in association with UKNOF in January. Agenda sessions for the IXManchester event will feature talks on Engineering, Public Affairs plus an update from the IXManchester steering committee.

The IXManchester meeting will take place on Monday 20th January with UKNOF the day after. Both meetings are being held at Manchester Central Convention Complex. Registration is open now. To sign up please go to: www.linx.net/events/regional/Manchester/MS/Manchester

For information about the UKNOF event please visit: uknof.org.uk

Staff Recruitment
Jonathan Cogger
Trainee Service Delivery Engineer

Jonathan Cogger has joined the LINX Engineering department as a Trainee Service Delivery Engineer. Prior to joining LINX, Jonathan studied for a degree in Games & Entertainment Systems Software Engineering. Jonathan told HotLINX: “I really enjoy the hands on, physical side of networking. My role maintaining the suites at the LINX sites, and being mentored under Martyn Ranger, has really helped me increase my knowledge of networking as a whole.”
Internet Companies Call on Congress to Limit NSA Surveillance

A coalition of leading Internet and technology companies have written an open letter urging President Obama and the US Congress to change the laws on Internet surveillance and bulk data collection.

We understand that governments have a duty to protect their citizens. But this summer’s revelations highlighted the urgent need to reform government surveillance practices worldwide. The balance in many countries has tipped too far in favor of the state and away from the rights of the individual - rights that are enshrined in our Constitution. This undermines the freedoms we all cherish. It’s time for a change.

The companies called for clear limitations to government surveillance powers and an end to indiscriminate mass data collection.

They also reiterated previous requests to be allowed to disclose information about government requests for user data.

Governments should allow companies to publish the number and nature of government demands for user information. In addition, governments should also promptly disclose this data publicly.

The letter also reflected fears of Internet balkanisation, sparked by Brazil’s recent proposals to require Internet companies to store data on Brazilian citizens on servers located in Brazil, in order to bring them within Brazilian legal jurisdiction. The letter argues that “governments should not require service providers to locate infrastructure within a country’s borders or operate locally”, but also argues for better processes to resolve conflicts of laws between different jurisdictions.

Governments should codify sensible limitations on their ability to compel service providers to disclose user data that balance their need for the data in limited circumstances, users’ reasonable privacy interests, and the impact on trust in the Internet. In addition, governments should limit surveillance to specific, known users for lawful purposes, and should not undertake bulk data collection of Internet communications.

While lobbying for changes in the law, Internet companies have also been forced to treat the US, UK and other western governments as security adversaries on a par with organised criminals and hostile states, after it was revealed that the NSA was hacking into networks that had already agreed to share user information with the agency. In an official blog post last week, Brad Smith, General Counsel at Microsoft, wrote:

These efforts threaten to seriously undermine confidence in the security and privacy of online communications. Indeed, government snooping potentially now constitutes an “advanced persistent threat,” alongside sophisticated malware and cyber attacks.

Use of the term “advanced persistent threat” in relation to the actions of the US government is a clear signal of a change of attitude in corporate boardrooms in their dealings and relations with the intelligence community.
Partnerships for Connectivity: Levelling Up Local IX Knowledge, and Sharing Best Practices

In the last edition of HotLINX, the Internet Society (ISOC) and its partners were working with the local community in Ecuador. In this edition we look at what’s happening in Armenia and Serbia.

Armenia
A Best Practices workshop was held in Yerevan, Armenia on 9 October with the Armenian Internet exchange point (ARMIX). The objective of the workshop was to bring in international experts to provide perspectives on best practices for managing an IXP, routing, and security issues. EURO-IX and ISOC teamed up after this workshop to facilitate ARMIX experts’ participation in the October EURO-IX meeting. ARMIX reports that the exchange of views with IXPs was invaluable.

Serbia
“Levelling-up” efforts continued in Belgrade from 4-5 December. A 2-day workshop was held with the Serbian Open Exchange (SOX), experts from Serbia, and international experts. The objective of this workshop was information exchange and best practices, but also included some additional segments on BGP and DNSSEC. EURO-IX, RIPE NCC, INEX, VIX, SIX, Hurricane Electric, and other experts were also part of the team in Belgrade.

ISOC works with partners throughout the world to help develop Internet infrastructure, build human technical capacity, and to engage on Internet related issues.

