HotLINX

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In this issue of HotLINX...

Clear Thinking on Cloud Computing

The Inside Story on the Cloud Computing Scene

See pages 3, 4 and 5

LINX

Up Front

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It's *"Yes we Cannes"* as Peering Professionals gather for EPF5
By LINX Chief Executive Officer, John Souter

As ever, Serge Radovcic of Euro-IX, was on hand to host proceedings at the EPF. The event in Cannes was widely acknowledged as one of the best peering forums to date.

LINX along with AMS-IX, DE-CIX and Netnod, hosted the fifth European Peering Forum in Cannes at the end of September. Sponsored by Equinix, Brocade and Interxion plus others, EPF5 brought together over 200 peering professionals from our respective IXP member organisations.

For the first time the event was held over three days which created many more opportunities for delegates meet to discuss peering issues with each other. The structure balanced the traditional conference presentation format with time periods put aside for people to make appointments with fellow attendees. This was organised via an online meeting tool for which everyone registered for EPF5 could have a log-in. This was of enormous benefit for me personally as I was able to arrange meetings well in advance and make others during the event itself as and when the opportunities presented themselves.

The conference agenda for EPF5 included a broad range of peering related content covering aspects of the local market, planned overseas developments as well as current technical issues. Franck Simon of France-IX got proceedings underway by presenting on French peering and the overall IXP landscape.

There were three panel sessions included on the program with each one producing some lively debate. Peering versus Transit followed by DIY IX : 'the value of small mutual IXPs' were both on the agenda on day two. On the final day the topic for discussion was the practical implications of IPv6. These sessions were moderated by Frank Orlowski (DE-CIX), Thomas Mangin (Exa Networks) and Martin Levy (Hurricane Electric) respectively.

Plans for EPF6 have begun with talks on possible venues having already taken place. Details will be made available on the EPF website:

www.peering-forum.eu

The evening social events were an integral part of the EPF5 agenda as they represented further opportunities to discuss network issues and establish new peering relationships

Editorial

Clear Thinking on Cloud Computing

May I welcome you all to issue 23 of the LINX membership magazine, HotLINX.

When I began writing this column I was in serious danger of drifting into pun overload. It's pretty obvious from the page imagery that the theme for HotLINX23 relates to Cloud Computing but my copy was beginning to feel more like a weather report. For that reason I toned it down a little as I'm not really looking for a job at the Met Office.

Renesys, BSO Network Solutions and Brocade have all contributed to the debate and all have approached the Cloud concept from different angles. Whatever your own thoughts on Cloud Computing I'm sure you'll find their views interesting.

To continue the technology theme we have an overview of the LINX Network Architecture Review from Owen Conway. This is a major project for LINX, which will take many months to complete, but the meticulous planning that is being undertaken is to ensure members' day-to-day operations are not affected. The process will ultimately lead to a more robust, resilient and scalable network, attractive to international peers for many years to come.

Elsewhere you will notice that LINX staff have also been busy racking up the air miles as we continue to push the benefits of peering in London to overseas markets. Business Development Executive Jennifer Atherton has visited the USA, Kenya and Norway in recent weeks and will be off to Poland for PLNOG in a matter days. These trips are already proving fruitful with many new prospects identified and several applications received. Well done Jen!

Please contact me or my colleague Megan Nisbet with your stories and feedback by emailing us at hotlinx@linx.net. You can also use this address if you would like to request any additions to the mailing list.

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Looking at Clouds from Both Sides
There goes the neighbourhood ● renesys

When Dove World Outreach Center decided to antagonise a huge swath of humanity by scheduling a book burning on September 11th, our first thought here at Renesys - www.renesys.com - was, *"Why would anyone want to offend so many people and become the target of so much hostility?"*

Being Internet intelligence experts, our second thought was, *"They must have a website and it's probably having a bad day - who else shares their IP address block?"*

Prior to September 9th, the Dove World Outreach Center website resided at www.doveworld.org, which resolved to IP address 65.61.140.175. This address is part of a large block of IP addresses (65.61.128.0/18) hosted by Rackspace Hosting (AS10532). Rackspace recently terminated their relationship with the center because they *"violated the hate-speech provision of our acceptable-use policy."*

Comment

www.doveworld.org is back in operation at IP address 173.230.133.25, routed as 173.230.128.0/20 and originated from AS3595, Global Net Access, LLC of Atlanta.

All this hoopla could make the IP a target of cyber mischief, such as DDoS attacks that flood web servers and render them inaccessible. Could other websites hosted behind the IP suffer collateral damage?
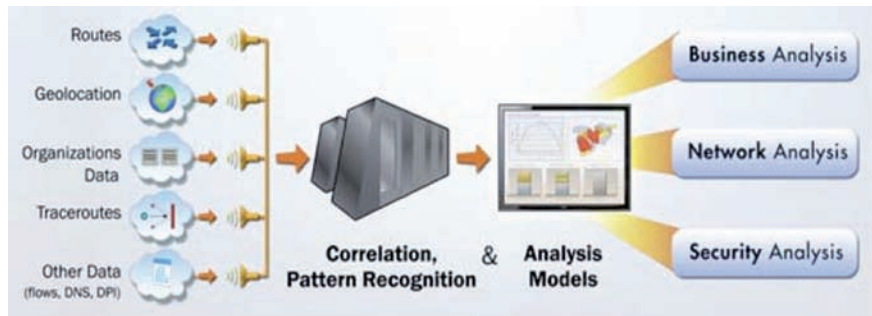
Quite possibly. There are over 400 domains at the IP address that formerly hosted www.doveworld.org. The domains vary considerably of course, from okra pickle sellers to financial services providers. About all they have in common are an IP address and cloud provider. But for better or worse – even with dedicated addresses and hardware at their IP – they share a common fate.

There are no zoning laws on the Internet. If you don't have situational awareness, information assurance and cyber security applications, you have no easy way of knowing who your cloud neighbors are or protecting yourself from their fallout.

Renesys products do just that. Our global sensor grid penetrates the cloud, collecting real-time routing changes from more than 360 sites, worldwide. This data is correlated with trace routes, DNS records, geographic, business and other data to provide the most comprehensive, real-time view of the Internet in existence today.

China syndrome

China's proclivity for blocking websites it doesn't like can really disrupt the (IP address) neighborhood. For example: a Canadian non-profit organisation promoting Falun Gong (a system of beliefs founded in China) has a website hosted by Atlanta-based Global Net Access (AS3595). The IP address of this domain, and hundreds of others, is 209.51.136.27.

To date, access to this IP address is blocked in China — not just the Falun Gong domain, but the entire IP address it resides on. Even simple pings and traceroutes that reach the IP when initiated outside China can't get past the Great Firewall when initiated inside China. Hundreds of websites that have no affiliation with Falun Gong are blocked in China because they happen to be in the *"wrong"* neighborhood.

Forecast: A beautiful day in the neighborhood

Despite all this, cloud computing has a bright future. Companies of all sizes are moving critical processes to the cloud for good reasons: it's better, faster and cheaper for many applications.

Resource issues aside, the key difference between in-house and out-sourced solutions is control of your neighborhood. In-house control is absolute; no (nasty) surprises lurk around the corner. If you out-source, you relinquish control. Your firewall can no longer protect you, but that doesn't mean you have to endure targeted (or untargeted) attacks, unreliability and poor performance just because you want to take advantage of cloud computing.

