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The future of the 'Net: one trillion IP-enabled devices, 5 billion broadband connections

The future of the Internet will revolve around its ubiquity as IP addresses become embedded in as many as a trillion devices and in ensuring that the digitally illiterate and government service delivery keep pace. They were two of the conclusions from a high-level panel that concluded PTC'11 featuring the architect of President Obama's national broadband plan, Blair Levin, Cisco global technology policy VP Robert Pepper and Google entrepreneur-in-residence Craig Walker.

Pepper predicted that in the next five years virtually all of humanity will be on the Internet with 5 billion on some form of broadband. Over this period, IPV6 will enable almost ubiquitous embedding of the Internet in devices, with the number of IP addressable devices rising from billions to one trillion. A key aspect of this would be untethered use of Internet, enabled by wireless and mobile tech.

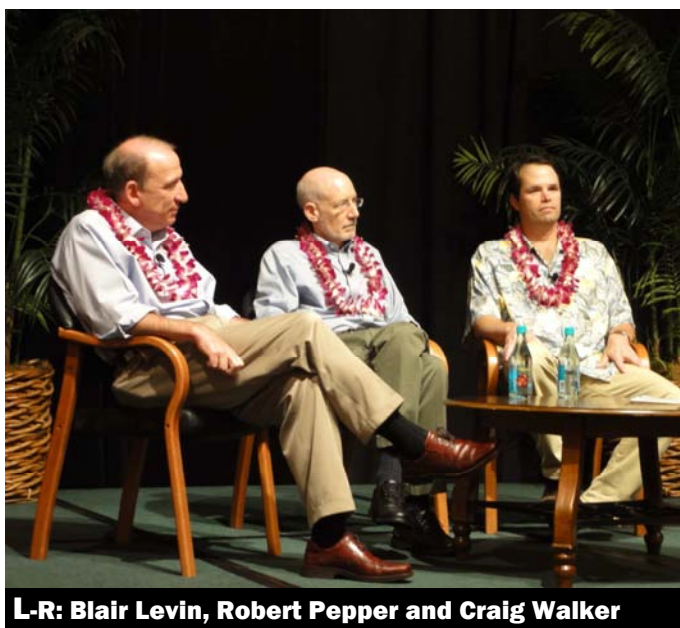
Levin, who served with Pepper at the Federal Communications Commission in past roles, concurred with this view and said that with the emerging ubiquity of the Internet, that "not being digitally literate will be the same as being (functionally) literate in a knowledge based society." He added that the real challenge was not in the deployment of networks themselves but in developing the use of applications in the public realm, specifically citing health, public safety and education.

"The fundamental way of delivering education today is through a platform developed 500 years ago by Gutenberg," Levin said. Pepper concurred, quipping "a teacher from 1911 could walk into a classroom in 2011 and be comfortable. The only difference is that the blackboard is now a whiteboard!" Levin painted a scenario where textbooks would be replaced by e-books where a student could click on a passage and place a Skype video call to a teacher to get more explanation on a subject. A whole new industry of interactive, online tuition could be developed, he suggested.

More generally, Pepper said that emerging economies were leapfrogging legacy platforms and moving straight into mainstream adoption of disruptive technologies. This presented a challenge for North America and Europe where there were "huge constituencies threatened by this. It has huge implications for the developed economies."

On this theme, Levin pointed out that the "iconic" companies in the Internet space such as Google and Facebook were still largely North American but this was a legacy of decisions made in the 1960s, 70s and 80s. "We are not doing the things now to ensure that we are still doing the same in the next 20 to 30 years," Levin warned.

Google's Walker identified the rise of the smartphone as the most significant trend he saw currently in the Internet, pointing out that the past year was the first where smartphones actually outsold standard mobiles worldwide. "What will that mean for things such as education?," he asked, going on to illustrate the potential power of locational technology with the example of an interactive system which allowed one



L-R: Blair Levin, Robert Pepper and Craig Walker

to even discern the most popular items on the menus of local restaurants.

Pepper also talked at length about the rise of so-called ambient video—effectively people using webcams to monitor such things as what their pets at home are doing while they are away. He said that Cisco calculated this now accounted for an extraordinary 310Tb a month of Internet traffic and demonstrated how that even with the best intentions, people continued to find new ways to use the Internet that were unanticipated by forecasters.

Grahame Lynch

Carriers look beyond Ethernet exchanges

While the emergence of Ethernet exchanges around the world is arguably one of the hottest trends over the past year or so, they won't be solutions to end all solutions, according to operator members on a panel at PTC'11.