For more information on these projects and other ISOC activities please visit their website: www.internetsociety.org

IWF Human Rights Review
The independent review into the human rights implications of the Internet Watch Foundation’s activities concluded in November. Lord Ken MacDonald praised the IWF for the respect and sensitivity with which it had balanced the rights to privacy and freedom of expression with the important task of combating the distribution of child abuse images online. He argued the IWF does impact on human rights, but in a way which is proportionate and justifiable. However, Lord MacDonald also argued that the organisation should explicitly limit its scope to child abuse content, removing other “potentially illegal” content from its remit, and should put aside plans to extend its work to P2P networks.

UK Ranks 3rd in Web Index
The UK has ranked 3rd in the 2013 Web Index, a report funded by the World Wide Web Foundation which ranks 81 countries in terms of Internet access, affordability, institutional and policy environment, and 77 other indicators.

The UK ranked highly despite being downgraded for having “inadequate safeguards and due process against government digital surveillance”. Norway and Sweden ranked the highest, while the USA closely followed the UK in 4th place, down two places since 2012.

Defamation Act changes to take effect from January
Justice minister Lord McNally has told the House of Lords that the new Defamation Act, which received Royal Assent in April, will take effect from the start of next year.

The Act will provide new protection for web site operators against claims that third parties have left defamatory comments on their site, especially in cases where the poster is willing to identify themselves to the complainant, or where their identity is known to the website operator.
LINX Community to Share in 20th Anniversary Celebrations

Much of LINX’s success over the years has been built around its engagement with its members. We will shortly be staging our 84th membership meeting and have held numerous other events, lunches and gatherings around the world as we’ve endeavoured to keep connected with the networks who have made us the organisation we are today.

When LINX came into being in 1994, it began with just five members, but will shortly be breaking the 500 barrier with networks connecting from around 60 countries. While it’s obviously not possible to meet everyone personally we do want to give everyone the opportunity to be part of the 20th birthday year celebrations. For that reason we have arranged a number of events, either as hosts or as part of other industry conferences, so we can reach as many of you as possible.

We will also be marking our anniversary year with a special 20th birthday logo to again highlight the organisation’s longevity. The LINX website is to be relaunched in the spring and a special press event and other media activity is being arranged too. We have also lined up a series of promotional incentives where every member can potentially benefit.

Looking forward...

LINX is planning to mark its 20th anniversary year with a number of events in the UK and around the world. LINX values its part in the community so wants to mark the milestone by reaching out to the community so they can be part of the celebration.

Here is an overview of the events planned over the next 12 months:

January
- 1st IXScotland member meeting (9 January)
- 3rd IXManchester member meeting (20 January)

February
- 1st LINX NoVA member meeting (7 February)
- LINX84 in London (17-18 February)

March
- Co-host of the 24th Euro-IX with LONAP and IX Leeds (16-18 March)

April
- Global Peering Forum (GPF9) in Whistler, Canada (7-10 April)

May
- LINX85 AGM in London including LINX@20 gala dinner (19-20 May)

Promotions & Incentives

20 is the magic number with LINX’s special anniversary incentive campaign. Throughout the whole of the 2014 LINX will be offering prizes for port and member connections plus those connected via a reseller. These are not just one offs, but are available every time LINX receives a 20th connection, so there is a very real chance your network could win. Here is a summary of what is available:

- **Member Promotion**
  For every 20th port connection made, the member will receive a special gift to mark the occasion

- **Prospect Promotion**
  Every 20th new member connected will also receive something special

- **Reseller Promotion**
  ConneXions partners will receive a gift for every 20 new members they bring to LINX
LINX Calendar Feeds
To help follow the upcoming LINX@20 events and beyond there is an iCalendar ICS feed available. It works with Microsoft Outlook, Google Calendar, Apple Calendar (formerly iCal) for MacOS and iOS. You can also use the Lightning Extension for Mozilla Thunderbird or for Android devices the CalendarSync system and the free app, iCalSync.