Renesys Internet Intelligence – real-time network alarms (unavailability, hijackings, unauthorised connections, etc), insight into ISP behaviour, and a repository of continuous data since 2002 – brings visibility, predictability and reliability to the cloud.

Cloud Computing

"Real Cloud Computing hasn't been invented yet!"

Written by **Charles-Antoine Beyney**
President and co-founder of BSO Network Solutions

Over the last 30 years, the computing industry has gone through an extraordinary transformation. Given the principle that its existence is based on technological progress, the sector has never ceased to be inventive, design ever more powerful algorithms and above all look to develop solutions that break with the past. This strategy is deemed absolutely necessary if the industry is to grow and prosper. Unfortunately, the phenomenon has reached such proportions and engenders such economic consequences that the appealing term of *"technological innovation"* now covers just about anything, and especially marketing concepts that may lack inspiration.

It could be imagined that the bursting of the Internet bubble in 2000 brought the sector a degree of wisdom by limiting its excesses. But what we are witnessing at the moment with Cloud Computing suggests that we have not learned a great deal from our past mistakes. So why attack a new technology, i.e. *"Cloud Computing"* whose economic, technical, productive and even ecological advantages

are hailed by everybody? Because contrary to what some would have us believe, global Cloud Computing does not exist, and worse, will not be operational for 5 to 10 years.

What we are doing at the moment may be likened to more or less complex virtualisation, but this cannot in any way be defined as Cloud Computing which does not simply mean installing virtualsation software to manage company servers, back-up solutions or messaging. Neither does it mean giving the keys to an IT system to a service provider and tasking it with system administration via a shared cloud. No, Cloud Computing is a great deal more than that. It is a 'whole', which means virtualising all a company's IT infrastructure resources.

In short, it is the consistent integration of a complex architecture that will entirely replace a customer's computer room. It also means changing the vision that a company may have of its IT system so that it is perceived as a productivity tool, not as a financial and human burden. But no such solution is yet available on the market since the necessary technologies are not fully functional and on occasion are not even compatible one with another. Also, this type of integration cannot take place without change management at the heart of the company.

The advent of successful Cloud Computing is only a matter of time, but customers must understand the true nature of what they are being offered and must not commit to choices they believe to be long-term when in fact these are only temporary or even incompatible with current systems. Cloud Computing is a wonderful idea on paper, but if we continue to oversell it while its technology is still immature and companies are not entirely ready, we could inflate another speculative bubble which would be catastrophic for an industry it is hoped will be one of the motors of an economic recovery.
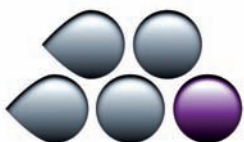
European Businesses Embrace the Cloud...just not Volcanic ones

The computing model has reversed. With increasing adoption of high-powered mobile devices and applications, more and more information is being created outside of centralised data centres and at exponential rates. According to recent research, there will be 15 billion mobile devices in use by 2015 and by 2020 over 35Zb (Zettabytes) of data will be generated by users. These numbers are staggering and illustrate the size of the task facing modern CIOs; how to service user needs and ensure productivity and financial success. At the heart of this task lies the network infrastructure and the cloud.

Building an architecture that has the elasticity to cope with modern demands is not simple and requires a forward-thinking strategy to embrace different ideas and solutions. However, achieving this is easier said than done, as modern CIOs know all too well. 'The cloud' is emerging as the answer to all their prayers. The cloud means on-demand hosted services, such as computing, network and storage capacity, where all the time-consuming, complex and expensive hardware management takes place, is at once removed from the buyer.

According to recent findings by research firm IDC, cloud-based IT services are currently worth £10.7 billion globally, and that figure is estimated to grow to around £27 billion by 2013. In Europe, enterprises are beginning to embrace the business opportunities offered by virtualising assets and accessing applications through the cloud. However, as a frequent traveller based in Europe, I am sick and tired of hearing about clouds! *"Andy, what are you going on about?"* I hear you say. You probably remember reading about how travel schedules across most of Europe were terrorised by a plume of volcanic ash during April and May. Southern Iceland's Eyjafjallajökull volcano grounded flights across European air space, leaving countless travellers stranded.

Now, you are probably wondering why I mention clouds and volcanic ash? Well, at the same time travel chaos hit Europe, Brocade conducted a survey of 200 European CIOs to find out how they were embracing cloud-based computing models. Our findings showed that European enterprises are beginning to embrace the business opportunities offered by virtualising assets and accessing applications through the cloud.

More than 60 percent of enterprises are expecting to have started the planning and migration to a distributed – or cloud – computing model within the next two years. Why? Well, respondents told us that the key business drivers for doing so are to reduce cost (30 percent), improve business efficiency (21 percent) and enhance business agility (16 percent).

The findings reinforce Brocade's vision that data centres and networks will evolve to a highly virtualised, services-on-demand state enabled through the cloud. Brocade recently outlined its vision, called Brocade One™, at its annual Technology Day. Brocade One is a unifying network architecture and strategy that enables customers to simplify the complexity of virtualising their applications. By removing network layers, simplifying management and protecting existing technology investments, Brocade One helps customers migrate to a world where information and services are available anywhere in the cloud.

The days when the majority of computing power was in the data center are behind us. Today, we have incredibly smart end points with lots of computing power that are remote, distributed and mobile. Information and applications are virtualized and can reside anywhere within the cloud. While our findings show that European adoption is on the rise, businesses need to address a number of very real challenges/concerns to reap the benefits of the cloud – enterprises, in the majority of cases, are investing in the development of a private cloud infrastructure due,

Written by **Andy Moore**
EMEA Regional Manager – Service Provider, Brocade - www.brocade.com

in part, to concerns over security. Over a third of respondents cited security as the most significant barrier to cloud adoption, closely followed by the complexities of virtualising data centers, network infrastructure and bandwidth.

As data centers become distributed, the network infrastructure must take on the characteristics of a data center. And if the network becomes your data centre, then the network is your business. For the cloud to work, the network needs to be scalable and deliver high performance and security – without these traits any migration is doomed. What our research tells us is that companies are now recognising the profound economic implications of adopting cloud solutions and are ready to make the journey of adoption, but only if the foundation infrastructure is sound.

Brocade is once again ahead of the competition with Brocade One as the unifying architectural vision. We can help ensure that businesses can migrate to a cloud-based environment, and deliver that sound foundation they require. Now, if we can figure out how to keep planes in the air during volcano eruptions I will be a very happy man.

BROCADE

London Docklands Diversity

A Cogent Case Study

There is certainly no discussion as to the outstanding nature of London as an Internet hub. Besides hosting one of the major Internet exchanges in the world, London is the broadest metropolitan area in Europe, aggregating residential broadband traffic from all over the United Kingdom, one of Europe's largest installed subscriber base, and a major business centre, especially for critical financial applications.

London is also a major gateway for Internet traffic between Europe and North America, as many transatlantic undersea cables land on the coasts of the UK or Ireland and ultimately pass through London to serve the European continent. Within the London Metropolitan area, the Docklands have been a major historical settlement for both data centre space and carrier networking hubs, due to the early availability of large carrier neutral collocation facilities.

While significant new data centre projects have materialized over the last few years outside of the Docklands area (some in the City, some further West in the Heathrow area, some outside of the M25 – and some in other cities in the UK as well), the Docklands area has remained a busy networking spot. This has brought carriers to think about their network architecture around London, as a result of natural network diversity requirements and recommendations by their clients, among the service provider space or from traditional corporations, to enhance such diversity for disaster recovery purposes.