Despite the overt benefits of connecting to an exchange, including access to new geographies, faster time to market, and the streamlining of Ethernet interconnection processes, speakers from One Source Networks, Expereo, and KDDI America, noted that connecting to an exchange is only the first step to developing their global services.

The fact is that while participating in an exchange offers a convenient way to access new network partners, it won't replace traditional dedicated NNIs.

“Once we establish more and more interconnections through that exchange with a certain carrier, we'll probably want to go with a direct NNI with them, and we'll probably want to get that NNI as close as possible so it works with both our markets,” said Matt Carter, director at KDDI America, whom this week connected to Telx, CENX and Equinix exchanges. “So the exchange is a complementary add to our international investments and they get us into areas where we wouldn't have been otherwise, and once we are there, we can move on to the next step.”

The sentiment is echoed by Gina Nomellini, chief marketing officer at One Source Networks, who also cited exchanges as a good starting point to access areas where a solid business case might not be immediately available. By leveraging exchanges, operators can start trading services right away, and then gauge the opportunity before formalising an investment strategy.



Likewise at Expereo, exchanges represent an immediate way into different markets, allowing the operator to meet immediate customer requirements at much lower costs.

“We are very demand driven as well. It is a nice way to start somewhere and then optimise later on, whether that is going direct, or maybe even build out,” said Alphons Mulders, Expereo International, USA.

That said, there are compelling reasons for connecting into exchanges, the operators said.

Mulders said that exchanges allow his company to direct strategic investments into markets where there is more opportunities.

“The reason why we partner with people like Neutral Tandem or Telx is - why should we invest in San Jose, those guys have a nice piece of equipment there that is invested by one of these guys, so we better put our money in San Paolo, or other places, where there is nothing there today. In our design, it is possible to work with exchanges, and rapidly increase our footprint and help our carrier customers with their needs, which is getting global access,” Mulders explained. “It makes sense for us, it makes sense for all the suppliers and it makes sense for customers. For us, it gives us a shorter time to market, if we need to build in California, it will take time for us, so we better partners with one of these guys. It lowers our investments.”

At the same time, exchanges, by aggregating carrier networks and providing a platform to trade services also helps reduce the cost and complexity of interconnections.

“The turnkey approach of that exchange is one of the most important things for us, meaning that what I'm not looking for is going to an exchange, and just getting a technical interconnection, but still need to go out to contracts, SLAs, set up commercial and operations arrangements with every provider in that exchange in order to buy from them,” One Source Network's Nomellini said. “So having a turn-

key approach in the exchange as well as which partners are in that exchange would be our strongest criteria.”

Tony Chan

CENX's CoreSite deal highlights key differentiation

Carrier Ethernet exchanges have become not only a hot topic in the past year, but also a very competitive market. From what was essentially a non-existing market in 2009, there are now several competing to attract carriers to their exchanges.

For Nan Chen, president of CENX, however, there are distinct differences between his organisation's strategy and those of its competitors. For starters, his competitors do not focus exclusively on this segment. “They all have different business. Their core business is space and power that they are trying to sell. This is more of a side business to drive more space and power that they are trying to sell, but this is our core business,” he said. “They only deploy their exchanges inside their own data centres. We will deploy our exchange anywhere.”

Reinforcement his statement is a deal announced this week, which will see CENX deploy its exchanges inside 11 data centre facilities of CoreSite Realty Corporation, a US-based data centre facilities operator with over 600 customers inside its facilities.

The deal will bring CENX's presence to a number of new US markets, including the Bay Area, Boston, Northern Virginia and Washington, DC, as well as additional sites in Chicago, Los Angeles, Miami and New York. The new sites will add to CENX's current footprint of six US markets, as well as London and Hong Kong.

“What it does is enables our customers to easily, because the carrier density is very high [at CoreSite's facilities], it enables them to connect to us very easily,” Chen said. “It also enables the data centres customers, for example, content providers, to connect into us and they can offer services to all the 15 million buildings that CENX has already made on-net, so they can reach their customers very easily.”

Differentiation to his competitors also extends to the pricing model that CENX is operating under. According to Chen, instead of focusing on selling space and power, the company focuses on ports and circuits. CENX's main revenues will come from monthly recurring port charges and commission for each circuit provisioned for its customers, and will allow its customers to select their own in bound connectivity or co-location solutions.

The core market focus also means CENX is able to deploy new technologies and services more quickly. Chen, who founded the Metro Ethernet Forum – the defacto standardisation body for Carrier Ethernet technologies, noted that CENX now has a team of 50 research and development staff, who are solely focused on developing solutions and software to enhance Carrier Ethernet implementations.