Further information on all these calendar services can be found on the LINX website: www.linx.net/ical/LINXMembertshipCal/workingfortheinternet

We want your photos and video footage!
To accompany the LINX@20 marketing campaign we are looking to produce a video montage of footage of the past two decades of LINX. Do you have any pictures from early LINX meetings or technical equipment? Maybe you have a colleague who has or perhaps you know someone who has even left the industry who does. If you think it may be of interest to LINX and the wider Internet community then we would very much like to hear from you. If you have any questions or would like to let us know what you have available then please contact us at marketing@linx.net.

June
• IXF meeting host as part of ICANN50 (22-26 June)

July
• Member engagement events including Golf day, Karting and 5-a-side football
• IXScotland meeting to mark the 2014 Commonwealth Games in Glasgow (Dates TBC)

August
• LINX86 in Manchester (18-19 August)

September
• European Peering Forum (EPF9) in Split, Croatia (22-24 September)

October
• 2nd LINX NoVAt member meeting
• 2nd IXScotland member meeting (Dates TBC)

November
• Host of RIPE69, the first UK RIPE meeting since the LINX 10th anniversary in 2004 (3-7 November)
• LINX87 in London - end of 20th year social (17-18 November)

That’s History with Nigel Titley
Attendees at LINX member meetings will know Nigel Titley and his informative presentations on RIPE policy. His association with LINX is long and distinguished, having spent many years as a Board member from when the exchange formed in 1994. This commitment culminated with his Conspicuous Contribution to LINX Award in 2007.

When LINX celebrated its 15th anniversary in 2009 HotLINX interviewed Nigel to learn more about how LINX came to be formed. His answers provided a fascinating insight into how the exchange prospered into the global organisation it is today.

“I always knew that the Internet would grow, although I don’t think anyone had an idea of how explosively. Certainly no one had the idea that it would become a central part of life.

When BT decided that the Internet was going to catch on and that a national dial up X25 network was not the way forward, I was drafted into the team building the network. We built what was then a world beating service with a 10M backbone and 2M of transatlantic bandwidth.

Having done that we approached the other UK providers: UKnet, Pipex and Demon for peering. At the time peering was being done by direct links, which is of course an N-squared problem, so we felt that Keith Mitchell’s suggestion of a central peering hub in Telehouse was sensible. Pipex lent a 5 port, 10M hub, and put a down-payment on one rack with an option on the one next door and LINX was born.”

LINX@20 2014 Calendar
Local Exchanges

LINX NoVA
Up & Running!

Since the last issue of HotLINX it has been full speed ahead with the launch of the first LINX overseas exchange, LINX NoVA. All the necessary equipment has been ordered and the key contracts with colocation operators, dark fibre supplier and support partners are now all in place.

To recap, LINX NoVA is a multi-node IXP in North Virginia. It has been built across three data centres initially, EvoSwitch in Manassas, CoreSite in Reston and Dupont Fabros in Ashburn. Discussions with other data centres are ongoing with more sites possible. The new exchange is powered by Juniper Networks equipment and based on dark fibre supplied by FiberLight.

LINX has already received orders from existing and new members to connect at the exchange. The site will go live in January following the main build and subsequent acceptance-into-service testing.

LINX NoVA will offer the full range of IXP services and will be 100G capable from day one. To encourage growth there are no charges for 1G or 10G ports until 2015.

LINX NoVA Prospectus
The LINX NoVA Prospectus is now available to view online and features all the key information plus videos from LINX Board members speaking on the service offering. This document has been produced partly for Open-IX endorsement, but also to allow full membership transparency.

View the LINX NoVA Prospectus here: www.linx.net/service/publicpeering/nova

IXScotland News
Hosted at Pulsant’s South Gyle data centre in Edinburgh using the hardware from Extreme’s Summit X460 Series, LINX’s latest local exchange, IXScotland is now live.

The exchange will allow networks to stop ‘tromboning’ traffic to London and back again, and will help increase resilience by creating a new centre for interconnection in the UK. The result is reduced latency and faster connectivity for Scottish networks and Internet users.

Latency was a key driver in the new exchange and early indications show that speeds are up to five times quicker than before IXScotland was established.

IXScotland was welcomed by the Scottish Cabinet Secretary, John Swinney, who commented: “We are delighted to welcome the establishment of a dedicated IXP for Scotland which will speed up Internet access for businesses and individuals. I want to recognise the key contribution of LINX, who have worked with the industry and Scottish Government to make this happen”.