As the operator of one of the networks transiting through the London area, Cogent Communications (NASDAQ: CCOI) has been upgrading its network and improving redundancy in the UK over the last couple of years.

Cogent operates an 81,400km long distance fibre backbone which spans 28 countries in North America and Europe, crossing over 145 metropolitan areas and serving more than 1,500 on-net locations (including more than 430 carrier neutral data centres) with over 22,850km of metropolitan fibre. In the London area, Cogent serves approximately 20 carrier neutral data centres, offering IP Transit and Ethernet Point to Point services to hundreds of the UK's Internet access, applications and content providers, as well as to corporations, as part of its over 23,300 customer base across both continents.

Historically, Cogent's network in the Greater London area was designed around hub locations in the Docklands area and did not extend any further into the UK & Ireland.

Connections to the European continent crossed the Channel Tunnel to connect with Paris, and used a submarine cable to connect to Belgium and then on to Amsterdam. In 2008, Cogent initiated its network development efforts in the area by extending its backbone network into Ireland, as well as Manchester, Glasgow and Edinburgh in the UK *(see graphic)* to provide additional connection alternatives for local customers. At the same time, Cogent established a new hub location in Slough-West London, thus providing geographical fibre diversity for London-based customers.

In 2009 and 2010, a second major development followed. To start with, Cogent chose to terminate certain transatlantic links directly in Southport (nearby Liverpool), distributing those on its UK backbone to Manchester or Slough without touching London or the Docklands. This provided diversity for transatlantic traffic with other links coming from North America being directly connected to central London.

Two additional direct fibre routes were then also added, between Slough and Paris, and between Manchester / Cambridge and Amsterdam. While London remains connected directly to Brussels, to Rotterdam / Amsterdam and to Lille / Paris (over the Channel Tunnel), the net result is a network that now provides the UK with complete redundancy from London and the Docklands, over four diverse routes and to five separate Continental destinations.

Diversity from the London Docklands area has become a must-have for carriers' networks crossing the UK. The carrier community has been working on this for a while, and Cogent has established a strong network setup, as shown in this case study. Further developments are on their way on the Cogent network, to provide even more diversity and density in the region.

Cogent operates AS174 (3,250 AS connected, 8,600 Gbps peering capacity, more than 25 PB/day traffic) and has been a LINX member since 2003.

Recruitment
Engineering strengthened with two key appointments

Kamran Khalid
LINX Network Engineer

Kamran began his career in the industry at LINX member Claranet, initially as a First Line Customer Support Agent and then as a Provisioning Administrator. From there he moved to the RIPE NCC to undertake the role of Hostmaster before joining Bulldog Communications (later to become part of Cable&Wireless) as a Network Engineer.

Another stint at the RIPE NCC followed as a Support Engineer before taking on a Systems Analyst role at Dutch ISP Online Breedband in August 2008. It was from here that he joined LINX some 18 months later.

Comment

Speaking about his new role at LINX Kamran told us, *"I was keen to get back into technical layer 1,2 and 3 technologies and working for LINX allows me to get involved in every aspect of the networking process. Also, for most of my IT career, I've worked for ISPs and IXPs like LINX who provide a valuable service that maintains the true spirit of the Internet. I've really enjoyed the variety of work here and especially getting back in touch with the Internet community at LINX meetings."*

Jade Antoinette
Engineering Admin Assistant

Jade began her Internet career as an Office Administrator at BIS Limited, a managed network solutions company. This role involved sending out maintenance notifications, assisting the Service Delivery Team and dealing with third party suppliers such as BT and COLT.

Comment

Jade told HotLINX, *"It has been really good so far. The job has allowed me to get a far better insight into the more technical side of LINX through carrying out on-site suite checks, ordering consumables and tools and liasing with suppliers etc. This has enabled me to really broaden my overall knowledge of the industry. I work with a great team and it's such a varied role too - I am really enjoying it!"*

LINX Architecture Review
Plans announced at LINX70 Meeting

At the LINX70 membership meeting in August LINX announced plans for a comprehensive review of its network architecture. This is an involved process which is scheduled to take up to 18 months to complete. However, members are expected to see little or no impact in the service they receive on a day-to-day basis during this period but will ultimately enjoy enhanced stability and resilience on completion of the project.

Where we are today?

Currently LINX members achieve redundancy via the dual vendor and dual LAN model provided by Brocade and Extreme Networks. Ring protection protocols serve platform resilience via MRP on the Brocade LAN and EAPS on the Extreme LAN. However, the existing architecture will not scale indefinitely. ISL bandwidth and port capacities are becoming an issue and there are also concerns about overall long term robustness.

What Happens Next?

The architecture review is part of a major member consultation exercise which will look to develop ideas in conjunction with proofs of concept (POCs) plus guidance from the LINX Board. A budget proposal for the project will be presented for approval with an update for the members at LINX71 in November.

Comment

So what are the goals of the Architecture Review? Owen Conway, LINX's Network Architect, told HotLINX, *"Amongst the improvements we are looking to implement is a more flexible method of link utilisation with the shortest path routing and no idle resilience. We also want to improve failure protection and have the ability to isolate faulty equipment with minimal impact to the membership. Beyond that the target will be the improved scalability of the network so that it's easier to add locations and equipment. This will enable us to resolve current bandwidth demands and offer flexibility for future services."*

While the existing dual LAN model provides redundant hardware platforms with clear dual-vendor separation there are still some issues. Use of the second LAN is not compulsory and therefore not every member connects to both. Long-lined members can also have difficulty in connecting and therefore the two LANs do not offer the same capacity.

The favoured option is what is known as The Strawman. This is a VPLS system which provides fast failover, optimal routing, loop protection and has traffic engineering options. It is a single underlying redundant network platform which has two broadcast domains that offer improved redundancy options for members. A major benefit is that it uses existing dark fibre and the DWDM infrastructure.

On the negative side it can be expensive and would make for a Capex intensive year. There would be increased installation and build work and it would require a short period of maintenance and a planned outage.

Proof of Concept

Discussions will continue through the remainder of 2010 and early 2011. Key to the discussions will be the choice of vendors, MPLS/VPLS implementations, the specific migration scenarios and the troubleshooting and support options. This will be done in conjunction with POC labs, which will in turn narrow the focus and decision making process.

Provisioning, configuration and capacity planning tools will need to be sourced. Commercial software is available but is this something that could be provided in-house. This is another area where members may have suggestions.

Any members who have any questions regarding the Network Architecture review should direct their questions to Owen Conway via eng@linx.net.

Malcolm Hutty
Head of Public Affairs
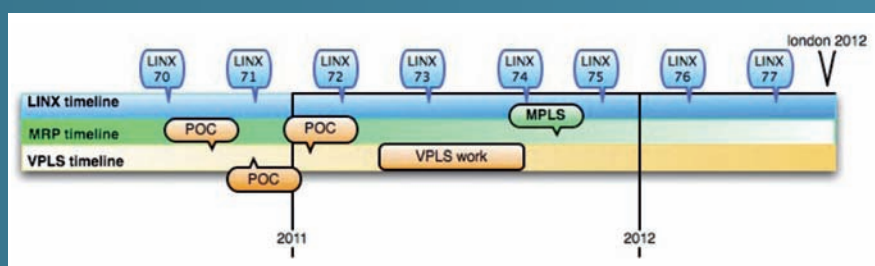
Network Neutrality – the next big EU policy debate

Personal view by Malcolm Hutty, LINX Head of Public Affairs

Ofcom and the European Commission fired the starting gun on the net neutrality debate with the publication of a pair of discussion papers at the end of June. EU Commissioner Neelie Kroes had promised in her confirmation hearing to protect network neutrality and has made a series of comments since indicating her willingness to legislate if necessary.