One such example is the roll out of a feature that enables end-to-end monitoring of Ethernet circuits on CENX's platform. The technology sends traffic down both ends of a circuit, which is then reflected back to the exchange, where the information is captured and log in real time. This allows CENX to offer full visibility of circuit conditions to customers, a capability that is currently unique to CENX, Chen said.

Tony Chan

Variable pricing: the Holy Grail for international wholesale?

A panel looking into the crystal ball for international wholesale painted a less than rosy picture where continual price decline is paralleled by explosive growth in demand and costs, but there just might be light at the end of the tunnel.

According to Marc Halbinger, CEO at PCCW Global, the idea that telecoms capacity is a commodity is a misnomer because commodity pricing “goes up as well as down,” whereas telecoms end-pricing only goes down.

The problem, Halbinger noted, is that there is no variable value in today's bandwidth model. Capacity is sold at a fixed value and carriers have no way to differentiate services to recoup extra costs that is now associated with delivering services.

One example he offered is the cost of providing the Internet to consumers. For operators like PCCW,

the international capacity required to support Internet users is a cost of providing such services. The problem is that those costs are only going up, not only because of escalating bandwidth requirements against relatively fixed retail pricing, but also as a result of the globalisation of network infrastructure.

Today, the local network for PCCW in Hong Kong doesn't end at the border, but instead needs to terminate in New York, China, London and so on, because that is where the Internet content is, he said.

The challenge for carriers is to create an environment where they can create variable value while maintaining a fixed cost.

His solution to that problem? One-to-one interactive high-definition video.

"High definition video is a technology that really requires QoS from one end-point all the way to the other end-point. That will provide a little bit of difficulty for over-the-top providers because they are not owning the local loop and can't deliver on any type of QoS without reaching some sort of structure or agreement for traffic delivery for good QoS terms. On the other hand, for carriers such as ourselves don't have that problem," Halbinger said. "That's why I'm hoping if the world does go to one-to-one interactive high-definition video, perhaps the technology requirements of QoS will allow us to go back to a fixed cost investment with variable network returns."

Another path to generate differentiated services is through the adoption of IP, added Joseph Chan, executive vice president, international business at Hong Kong-based CITIC International. According to Chan, going to an all-IP world will enable carriers to differentiate their services by leveraging the QoS capabilities of IP.

One positive example of variable value that has already manifested itself is with low-latency routes, added Will Hughs, president and CEO, Telstra International - Americas.

"On the Chicago to New York route in the US, three milliseconds can mean the difference between US\$2,000 a month and US\$250,000 a month," Hughs said. "The financial traders will pay a premium." This however is a risky venture, he added. While operators can invest to build this type of networks, there is no guarantee that new entrants will come in with even lower latency, hence destroying any value created by the original network.

On a more positive note, there are still plenty of opportunities as the world embrace more and more telecommunications services, Hughs added.

"I think the future is incredibly bright. If you take the average ARPU for telecommunications users in general, it is still going up. There are all sorts of developing countries that are going up and who knows, maybe some of the cable [TV] revenue will be shifting to us as well. There are so many more ways that we depend on global telecommunications and the Internet infrastructure, so there's definitely demand there," Hughs said.

"The challenge is going to be finding creative ways to monetise it. Marc's made an excellent point about creating variable pricing out of a fixed cost structure. I think we need to look back, let's look back at the voice model - more granular, per destination, per QoS, per Megabyte type of pricing."

Tony Chan

Tackling the rural broadband challenge; three points of view from the US

A panel session at PTC'11 has shed light on how three different organisations in the US are dealing with the challenge of extending broadband to rural and remote populations - but also highlighted additional issues to be considered once the links are in place.

The GCI Communications Corporation is currently involved with the TERRA project, aiming to significantly upgrade middle-mile networks in remote areas of Alaska - currently served in many cases by satellite links - along with next generation wireless for last-mile coverage. "Through stimulus funding and government loans, GCI is constructing a terrestrial hybrid fibre/microwave network in western Alaska," said GCI RF engineering manager Mark Ayers. "The consumers in this case are going to benefit greatly, because they're going to experience a cable modem type of service, in villages that that have never had that before."

Initially, the deployment for the TERRA project will cover 57 currently satellite-served sites; Ayers said

that GCI was considering either Wi-Fi or HSPA connections for the last-mile, replacing current fixed wireless links, because users placed a strong emphasis on mobility. But he added that it was the educational and medical sectors who were driving the demand for middle mile improvements.