The first packets over the IXScotland exchange were sent 16th on October with peering beginning officially on 1 November. To date there are six connected members with a further five due to be connected shortly.

 Coming Soon...
Partial rackspace through colocation resales and the ConneXions reseller channel product will both shortly be available at IXScotland. Further details available in due course.

IXManchester Update
PoP Expansion to go live in Q1 2014
IXManchester has now been live for 18 months and progress is going well. There are 40 Members connected at the exchange. New port orders are now being taken ahead of the soon to be completed PoP expansion.

Two further PoPs (Telecity Joule House and M247’s Ice-Colo2) are to join the one already established at Telecity Williams House. The three IXManchester sites will be interconnected in a ring topology with 2x10G of capacity using Extreme Networks x670 and x460 equipment.

Many major networks have enquired about connection in IXManchester with potentially 20 networks taking 10G ports at IXManchester in the coming year.
Reseller News
ConneXions Programme Update
By Sheryl Francis, LINX Business Development Executive

ConneXions, the LINX reseller programme, has been up and running for nearly 2 years now. Many members have connected via our reseller partners, increasing connected capacity at the exchange by more than 100G.

The programme is currently available on the London Juniper LAN and at LINX NoVA where we offer both 10G and 100GE reseller ports. At our other IXPs; the London Extreme LAN, IXManchester and IXScotland, we have received the Extreme XOS 15.1.4 upgrade and are currently in the process of testing. Once this is complete we will be able roll out reseller ports on the Extreme LAN and IXScotland and IXManchester once upgraded to Extreme kit.

Members joining via ConneXions can connect at 100M, 250M, 500M, 1GE and 10GE port sizes, or multiples thereof.

We have one membership policy with all members treated equally whether connecting directly or remotely. All members are entitled to vote, benefit from our dedicated Member Relations and Public Affairs teams and be part of the LINX community.

There are currently 13 ConneXions partners, who are able to help new members join LINX from a huge number of countries around the world. As a partner each one is able to offer the significant value added service of a one stop peering shop for those members. By bundling LINX costs with other service costs this can help make the process easier for new members and reduce administrative issues by only having one supplier to pay and liaise with.

For our partners, we offer product training and support, literature and marketing materials where needed and we work with our partners by passing on leads to them. All of which ensure that they are able to maintain control of the business relationships with their customers as well as developing new ones.

If members would like to speak to us about becoming a partner they can email conneXions@linx.net or call me on 0207 645 3525.

The LINX Business Development team have been providing training and support to our new ConneXions partners. Here are a few comments we have received on the programme so far.

**Liquid Telecommunications**
“Liquid Telecom is predominantly an African company with our customers and salesforce in Africa, so when LINX offered to conduct ConneXions partner training at our Sales conference in Capetown, this was very well received and appreciated. The training was delivered informatively and with enthusiasm and has already generated a positive response and some active leads from our customers. Liquid Telecommunications IX Connect Remote Peering product aims to connect African ISPs directly to the most important IXPs in Africa and globally. LINX is a natural choice for our customers, and for us a long standing member, since it is the IXP that has members from the most African countries.”

Ben Roberts
Group Director Network Strategy

**IX Reach**
“Having Ben and Sheryl from LINX deliver their company presentation to IX Reach was highly beneficial, and allowed everyone from within the IX Reach organisation - including those who don’t ordinarily get the chance to attend LINX meetings - to have the opportunity to ask questions about LINX’s processes and operations. The LINX training we received was valuable and insightful, allowing an open forum for discussion to take place around both LINX’s and IX Reach’s expansion plans in the East Coast of the US. We all very much appreciated LINX’s willingness to take the time to explain in depth and detail new services and development plans.”

John Hill, Business Development Manager

**Seacom**
“The LINX reseller program training was essential to providing our sales and support staff with a complete overview of the LINX reseller program in order to best support our customers and their needs.”

Robert Marston, IP Product Manager

Julie Doherty (left) is pictured receiving a ConneXions Partner certificate on behalf of Allegro Networks. Allegro received training and support materials to help them resell LINX membership services back in August.
LINX83 Meeting Round Up
LINX83 member meeting and EGM was held on Monday 18th and Tuesday 19th of November. It was another very well attended meeting with well over 150 registered to be there, either in person, or via the webcast.