These initiatives are the first step with legislation that already exists. The EU Framework Directive for Telecoms, which must be implemented in EU member states by May 2011, will grant national regulators power to ensure ISPs are transparent with customers about their traffic management measures.

Network neutrality is a debate that has generated more heat than light in the United States, where it originated. Some of the overheated rhetoric from campaigners has demanded an end to all traffic management by ISPs. The industry will need to explain carefully to regulators that some forms of traffic management – such as deciding which transit providers and IXPs to use, and updating routing tables in line with shifting operational requirements – is an essential and unavoidable part of running a network. At the same time, if anyone in the ISPs industry has dreams of a world where a user can type www.amazon.com into their web browser and be greeted by a marketing message from their ISP and a redirect to Borders, their *"Preferred Books Partner"*, then Commissioner Kroes has given a clear message that that's not a business model she will tolerate.

In truth, the real discussion will take place between these two extremes. Adding further complication, some of the strongest pressures for reducing neutrality come from government itself, which sometimes sees technical measures by network providers as a magic wand for reducing copyright infringement, suppressing illegal content, and for fighting other social problems.

Consumer groups are fearful that ISPs might suddenly decide running an iPhone app store-style walled garden is a more attractive business model than providing a generic communications service. ISP executives reply that competition provides better protection than regulation ever could, and worry that pre-emptive regulation could choke off as yet unimagined revenue streams. ISP engineers are concerned that regulators might accidentally outlaw perfectly ordinary and essential network management in response to political pressure. With such a mix of perspectives, there's plenty of potential for this topic to create a lively debate on this side of the Atlantic too.

LINX Public Affairs Blog
https://publicaffairs.linx.net/news

In Brief

The Latest Stories on the LINX Public Affairs Website

Irish ISP wins major "mere conduit" lawsuit
Content blocking, Intellectual Property
UPC Communications, one of Ireland's largest ISPs, won its lawsuit defending itself against the record labels in early October. The record labels, led by music giant EMI, had asked for an injunction forcing UPC to introduce a three strikes regime for customers accused of sharing copyright files online, to block access to web sites identified by EMI now or in the future, and to filter peer-to-peer traffic.

The judge determined that UPC was protected by the "mere conduit" defence and that there was no provision in Irish law for issuing such an injunction. This is despite the judge's view that the level of copyright infringement was a "scandal" that was "devastating" the recorded music industry. In short, the music industry couldn't have found a judge more sympathetic to their issues, but when they targeted the ISP for a remedy the court found that the law simply was not on their side.

Commission tells France, Spain telecoms taxes are unlawful
Europe, Regulatory Framework, Tax
The European Commission has told France and Spain to repeal their sector-specific taxes on telecoms operators, which it says are prohibited under European law.

When France and Spain abolished paid advertising on their public service TV channels in 2009 they each introduced a tax of 0.9% of gross revenues on telecommunications operators to make up for the loss to government funds. This is expected to cost operators around €400 million in France and €230 million in Spain. The Commission has decided this doesn't amount to a prohibited State Aid for public service TV, but does constitute an unfair and unlawful imposition on the telecoms companies.

The Authorisation Directive, 2002/20/EC, part of the Telecommunications Regulatory Framework, provides a General Authorisations for anybody may operate a telecommunications service in Europe, subject to certain conditions, without needing a licence. Member States are allowed to impose a sector-specific charge on telecoms operators to *"administrative costs"* of operating and enforcing the regulatory regime (essentially, to fund the national regulatory authority), but these charges must be *"objective, transparent, and proportionate"*.

The Commission's action has wider potential significance than just France and Spain: it suggests that all sector-specific charges on telecoms operators designed to support subsidise other industries may be prohibited. This will be seen as good news for ISPs, and a blow to those in the copyright industries who have called for taxes on ISPs to prop up their traditional business models.

Commission sues UK over Phorm
Europe, Interception, User privacy
The European Commission is suing the United Kingdom for failing to protect Internet users from unlawful interception of communications by private companies, as it is required to do by the European Directives. The complaint arises an EU investigation into BT's trial of data profiling in partnership with ill-fated Phorm Inc, and more specifically the lack of enforcement action against BT.

The case will be heard by the European Court of Justice.

Africa Community
African Peering and Interconnection Forum

The first-ever African Peering and Interconnection Forum held on 11-12 August in Nairobi, Kenya represents another sign of increased coordination among the African Internet community. The event was a unique opportunity for a diverse group of members from the African Internet community to discuss strategies for developing more robust Internet connectivity within and between African countries, and how to make more efficient use of resources through interconnection strategies. The event was facilitated by the Internet Society with the support of local hosts TESPOK.

Another reason for continued reliance on international connectivity has been that, despite being increasingly popular among African Internet users, global content providers seem to have paid little attention to Africa. But this is changing.

Points of Presence (POPs) that avoid the use of expensive international bandwidth by providing lower cost local access to content from high bandwidth sites, such as YouTube, are becoming more common. Speaking at AfPIF, Mike Blanche, Google's Program Manager, peering and content distribution, EMEA told participants that Google is planning to establish a POP in Kenya in 2011, which complements Google POPs already established in South Africa and Nigeria. The announcement drew cheers and excitement from the meeting attendees, who saw it as a sign that the region is finally attracting the attention of global content providers.

Comment

AfriNIC CEO Adiel Akplogan summarized the motivation for many of the participants in meetings such as AfPIF, "The Internet is a powerful socio-economic tool. To fully leverage on it, we have to understand the economics of the Internet and then put in place mid- and long-term strategies, including a sustainable training plan built around an Afri-centric vision of the Internet, the development of a proper infrastructure design, and continuing engagement in global debates around the Internet."

Interconnection in Africa:
Leveraging investments in local Internet infrastructure and enabling local content

Undersea fibre optic cable efforts, cross-border linkages, national fibre backbones, metro links, and last mile connections have significantly added reach and capacity to the Internet infrastructure in western, eastern, and southern Africa. However, despite an increasing amount of infrastructure within individual countries, much data traffic destined to networks in the same country and neighbouring nations is often exchanged in Europe, just to return back to Africa. This not only contributes to high end-user access prices that dampen Internet growth and use, but also sends financial resources overseas that could be used to grow local networks.

Even where fibre networks exist between countries, traffic often takes circuitous international routes to return back to Africa.

Comment

"A good example is to trace the path followed by an Internet packet from Nairobi to Kigali, Rwanda. The packet from Nairobi will often be sent off-shore to Europe then back around to Kigali, despite the fact that terrestrial fibre infrastructure is present directly between Rwanda and Kenya," said Michuki Mwangi, Senior Development Manager in charge of Africa at the Internet Society.

Several recent developments underscore a growing effort to leverage existing infrastructure to make Internet traffic flows more efficient. One of these has been the establishment of IXPs, which can also help stimulate the broader information technology sector by encouraging the development of local content, web hosting, and related services. IXPs also stimulate general economic development by enabling individuals and organizations to access more cost-effective Internet service.