“Health clinics and schools in villages, who also get their own government funding to go buy services... really have got to the point where they’re demanding lower-latency performance and higher throughput,” he said. “You get to a threshold where, although satellite is a good solution to providing reasonable levels of bandwidth, the kind of bandwidth they’re asking for gets cost-prohibitive on satellite.... the clinics and schools are very excited about not only getting the reduced latency, but also hopefully over time once you’ve paid the capital cost of construction off, you can see a reduction in cost for the bandwidth in the villages.”

The non-profit Mid-Atlantic Broadband Cooperative, on the other hand, was motivated primarily by economic



Mike Henson, Tad Deriso, Mark Ayers

development concerns by economic development concerns to build a wholesale fibre network through rural Virginia. “This wasn’t driven from a community anchor perspective, or a profit perspective – it was really driven by business and economic development,” said CEO Tad Deriso, adding that near the turn of the century, companies wanting to expand into the region had been actively dissuaded by high telecoms costs. “We said – well, how do we fix this? And we came up with the idea of an open access network that really enables private sector telecoms providers to make it cost-effective for them to provide services in a rural area.”

“We’re strictly a wholesale provider, we do zero retail services, we don’t provide residential or business customers’ connectivity. I think that’s one of the real reasons we’ve been successful, because in essence we don’t compete with the private sector providers.”

The rollout has been funded via a mix of grants from the Virginia Tobacco Foundation, and contributions from member organisations, which include a wide variety of fixed and wireless ISPs. “There has been about \$4 million in total projects; about \$1.9 million has been provided as grants,” said Deriso.

Designed specifically to enable last-mile broadband players, the network combines 800 route miles of new backbone fibre focused on business communities and carrier interconnection points, plus some dark fibre acquisitions via swaps and Indefeasible Rights of Use agreements to link to key peering connections. It features Multimedia Service Access Points, with space for ISPs and other member organisations to co-locate without any cross-connect charges, as well as wireless towers on which ISPs can co-locate.

“We just want to be the network that ties everything together... there’s about 12,000 customers who have never had any type of broadband access... and now have the ability to have broadband access,” said Deriso.

Meanwhile, NoaNet CSO Mike Henson raised some questions about ensuring sustainability amidst the advent of advanced wholesale networks. Based in Washington State,

NoaNet represents Public Utility Districts that have linked their fiber optic networks together to achieve economic feasibility in underserved areas. It currently has over 1,800 route miles, servicing over 4,000 homes and businesses through a combination of incumbents, competitive carriers and MSOs, and has been entirely self-funded since creation until last year, when it received A\$140 million across two grants as part of the US Stimulus Act.

“The big question is how do we make this type of thing fit into a community development plan that makes sense? The governor’s set the goal for Washington State that the anchor institutions – the estate agencies, schools, libraries, hospitals – will have gigabit access within five years,” said Henson. “With this grant, we’re going to reach... most of the anchor institutions within rural Washington.

“[But] if we take those customers out of the local service providers’ revenue opportunities, how is it that we’re going to be able to sustain that local incumbent?” he continued. “If a phone company’s got 1,000 users, and they’ve got three large customers, and those are the anchor institutions... if we hook di-

rect fibre facilities to them, and they have open competition, that incumbent loses that customer to another customer... how does that incumbent continue to provide for its 1,000 customers? He lives on a narrow edge as it is.”

“So how do you do this so that everyone gets what they need... how do you get a common interest with somebody when competition probably isn’t in their best interest? And those are the struggles we’re going through.”

Petroc Wilton

Pacific Fibre to enable uncap Internet in ANZ through new leased pricing

Pacific Fibre CEO Mark Rushworth aims to drive uncap Internet access in Australia and New Zealand through a new dynamic pricing scheme that will see the cost per megabit of transport over its system drop over time to enable ISPs to formulate new pricing plans.

“One thing we are doing is a leasing type of product, not the traditional one or two year leasing product, but more of a five year leasing product, that we are providing to our anchor tenants,” he said.

Instead of a simple flat rate or declining pricing model, Pacific Fibre will now price these leases according to customer requirements, balancing that with a promised decline in variable cost per megabits.

“What we have done is to say ‘give us your traffic demand forecast for the next five years,’ and then what we do is give them an opex model that effectively puts the price per megabits right down through the floor,” he said.

The approach not only gives business planners within its ISP customers visibility into key metrics such as projected bandwidth costs per month over the duration of the lease, but also allows those customers to start looking at how they can drive pricing plans in the market to bring about uncap Internet access.

Meanwhile Rushworth expects demand to ramp up quickly for capacity on Pacific Fibre, citing figures that put 90% of the Internet traffic from New Zealand and 80% of the Internet traffic from Australia, are US-bound traffic, as well as the deployment of NBNs in both markets. “NBNs will drive a whole level of demand in the market place,” he said.