There was a varied agenda featuring technical talks on BGP by Thomas Mangin (Exa Networks) and Tools and Process Automation by Andy Davidson (Allegro Networks). Phill Magill also gave a very interesting talk on developments at TalkTalk.

The programme also included a RIPE Policy update from Nigel Titley plus updates on LINX’s local exchange initiative, Public Affairs and details on how LINX would be marking its 20th anniversary year.

At the EGM separate resolutions were passed in respect to the proposed price cuts, the 2014 budget and remuneration of the LINX Board. Further information can be viewed by members on the LINX website (member log-in required): www.linx.net/members/events/meetings/L83/LINX83-egmnotice.html

If you are a member but were unable to attend this meeting you can still view PDF and video files on the LINX website: www.linx.net/LINX83

LINX84 Agenda
As HotLINX went to press the agenda for LINX84 was in the process of being finalised. As usual, attendees can be assured there will be a packed and varied programme with a number of presenters already confirmed for the event.

Ondrej Filip has been invited to speak about Czech Republic exchange, NIX-CZ as well as the Bird Internet Routing project. It is hoped that Jim Cowie of Renesys will be present to talk about the prevalence of Man-in-the-Middle traffic redirection with Andy Furnell also being lined up to explain the technical details behind Sky's peering strategy.

In addition to updates on the LINX network, there will be presentations on the expanding local exchange initiative along with what’s happening in the regulatory sector.

Registration for the meeting has now opened. To sign up for the event please visit: www.linx.net/LINX84

As always, a key component of the LINX meeting experience are the break periods. It is a chance to do business and network with existing and prospective peers while learning about developments in the LINX community.
Industry Events

Global Networking
Four LINX Local Exchange Member Events Kick Off 2014 Conference Season

We start 2014 with LINX events for each of our four IXPs in the space of eight weeks. These begin in January with a gathering for IXScotland in Edinburgh on Thursday the 9th followed by IXManchester’s third meeting on Monday the 20th.

Then, on Friday 7th February, we go stateside to Reston, North Virginia, for LINX NoVA’s inaugural member meeting before heading back to London’s Congress Centre for our regular quarterly member event on the 17th and 18th. You can follow announcements for all upcoming meetings on the LINX website.

LINX Q1 2014 Event Timeline

Events Round Up

As 2013 came to a close there were still a considerable number of miles being clocked up by staff in the name of LINX. RIPE, a firm fixture in the LINX industry calendar for many years, held its 67th meeting in Athens, Greece in October. Also that month CEO John Souter, plus other key personnel, were present at the Euro-IX meeting in the Finnish capital Helsinki. In November Ben Hedges and Sheryl Francis of the LINX Marketing & Business Development team attended Africa.com in Johannesburg to further re-enforce LINX service message in the African marketplace.
Internet Systems Consortium
ISC Releases ISC DHCP 4.3 Alpha
Version 4.3 (also known as IPv6 Uplift) of ISC’s open source DHCP software will be released by the end of January 2014, and expands on features for IPv6, such as better client classification and IPv6 relay options. The latest release also brings OMAPI support for adding subclasses dynamically, allowing administrators to change new lease treatment without restarting the server.

For more information on ISC DHCP 4.3, visit www.isc.org/downloads/dhcp/

Renesys
New Report Published
In November, Renesys released the first in a sequence of reports about the prevalence of Man-in-the-Middle traffic redirection on the Internet.

In these events, unlike similar events seen in previous years, a provider selectively propagates a false BGP route to the victim’s prefixes. Preserving a ‘clean path’ ensures ultimate deliverability of the traffic, creating an interception opportunity. Renesys reports that a substantial amount of the traffic in 2013’s redirection events flowed through European Internet Exchange points.

In July and August, a large number of LINX members accepted false routes propagated by a LINX peer for several weeks without detecting the misdirection. It’s important to apply appropriate prefix filters on peering sessions to ensure mutual customer reachability - with no surprises.