On 25 June, leaders from business, government, and the Internet community in Sierra Leone gathered in Freetown to launch a new IXP. The facility, known as the Sierra Leone Internet Exchange, or SLIX, will allow Internet service providers to interconnect and exchange local data traffic within the West African country rather than over international links. With the opening of SLIX, Sierra Leone became the 19th African country to establish an Internet exchange point,

Comment

"The launch of SLIX is an important milestone for the Internet in our country," said Ms Michala Mackay, President of the Sierra Leone Chapter of the Internet Society. *"In addition to the technical benefits SLIX will bring to service providers and users, it also marks a key success in the sustained efforts by Internet stakeholders to work collaboratively in achieving our goals to extend the development and availability of the Internet for all Sierra Leoneans."*

The announcement of SLIX was followed closely by the announcement of a new IXP in Mombasa on 13 August, making it the second IXP in Kenya.

Comment

Commenting on the launch, Tejpal Bedi, Chairman of the Telecommunications Service Providers Association of Kenya (TESPOK), said, *"This new IXP in Mombasa is a great indication that Internet growth and development have matured in the region since the first Kenyan exchange point was launched in Nairobi in 2001."*

The establishment of both IXPs was facilitated in part by the Internet Society's African Interconnection and IXP Programme, an initiative to promote more robust Internet connections within, and between countries in Africa. The programme combines technical training, IXP deployment assistance, development of value added services at existing IXPs, and the establishment of regional communities to promote information exchange and joint problem solving.

Information

For more information on the work of the Internet Society please visit the ISOC website: www.internetsociety.org.

Industry News

RIPE NCC Launches RIPE Labs Version 2.0

In July 2010, the RIPE NCC launched RIPE Labs version 2.0 - https://labs.ripe.net - a platform for the RIPE community and anyone passionate about the infrastructure of the Internet to share new tools and thoughts on new Internet technologies.

RIPE Labs 2.0 accelerates the development of new tools by encouraging the Internet community to participate in discussions and share their ideas on the latest prototypes and other Internet related developments. Since its launch in 2009, RIPE Labs has become a dynamic resource for the Internet community, attracting thousands of visitors per month and spurring debates on hot topics such as the measurement of IPv6 adoption worldwide.

Comment

Mirjam Kühne, RIPE Labs Community Builder at the RIPE NCC, told HotLINX:

"Community participation is vital for the continued success of RIPE Labs. If you are developing a tool that might be of interest to the community or if you would like to share your thoughts on Internet technology advancements, we encourage you to participate in RIPE Labs."

Mirjam Kühne
RIPE NCC

Information

For more information on RIPE Labs and to see the latest tools, research and ideas already submitted by, please visit: https://labs.ripe.net/

RIPE Labs
Web Platform includes many interactive new features

To accommodate the increasing content load and to encourage participation on the RIPE Labs website, the following improvements have been implemented:

Promotion of discussion and idea sharing
- It will be easier to comment on each article or tool
- You no longer need to register to make comments or join discussions
- Registration is only required for contributors of articles or tools

Simpler RIPE Labs website navigation
- The search functionality has been upgraded
- A tag cloud shows the most popular topics
- Long-term projects will have dedicated pages with detailed descriptions and regular updates

Your participation is vital for the continued success of RIPE Labs. Please send your comments or questions via: labs@ripe.net

RIPE Atlas
Prototyping an Active Measurements Network

The RIPE NCC is developing RIPE Atlas, a pilot active measurements network which will be launched in November at the RIPE 61 Meeting in Rome. The aim of this pilot is to produce an atlas of different kinds of high-resolution maps of the Internet: geographical, topological, real-time and long-term. As with classical geographic mapping, these maps will get more accurate as we increase the number of points we measure from. As a result, we are making our probes small and easy to deploy and asking for support from as many sponsors and probe hosts as possible. The first probes will be distributed at the RIPE Meeting in Rome.

This photograph is of a pre-production probe. The production versions will look a little different...and have a nicer colour!

Your Own Measurements From Anywhere!

We cannot build RIPE Atlas without help from people hosting the probes and from sponsors paying for the thousands of probes we will deploy. Therefore RIPE Atlas will offer you the potential to run your own measurements from any vantage point in the network if you host or sponsor probes.

Sponsors

In return for sponsoring new probes for a year, sponsors will have access to all RIPE Atlas probes for running their own measurements. The amount of measurements available to sponsors will be proportional to the number of probes sponsored. This means that, as a sponsor, you can use a huge network of active probes without having to deploy your own infrastructure. And of course we throw in the usual benefits such as explicit recognition, logo placement and a privileged channel to the developers.

As an early sponsor, you will be recognised as a pioneer and have an early opportunity to influence the direction of RIPE Atlas. We are looking for pioneer sponsors to join us and are offering sponsorship rates that start at 2,048 EUR.

Comment

More information on sponsorship of the RIPE Atlas pilot is available at: https://labs.ripe.net/Members/dfk/active-measurements-sponsorship

If you are interested in contributing to this effort as a sponsor, please contact the RIPE NCC's Chief Scientist, Daniel Karrenberg, at: daniel.karrenberg@ripe.net
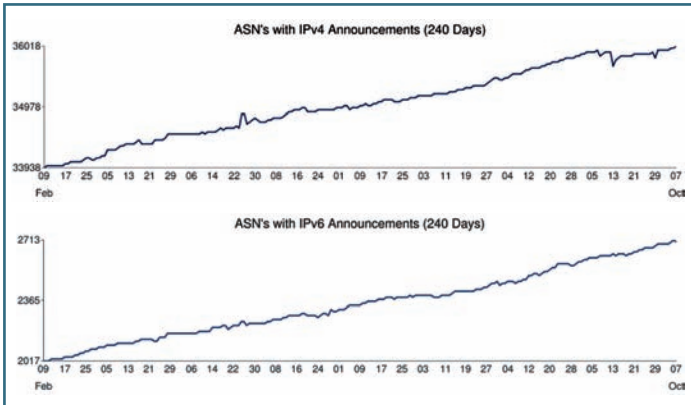
Daniel Karrenberg
RIPE NCC

Hosts

Like the sponsors, probe hosts will also be able to specify their own measurements using all other probes in the measurement network. For hosts the amount of measurements they can do will be proportional to the bandwidth and uptime of their probes. A registration page for potential hosts is scheduled to open in mid-October. The first probes will be distributed at RIPE 61 in Rome. More details and regular updates on this pilot are available from RIPE Labs at: https://labs.ripe.net

Martin Levy
Director IPv6 Strategy,
Hurricane Electric

IPv4 exhaustion date looms ever nearer:
"Are you ready for IPv6?" Asks Martin Levy

shows how a vast majority of countries that already have Internet access also have IPv6 of some description. As of January 2010 over 90 countries had a "live" IPv6 presence and IPv6 is active at nearly all the major global Internet peering points.

In HotLINX22 - published mid-July - we included a graphic featuring a still from one of Hurricane Electric's IPv4 exhaustion counters. At this point in time it was being predicted that there were 364 days before IPv4 addresses finally ran out. However, while the counters are obviously useful they are only a guide and there are factors that can affect what the eventual IPv4 exhaustion date will be.

As HotLINX23 went to press there were 14 /8 address blocks remaining, just 5% of all IPv4 addresses. In November 2009 this figure was as high as 10%.