Tony Chan

NTT Com rolls out special network for cloud access

NTT Communications has unveiled a new networking product that is targeted specifically for enterprises looking to connect to cloud infrastructure or services.

The new product, branded Universal One, is designed to solve highlighted problems that enterprises now face when looking to connect to clouds, including time-to-market, reliability, costs, and global coverage, according to NTT Com. The service will first be launched in “the coming months,” in Japan, with availability in global markets expected in the September time frame.

“As companies look to incorporate cloud services in their growth strategies to reduce the burden of designing and managing complicated networks, one of their concerns is how reliably network services can assure continuous access to the cloud,” the operator said. “NTT Com expects Universal One to satisfy this concern by enabling enterprises to rapidly deploy cloud-based networks on a reliable, low-cost, scalable basis, with the added assurance of redundant access lines.”

Orange Business Services launches comms platform for Asian traders

The Trading Solutions unit of Orange Business Services has launched what it dubs a “trading communications platform” in Hong Kong and Singapore. The service, called, Open Trade, offers a touch screen, multimedia communications system with multiple language support.

The system is described as “a small turret seamlessly integrating voice, video, email, instant messaging and web-based applications into one communication device.”

David Guerineau, vice-president for Asia Pacific, Orange Business Services -Trading Solutions, said: "With Open Trade, users spend less time managing contacts and more time connecting with customers and generating new business. Supporting a global SIP network enables the platform to pave the way to a new trading environment where users are at the centre of communications, not the machine. Open Trade is a cloud-ready, multimedia communications hub which builds upon the reliability of our other systems, offering greater software flexibility and meeting green standards."

OpSource joins Equinix

Enterprise cloud and managed hosting solution provider, OpSource, has joined the Equinix ecosystem.

The move will allow OpSource to target its cloud services to over 3,700 companies inside Equinix's facilities across North America, Europe and Asia Pacific, now referred to as Platform Equinix.

In addition to this ability to sell inside Equinix, OpSource will also be able to deliver on the performance expectations of its end-users by deploying its assets and services closer to customers with targeted geographical distribution to improve network performance and application response time.

"During the past two years, the introduction of cloud computing offerings has radically accelerated innovation in the hosting market", said Lydia Leong, research vice president for Gartner. "Many of the use cases that IT buyers are considering when evaluating cloud service models require enterprise-class solutions, including high levels of availability, performance, security, and flexibility. Partnerships can significantly expand the options available to IT buyers, especially where hybrid offerings are desired."

PACIFIC CROSSING GETS NEW CEO: Pacific Crossing, the NTT Communications subsidiary and operator of the PC-1, has appointed Takahiro Sumimoto as its new CEO. Sumimoto previously served as vice president of NTT America and also served on the Board of Directors of Pacific Crossing. The PC-1 cable system has made significant progress over the last few years, having been upgraded twice to expand capacity, extended backhaul capabilities and strengthened its product offerings, while maintaining impeccable network quality of service," he said.

EPSILON LAUNCHES GLOBAL HUB FACILITY IN JAKARTA

Epsilon has launched what it calls a carrier hub in Jakarta, Indonesia. The Epsilon Global Hub will be located in the MGK building in the Indonesian capital and is designed to meet the colocation requirements of carriers in the market. The facility is a brand new site to provide managed data centre services, the company said. The site will initially feature 170 m2 with enough space to support 48 racks. Another 750 m2 is scheduled to be released by mid-2011. According to Epsilon, the site is connected via "multiple cable systems with protected routes" to its Singapore hub. "EGH Jakarta is designed for carriers whom are already well established on the Epsilon platform, or for new entrants requiring technical facilities to extend connectivity globally," the operator said. "The Meet-Me-Room (MMR) housing offers access to the eConnect platform (with connectivity to over 50 telehouses with over 300 preconnected carriers), allowing for seamless inter and intra building connectivity."

ERICSSON WINS BIG TELSTRA CONTRACT

Ericsson Australia has scored a major mobile network expansion project with Telstra worth an estimated A\$473 million and including both network equipment and services contracts, according to sources close to both companies. Ericsson will supply new radio network controllers, Node B cards and radio backhaul equipment and it is the first time that the company has bundled mobile and transmission gear in the same contract, CommsDay was told. The deal was finalised this week but has not been officially announced. A spokesperson for Ericsson said the company had no official comment as yet, while Telstra had not responded by press time. Ericsson is one of a number of vendors that have been involved in major trials of LTE with Telstra in the past year. In November the two companies demonstrated high-definition video over LTE between Melbourne and Sydney, the first inter-capital connection using LTE, according to the companies.