LINX Associates
What are LINX Associate Members?
Like LINX, associate members are usually ‘not-for-profit’ organisations. They are members in all respects but they have no voting rights and LINX does not charge them for membership.
www.linx.net/good/assoamember.html

Netnod at internetdagarna
Netnod partnered up with the Swedish Chapter of the Internet Society (ISOC-SE) and co-organised a full day on Internet governance. The session took place as part of “internetdagarna”, the largest annual Internet conference in Sweden, attracting more than 2000 participants this year.

The ISOC-SE session discussed privacy in a post-Snowden world, the state of Internet governance today and what national and international legislation and policy proposals will affect Internet users tomorrow.

Netnod’s Nurani Nimpuno, who is also a member of the ISOC-SE board, joined international speakers, such as former IAB chair Olaf Kolkman, Internet Hall of Fame inductee Annette Esterhuyzen and Internet governance expert Emily Taylor, to discuss the hot topics in Internet governance today: We were delighted to see the great turnout and the passion amongst the audience members for these matters that affect the future of the Internet!

Netnod’s Head of R&D Patrik Fältström also moderated a great session on “the streaming boom” and broadband development.

Check out the video archives on http://internetdagarna.se

The Netnod meeting
Netnod’s own meeting will take place in Stockholm 11-12 March 2014. Mark your calendars and start planning your travel! As usual, there will be an interesting mix of technical presentations and policy discussions, with both local and international speakers. And, as those of you who have attended the Netnod meetings before know, there’s always a great social at the Netnod meetings!

As we get closer to the event and the program develops further, you will find more information at: www.netnod.se/netnod-spring-meeting-2014
**LINX NOC Services Contract Awarded to Allegro Networks**

When LINX announced plans to launch LINX NoVA, it knew that it had to provide at least 5 to 8 additional hours support cover beyond the end of the UK working day. This led to a more fundamental review of how LINX operated its NOC services. Since establishing its first out-of-hours, outsourced NOC in April 2010, peak traffic has grown from 600Gb/s to 1.89Tb/s. There’s been a huge jump in private interconnect connections, 10Gb/s services had doubled and a move towards 100Gb/s has become more commonplace. In addition, LINX’s first IXs outside London, at Manchester and Edinburgh, as well as LINX NoVA, have also been established.

It was decided that the LINX NOC should become 24x7 operation, dealing with Tier 1 network monitoring and member service requests with LINX engineers remaining as the on-call Tier 2 team. The NOC would also need to be able to deal with remote hands services at the new local IXs as there are no short term plans to employ staff at these locations.

It was decided that evolving the current outsourced NOC was the most cost-effective approach and an RFQ (Request for Quote) was issued due to the extension in scope required.

Six potential partners entered the three stage process and after presentations and site visits, it was decided to select Allegro Networks as its NOC Outsource Partner.

LINX CTO Derek Cobb said: “We believe that the facilities Allegro offer, for both the main NOC and on the disaster recovery side, give LINX the best chance of delivering a successful solution for our members. Their understanding of LINX and the peering scene, plus the capability and commitment of all their staff means we can enter into this partnership with confidence. We are now working closely with Allegro to bring the new NOC into service. There are dependencies on the OSS programme and on completing training on LINX processes, but the early progress has been good and we are hopeful that we will be open for service in early February.”

**IX Reach deploys Juniper MX hardware to facilitate 100G connection to LINX**

LINX member and reseller partner IX Reach has deployed new Juniper MX hardware on its connection to LINX. The equipment, chosen in partnership with Alternative Networks, will allow customers to benefit from faster provisioning and virtually instant upgrades at LINX over IX Reach’s network.

Rob Parker, Head Network Architect at IX Reach, commented, “Our network is constantly growing. Using the most up to date hardware and technology ensures we can deliver unwavering connectivity in an industry where both short lead times and the highest uptime possible are key.”

This development means that IX Reach has become the first ConneXions partner to connect at 100G speeds.

**IXP Study Results**

**New Study Reveals How IXPs Spur Internet Growth in Latin America**

The Internet Society (ISOC) recently published the results of a study that demonstrates the far-reaching economic and societal benefits of establishing IXPs in emerging markets. Commissioned by ISOC and conducted by Professor Hernan Galperin of the Universidad de San Andrés in Argentina, the study examined critical cost and performance benefits of IXPs in Argentina, Brazil, Colombia, and Ecuador - leading countries in Internet growth in Latin America.