These /8 address blocks are typically issued to the five Regional Internet Registries (RIRs) by the Internet Assigned Numbers Authority (IANA). The five RIRs are AfriNIC (Africa), ARIN (North America), APNIC (Asia and Oceania), LACNIC (Latin America) and RIPE NCC (Europe, the Middle East and Central Asia).

It should be noted that when considering the IPv4 exhaustion date that the final five blocks of /8 addresses will be simultaneously distributed to each of the regional registries leaving only nine other blocks remaining. With the addresses within a block typically being allocated every three or four weeks the final IPv4 exhaustion date could be much sooner than we think.

The actual number of IPv4 blocks can be tracked via the IANA website:
http://www.iana.org/assignments/ipv4-address-space

While on the face of it the deadline looks very close the industry as a whole has been working hard on making sure it is set up for IPv6. Earlier this year Hurricane Electric published a map that

The IPv6 routing table – a global view of IPv6 routing readiness
At the LINX70 member meeting in August, Martin Levy, Director IPv6 Strategy at Hurricane Electric, presented a very informative session on the state of the IPv6 routing table and in doing so he asked the question whether it was ready for real world use.
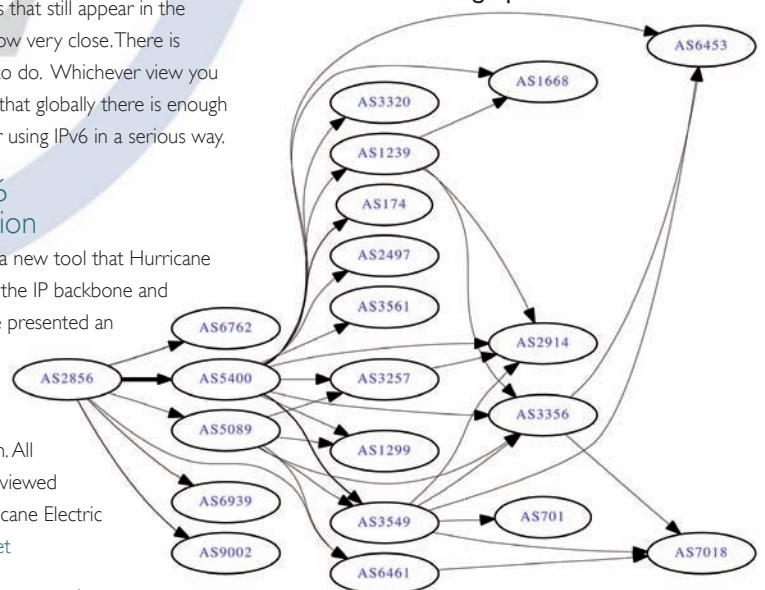
There are generally two schools of thought in the industry on this with one theory suggesting that it has been ready for years: Plenty of backbones are already running IPv6 routing and peering while IPv6 talks at conferences have been commonplace for some considerable time. The second theory is that the industry isn't completely ready - notably because of the few gaps that still appear in the routing tables - but is now very close. There is clearly still some work to do. Whichever view you pick, he stated it's clear that globally there is enough connectivity to consider using IPv6 in a serious way.

Global IPv4/IPv6 Route Propagation
Martin also introduced a new tool that Hurricane Electric has released to the IP backbone and peering community. He presented an overview of the tool and displayed some global IPv4/IPv6 route propagation information. All the information can be viewed graphically on the Hurricane Electric website: http://bgp.he.net

In addition to the route propagation pages, there's also information about the state of the global Internet - both in the IPv4 and IPv6 worlds. The data include prefix reports, peering

reports, adjacency summaries (with history), bogon reporting, DNS information and much more.

Amongst the statistics presented at LINX70 it was noted that there was a 14.9% increase of IPv6 prefixes originated over the previous 90 days with ASNs with IPv6 Announcements increasing by 11% over the same period *(see graph)*. Current figures can be viewed via the following links:

http://bgp.he.net/report/prefixes#_prefixes
http://bgp.he.net/report/prefixes#_networks

Some other good news announced at LINX70 is that global routing does now appear to be native on all tier1 backbones though it has taken until 2010 for the final tier1 to complete this step. However, there are a few backbones still missing some small subsection of routes, though this is likely to be rectified in the very near future.

Finally Martin described how some of IPv4's bad habits are creeping into the IPv6 world. In reviewing the bogon routes that show up under IPv6, he was able to show that the real-world hiccups we have been used to within IPv4 are now showing up in the IPv6 routing tables. This, Martin explained, is actually a good sign and enables people to tune their IPv6 environments to perform just like IPv4 does today.

IPv6 route graph - BT

For an overall progress report on global IPv6 deployment please visit:
http://bgp.he.net/ipv6-progress-report.cgi

LINX Meetings

Jennifer Atherton
Business Development
Executive

A Successful Return to the Congress Centre for LINX70

The 70th LINX member meeting took place at the Congress Centre in London, the first time the venue had been used by LINX since 2004. It was a very well attended event and feedback has shown that the location and the far larger Congress Hall was popular with meeting attendees and sponsors alike.

Day One *(Monday 16 August)*
The first day of the meeting very much focussed on the future for both LINX and the industry as a whole. Of great interest to those present was a discussion on the LINX Network Architecture Review which was presented by LINX Network Architect Owen Conway, Mike Hughes and John Souter leading to a lengthy Q&A session.
Also on day one were two very well received talks on IPv6 from Stewart Bamford of Level 3 Communications and Hurricane Electric's Martin Levy. You can read more about the content of Martin's presentation by turning to page 11 of HotLINX23.

The LINX70 Registration area.

Day Two *(Tuesday 17 August)*
The event program on Tuesday included updates from LINX staff including CEO John Souter, Head of Public Affairs Malcolm Hutty, Business Development Executive Jennifer Atherton and, in what was a farewell performance, an overview of engineering activity from Mike Hughes who was set to leave his CTO post at LINX in September.

Also featured on the second day was Nigel Titley's regular RIPE policy update, Bradley Freeman of JANET (UK) speaking on GNS3, a graphical network simulator and brothers Neil and Daniel Harris of Kendra, discussing ISPs *Peering at the Edge*. Nigel Titley later returned to the stage alongside Remco van Mook of Equinix for an amusing yet thought-provoking Network Neutrality debate.

The Gold sponsor for LINX70 was Interxion whose presentation, *Where the Cloud Lives – the Carrier Neutral Data Centre*, was given by David Sandars. Hardware.com were the Silver Plus sponsor and they were represented on stage by Force10 Networks. Andi Falkner, Force10's EMEA Technical Director spoke on the topics of *Network Automation and Virtualisation Solutions*. Also present as a sponsor were Flexiant, a software and services company.

Please remember that LINX70 presentations plus the audio and video archive are available for members to access from the LINX website: www.linx.net/linx70

Meet with LINX
Events to be Attended by LINX Representatives

LINX staff attend a number of industry events around the world every year. These include international network operator groups, RIPE regional meetings as well as our own LINX member meetings.

Please take a look at the list below to see where you can meet with LINX representatives over the coming months.