- Since 1998 nine IXPs have been established in Argentina connecting over 80 network operators. Internet transit costs have been reduced from USD $500 per Mbps per month in one city to about USD $40 per Mbps per month.
- In 2004, an initiative by Comitê Gestor da Internet was launched to establish IXPs across Brazil. To date there are 22 IXPs in operation, covering 16 of Brazil’s 26 states.
- In Ecuador, international transit costs hover around USD $1.00 per Mbps per month. Local traffic can now be exchanged at the IXP in Quito (NAPEC) for as little as USD $1 per Mbps per month. Without an IXP operators would exchange local traffic through international transit routes and the additional wholesale costs for local ISPs would be USD $7.2 million per year.
- By exchanging traffic locally, and by installing content caches at NAP Colombia, local ISPs were able to reduce dependency on international routes, thus reducing costs and increasing service reliability.
A recent enquiry on the LINX Support list concerned adding further web accounts for the member’s LINX web portal. The individual had an admin web account for the portal themselves but wanted to provide read-access for their colleagues.

While this is not a function available for members to do themselves, LINX are happy to carry out this task for you. All that needs to happen is for the member’s Guardian contact to send the names, contact telephone numbers, email addresses and job titles of those colleagues they wish to create web accounts for, and LINX Member Relations will do the rest.

Web Accounts for Member Web Portals

By Emma Saunders, LINX Member Relations Representative

A recent enquiry on the LINX Support list concerned adding further web accounts for the member’s LINX web portal. The individual had an admin web account for the portal themselves but wanted to provide read-access for their colleagues.

While this is not a function available for members to do themselves, LINX are happy to carry out this task for you. All that needs to happen is for the member’s Guardian contact to send the names, contact telephone numbers, email addresses and job titles of those colleagues they wish to create web accounts for, and LINX Member Relations will do the rest.

It should be noted that permission is required from the Guardian contact in order to create a new account. Furthermore, there isn’t a read-only version – when web accounts are created they allow for full member access.

Of course members may still submit a support ticket and this will be passed to Member Relations; however, for a faster turnaround time Member Relations should be emailed directly.

A question has also been raised lately regarding what to do when the Guardian contact is either away or not available. In this instance a written request submitted on company headed paper and signed off by a person of management or director level will be accepted.

Please send your requests to the LINX Member Relations team at mr@linx.net. If you have a question of your own please contact hotlinx@linx.net.

Sharing the LINX Message

By Thomas Mangin, Exa Networks and LINX Board Member

Most networks look at joining an Internet Exchange when their infrastructure matures in order to achieve better traffic control and/or cost savings. Some organisations will be happy simply with the advantages peering alone provides and will overlook the greatest value of an exchange: its community.

Explaining the benefits of something as intangible as a ‘community’ is not an easy task. Only by integrating and embracing LINX’s social dimension can members fully understand and realise the value of its membership. The best analogy I can come with would be trying to define the commercial value of friendship: hard to do but easy to understand the day a friend bails you out on a bad day.

The peering world is an open club where we are all made richer by the presence of diversity. By making sure potential new networks are made aware of what LINX is about, we increase the chance they participate, adding value to our community.

This is why I believe the HotLINX magazine is important. It is an easy door into our world, and not only a publication for our members, but a source of information for our industry at large.

And while I have your attention, I would encourage you to share HotLINX with colleagues and other networks, whether they currently peer or not. Why not offer a link to the HotLINX archive to someone near you this new year?

hotlinx@linx.net
The OptiDriver™ platform is a series of products that bring more capacity, intelligence and multi-dimensional flexibility to cloud and datacentre connectivity.

The platform is the industry’s most compact, highest-density 10Gbps transport system and features built-in testing and rapid turn up capabilities that significantly increase ease-of-use. By enabling more, higher-performance, intelligent networks, OptiDriver™ reduces operational costs and improves manageability of the most bandwidth-rich networks.

OptiDriver™ enables network operators to accommodate next-generation bandwidth and service requirements while reducing operational and capital expenses. OptiDriver™ supports intelligent ROADM and 100Gbps transport and can evolve over time as these advanced technologies mature. The OptiDriver™ platform is fully integrated into MRV’s advanced Pro-Vision® service delivery and provisioning platform. It also contains built-in processing support for current and emerging intelligent control plane technologies like GMPLS and SDN allowing OptiDriver™ to quickly integrate into new and existing networks.

• Highest Bandwidth Density: the most compact 10Gbps platform available
• Broad 100G Application Support: includes intelligent ROADM for automated & dynamic optical networks and 100Gbps transport
• Comprehensive Rate and Protocol Support: Multi-function hardware allows a minimum number of components to serve the maximum variety of applications
• Lowest Power Per Bit: overall typical power draw of less than 900Watts makes OptiDriver the most power efficient chassis in its class
• Flexible Hardware Design: A flexible shelf and component architecture dramatically lowers TCO, simplifies operations and minimizes power and space requirements

Extensible Virtual LAN (VXLAN) for multi-tenancy

In today’s virtualized data centre, where servers and appliances are provisioned and relocated dynamically based on available compute resources, unanswerable scaling challenges are placed on traditional multi-tenancy design methodologies. Whilst the traditional L2 approach, using VLANs for traffic separation, provides a level of flexibility in resource placement, the scale and CAPEx saving achieved is severely restricted; implicating a 4k VLAN limit, MAC address explosion and virtual port scale of individual platforms.

To address the challenges for multi-tenancy, Arista has co-authored the Virtual Extensible LAN (VXLAN) proposal with VMware, Citrix and Broadcom. The VXLAN protocol solves scaling issues by encapsulating tenant traffic within an outer IP/VXLAN header to provide tenants with L2 connectivity across a transparent routed IP infrastructure. The VXLAN header added to the frame includes a 24-bit Network Identifier allowing support for up to 16 Million L2 segments within a single VXLAN domain.

Arista provides VXLAN support in its 10Gbe, 40GbE and 100GbE switching platforms. Allowing line-rate VXLAN encapsulation at the Leaf and Spine layer of a Data Centre network for connecting bare-metal servers, network appliances and virtual servers. The VXLAN implementation allows both multicast and non-multicast modes for L2 connectivity within the Data Centre and also across a L3 backbone between Data Centres, whilst providing an open API, allowing automation of VXLAN domains within third-party Virtualization and Cloud Platforms like VMware NSX, PlumGrid and Openstack.

For further information about Arista’s capability for Virtualization and multi-tenancy in the Data Centre please visit: www.aristanetworks.com/en/solutions/network-virtualization
Here is an alphabetical list of all the LINX members, plus their ASN and peering contact details, that have connected since the beginning of October. Please refer to the map to see where each one is based.

**Avelacom**  
AS31059  
peers@avelacom.ru  
Russia

**Cogent Communications**  
AS174  
peering@cogentco.com  
USA

**Concept Coders**  
AS42344  
peering@conceptcoders.com  
United Kingdom

**Dhiraagu**  
AS7642  
peering@dhiraagu.com.mv  
The Maldives

**Enter**  
AS12850  
peering@enter.it  
Italy

**O2 Wifi**  
AS56460  
o2wifinetworkteam@o2.com  
United Kingdom

**rrbone**  
AS39138  
peering@rrbone.net  
Germany

**Startel**  
AS37011  
jeriel.atienza@startel.aq  
Angola

**Suretec (SureVoIP)**  
AS199659  
peering@suretec.net  
United Kingdom

**TG Support**  
AS35551  
jmarriott@gos-systems.com  
United Kingdom

**Three (UK)**  
AS21327  
peering@three.co.uk  
United Kingdom

**XDSL Networks**  
AS36916  
martin@xdsl.co.za  
South Africa

**Yandex Europe**  
AS13238  
day@yandex-team.ru  
The Netherlands

**Zain Group**  
AS59605  
miraj.rajan@zain.com  
Kuwait

Our member map shows where LINX already has members and where new members have joined from over the last three months. Please refer to the right-hand column for contact details.

**493 Members**  
60 Countries

**703 Connected member ports**  
1217703 Member-facing 10GigE Ports

**Over 1.890 Tbs of peak traffic**  
7.633 Terrabits of connected capacity

**82 New LINX applications in 2013**  
2 Member-facing 100GigE ports

**Countries with LINX members**  
**Countries with new LINX members since beginning of October 2013**