PLNOG5
21-22 October 2010
Krakow, Poland
Attended by: *Jennifer Atherton, Megan Nisbet and Bartek Raszczyk*
www.plnog.pl/spotkanie-5-pazdziernik

RIPE61
15-19 November 2010
Rome, Italy
Attended by: *John Souter, Jennifer Atherton and Patrick Gilmore*
www.ripe.net/ripe/meetings/ripe-61

LINX71
22-23 November 2010
London, United Kingdom
Attended by: *LINX staff & Board*
www.linx.net/LINX71
Web page will be available in October 2010

NANOG51
30 January - 2 February 2011
Miami, USA
Attended by: *LINX staff TBC*
www.nanog.org/meetings/nanog51

LINX72
21-22 February 2011
London, United Kingdom
Attended by: *LINX staff & Board*
www.linx.net/LINX72
Web page will be available in January 2011

RIPE62
2-6 May 2011
Amsterdam, The Netherlands
Attended by: *LINX staff TBC*
www.ripe.net/ripe/meetings/ripe-62
Web page will be available in early 2011

LINX73
16-17 May 2011
London, United Kingdom
Attended by: *LINX staff & Board*
www.linx.net/LINX73
Web page will be available in April 2011

The Internet revolution:
Opportunities, threats and challenges to your business - ignore it at your peril!

INET London, United Kingdom 29 September 2010

Established in 1994, INET events are ISOC organised conferences that are characterised by the engagement of multiple Internet stakeholders, of strategic locations and agendas tailored to meet regional needs. The latest event was held at the Park Lane Hotel in London in September and attracted nearly 200 attendees.

The focus for this meeting was network confidence and neutrality, and exactly what these mean for businesses and the future success of the Internet.

Some interesting questions were posed by the panels and keynote speakers which tackled the business issues of the advancement of the Internet and in particular, IPv6, and security.

Overall the verdict was that considerable progress has been made over the first ten years of the 21st century, but that there was much more hard work still to do. The goal of ensuring that a secure, trusted, open and universal Internet is available for all continues to be a driving force within the industry.

The presentations from this event are now available to download from the ISOC website: www.isoc.org/isoc/conferences/inet/10/london.shtml

Further INET conferences are planned in Beiruit (Lebanon), Tunis (Tunisia), Singapore and San Juan (Puerto Rico) before the end of the year.

To find out more please visit: www.isoc.org/isoc/conferences/inet

"Safari, So Good!"
LINX sponsor Capacity Africa event in Nairobi, Kenya

capacity NEW LOCATION

AFRICA 2010
21 & 22 September, Nairobi

Capacity magazine's 4th annual Pan-African wholesale telecommunications conference

Megan Nisbet and Jennifer Atherton (pictured) both represented LINX at the major African telecoms event, Capacity Africa, back in September.

Recently LINX exhibited at the 4th African telecom conference; Capacity Africa 2010. The event, which took place in Nairobi, Kenya between the 21 and 22 of September, always promised to provide excellent networking opportunities with major players attending from right across the African market. The contacts made could in turn lead to LINX extending its member network reach beyond those already established in Kenya and South Africa.

Comment
LINX Business Development Executive Jennifer Atherton said, *"We strongly felt that by sponsoring this event we had a great opportunity for LINX to raise its profile in Africa. We are looking forward to building relationships with these networks having presented the benefits of peering at LINX to them. By doing so, we hope that we will be able to increase our member base, allowing us to broaden the routing options even further for LINX members".*

The conference was attended by 300 industry professionals from around the world and featured a keynote address from the Kenyan Minister of Communications.

Topics under debate included market regulation, the ongoing development of terrestrial and subsea capacity and the opportunities for growth in the region. To find out more about this and other Capacity events please visit: www.telcap.co.uk/conferences-events.asp
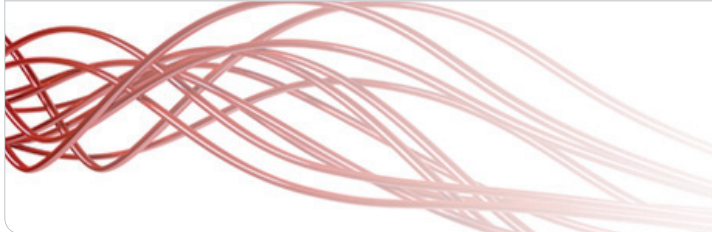
Embedded WDM using high-performance WDM transceivers

ProLabs

The advent of pluggable transceivers with WDM (Wavelength Division Multiplexing) functionality has long since given Network Operators greater flexibility and capabilities in their network design.

Most optical transceivers today can support DDM (Digital Diagnostic Monitoring), which is the function providing the transmission light levels on the link. This coupled with the fact that Optical Transceivers are significantly more intelligent than say 10 years ago, gives the network designer a whole load more choice at his fingertips. He is no longer handcuffed to the traditional *"active"* DWDM approach, where he either runs his own DWDM platform or rents wavelength services from a telecom operator. Both of these approaches are expensive and if he chooses to run his own DWDM platform then he can also expect an additional level of complication requiring much knowledge, training and ongoing support.

Consider instead, the prospect of having the WDM transceiver connected directly into the IP/Ethernet or FC equipment and completely removing the need for any separate DWDM platforms. Consider then that all services, no matter how many or what protocol, can be combined together through a single passive multiplexer over a single pair of fibre. The benefits are substantial, both technical and commercial. This "embedded WDM" approach is already widely used and accepted in broadband access networks for backhauling DSLAM and CMTS equipment and SAN/WAN networks between enterprises; 10G being readily available in all form factors.

The number of required transceivers is now reduced to 2 per channel (an LC patch cord connects each transceiver to the multiplexer), and as no additional active DWDM equipment is

required, this is a very reliable approach (MTBF 450 years) and Green Data Centre solution. All traffic information is accessible from the Ethernet switch removing the need for the separate DWDM NMS system requiring regular FW upgrades.

Capex, Opex, Power and Rack Space are slashed and the end user has a much more user friendly solution that can be handled effectively by their organisation. As the WDM transceiver is connected directly into the switch, it means that it is effectively acting as its own DWDM transmission platform. Logistically, this all means that the amount of tendering / installation work, and vendors / integrators are cut by half.

Today, all traffic protocols can be handled in this way. 1/10Gigabit Ethernet and 1,2,4,8 Gigabit Fibre Channel/FICON. CWDM (Coarse) can handle 16 channels and DWDM (Dense) can handle up to 80 channels in this way. Distances vary depending on protocol but 200+km can be expected for Gigabit and 80km for 10Gigabit Ethernet. For FC, 100km is achievable for 4GFC and 70km is available for 8G FC (SmartOptics has recently launched the only

system in the world to handle native 8G FC in a purely passive way without the need for additional active DWDM equipment).
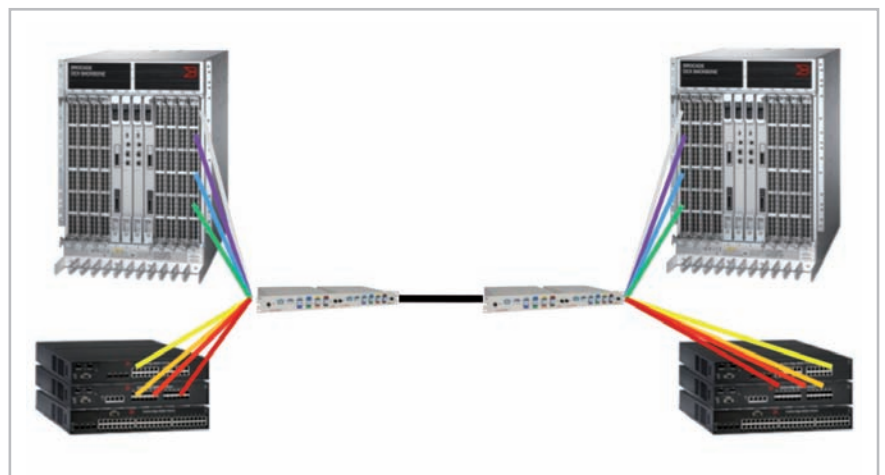
Vendors are already looking at 40 and 100Gbps technology, and potential users will be glad to know that this approach of removing the active DWDM transmission layer is also possible for these protocols as well. As transceivers continue to develop, active DWDM platforms will soon become a thing of the past in the enterprise.

Thomas Mangin, Exa Networks

The 'In the Spotlight' feature is where HotLINX speaks with leading members of the Internet and LINX communities. LINX Chairman, Grahame Davies and fellow Board members, Steve Wilcox and Patrick Gilmore, are amongst those who have already faced questions from HotLINX editor Jeremy Orbell but this time we speak to the latest member to join the LINX Board, Thomas Mangin of Exa Networks.

You've lived and worked in the UK for many years. What were the circumstances that lead you to come here?

In 1997, while in Wolverhampton studying for my Bsc in Computing, I meet the woman who was later to become my wife. On finishing of our respective degrees, she went back to Spain while I completed my then mandatory French national service. The following year she rejoined me in France, in Lyon, where I was studying for my Msc. Later, she decided to return to the UK to achieve a Masters in Interpretation, and as I did not believe we could withstand another year apart, I landed at LBA in November 1999 and have happily lived around Bradford ever since.

Can you tell us about your background in the Internet industry and your current role at Exa Networks?

After getting an address, bank account and National Insurance Number, I took a pair of compasses, a map and the yellow pages, and looked at the local businesses. One of them was a local ISP called Legend Internet, where I managed to get a job, despite the fact that the director who employed me could not understand most of what I said during the interview (and vice-versa).

I was promoted twice during my first year and ended up in charge of the whole technical team. Like many ISPs in early 2000, Legend then went through a period of formidable growth. One of my current co-directors and I were left to run the business on a regular basis, so when Legend's director decided to sell, we parted ways and formed Exa. I have been working there since then.

My role is mainly overseeing the operational side of the business, but like any role in a small organisation, you always wear more than one hat.

You were recently elected onto the LINX Board. What were the main reasons why you wanted to take on this position?

I have been involved with members' organisations since university, and when I first joined LINX in 2001, its mutual structure appealed to me. I was very surprised how open and welcoming the staff and other members were and I learned a lot thanks to the friends I made in the industry. I simply wanted to give my share back. My job at Legend Internet did not allow me to get involved. Starting Exa and becoming a father did not improve the situation and it is only recently that it became possible for me to commit the time I needed to be a director of LINX.

What challenges do you see ahead for LINX? How do you see the organisation developing in the future?

Clearly, LINX's biggest challenge is its current architectural review. I have no crystal ball to tell you how how the organisation will develop. A lot will have to do with general market changes including strategies from other industry players.

As long as the traffic continues to grow as it does, I am sure LINX will see its fair share.

Membership News

Jennifer Atherton
Business Development Executive

New Members Spring 2010

Sales Update
For the Period
July - September 2010

Bytemark
ASN:	35425
Country:	UK
Network:	Content
Policy:	Open
IPv4 Address:	195.66.227.144
IPv6 Address:	2001:7f8:4:1::8a61:1
Website:	www.bytemark.co.uk
Email:	peering@bytemark.co.uk
Tel:	+44 1904 890890
Peering DB:	Yes

Logicalis
ASN:	8950
Country:	UK
Network:	Cable/DSL/ISP
Policy:	Open
IPv4 Address:	195.66.224.174
Website:	www.uk.logicalis.com
Email:	peering@uk.logicalis.com
Tel:	+44 1753 777200
Peering DB:	Yes

The LINX membership continues to see exceptional growth with 378 members now connected to the exchange. Our table shows that we are still attracting members from the UK with others joining from Eastern Europe. This number will be boosted further following a record month of nine applications in August alone which will be keeping our Engineering team busy in the weeks to come.

Jump Networks
ASN:	8943
Country:	UK
Network:	NSP
Policy:	Open
IPv4 Address:	195.66.224.34
IPv6 Address:	2001:7f8:4:22ef:1
Website:	www.jump.net.uk
Email:	peering@jump.net.uk
Tel:	+44 7968 158327
Peering DB:	Yes

Media Groupe (JV)
ASN:	6670
Country:	Russia
Network:	CDN
Policy:	Selective
IPv4 Address:	195.66.224.122
Website:	www.jv.ru
Email:	noc@jv.ru
Tel:	+7 495 5041717
Peering DB:	No

Rom Telecom
ASN:	9050
Country:	Romania
Network:	NSP
Policy:	Open
IPv4 Address:	195.66.225.42
Website:	www.romtelecom.ro
Email:	peering@romtelecom.ro
Tel:	+40 766 357607
Peering DB:	Yes

Link Connect
ASN:	29297
Country:	UK
Network:	ADSL
Policy:	Open
IPv4 Address:	195.66.224.246
IPv6 Address:	2001:7f8:4::7271:1
Website:	www.link-connect.com
Email:	wayne.lee@link-connect.com
Tel:	+44 8453 662300
Peering DB:	No

Mold Telecom
ASN:	8926
Country:	Moldova
Network:	Cable/DSL/ISP
Policy:	Open
IPv4 Address:	195.66.224.115
Website:	www.moldtelecom.md
Email:	peering@moldtelecom.md
Tel:	+373 22 570 387
Peering DB:	Yes

Stratogen
ASN:	50292
Country:	UK
Network:	Content
Policy:	Selective
IPv4 Address:	195.66.225.130
IPv6 Address:	2001:7f8:4::c474:1
Website:	www.stratogen.net
Email:	support@stratogen.net
Tel:	+44 8455 440465
Peering DB:	No

LINX Recruitment – Sales & Marketing

Megan Nisbet
Marketing & Communications Executive

Prior to joining LINX Megan Nisbet, a 2009 Media, Culture & Communications graduate, worked for Belvoir Lettings in Corby. Whilst in this role, Megan was able to put to use the communication and marketing skills that she gained whilst studying for her BA (Hons) degree at Lincoln University.

Since taking on her Marketing & Communications Executive role in early 2010, Megan has been involved in a variety of different projects. These include co-ordinating member case studies, writing HotLINX articles, updating LINX social networking channels and maintaining key LINX website pages such as the About LINX and the LINX from Anywhere sections. She also works with LINX meeting sponsors to ensure that they gain the maximum exposure and benefit from the event that they attend.

Megan has also represented LINX at overseas trade shows including the ITW event in Washington DC (USA), Capacity Africa in Nairobi (Kenya) and this coming October, PLNOG5 in Krakow (Poland).

You can read a review of the Capacity Africa event on page 13 of this issue of HotLINX, while the PLNOG event is covered in depth in HotLINX22. This can be downloaded from: www.linx.net/publicity/hotlinx

Comment

When asked about her role at LINX, Megan said, *"This position is exactly the sort of thing I wanted to do when I left university. I am so pleased to have been given the opportunity and I am really enjoying my time here.*

"Everyone has been really helpful and friendly - it really is a great place to work".

You can send your HotLINX stories to Megan via: hotlinx@linx.net