IPv6 is an Innovation Opportunity

Jordi Palet (jordi.palet@consulintel.es)

European IPv6 Task Force & Steering Committee

IPv6 Forum, Education & Promotion WG Co-chair

Consulintel, CTO/CEO

Why a New Internet Protocol?

Only *compelling* reason: more addresses!

– for billions of new devices,
   e.g., cell phones, PDAs, appliances, cars, etc.

– for billions of new users,
   e.g., in China, India, etc.

– for "always-on" access technologies,
   e.g., xDSL, cable, ethernet-to-the-home, etc.

So, is about Addresses ?

- We make use of methods like NAT, PPP, etc. to share addresses
  - But NAT won't work for large numbers of "peers", i.e., devices that are "called" by others (e.g., IP phones)
  - They inhibit deployment of new applications and services
  - They compromise the performance, robustness, security, and manageability of the Internet
- But new types of applications and new types of access need unique addresses!
  - We have IPv4 addresses available
    - not for everything we wish to use them, in an efficient way
  - Obtaining more addresses will become more expensive

But Today … IPv6 is about RESTORATION and INNOVATION

- Doesn't matter "how much" IPv4 we have
  - Probably will never run-out, thanks to IPv6
- We need end-to-end (security)
  - NAT is NOT security
- IPv6 is about rediscovering the Internet principles
  - Removing tunnels
- Is about making the life easier for users (plug & play)
  - They don't read manuals, don't configure appliances
- We need efficient mobility
  - Not possible with IPv4
- In addition, IPv6 is an extensible protocol, open to what we need now and in the future

Reduce your cost starting NOW

- The cost is not anymore problem
  - No additional cost for networks with maintenance
  - No additional cost for Operating Systems
  - Some networking equipment might imply some cost
  - Education is always the bigger cost
  - Existing applications just work with dual stack

- But this is only true if you start now
  - When is up to you!

- Saving cost:
  - NAT is expensive, for operators and applications developers
  - Some Telcos already report 30-35% management cost reduction

New or Old Applications ?

- IPv6 is an opportunity for new advanced applications
  - P2P
  - GRID
  - Ambient Intelligence
- But, is this the chicken and egg thing?
  - Not always …
- May be this has been one of the IPv6 deployment mistakes
- We can (must) take advantage of IPv6 with the IPv4 Internet already
- Transition mechanism are there
- Lots of applications didn't succeed with IPv4
  - Remote control, monitoring, automation, surveillance, teledetection, alarms, ...
    - Home/Industry automation
  - Applications that haven't got the expected success, because was not easy to use them remotely (leased lines, modems, etc.)
- Let's give them a new chance with IPv6?

Innovation in Internet

- Despite the Internet boom, only two major "key" innovations:
  - Email and web
- Why?
  - No end-2-end, thanks :-(to NAT
- NAT hasn't a well defined behavior to apps.
  - Replacing all NATs to "behave" will cost more time, effort and resources than getting IPv6, which by the way, open new opportunities
- IPv6 is already being deployed by most of the big carriers
- App. developers yet to wake-up
- SMEs and individual entrepreneurs could already take advantage
  - **Opportunity for developing countries**
  - ISPs can be the distribution channel
    - Make new business
    - Don't lose customers
- May be IPv6-enabled apps. could become the new Internet boom

Conclusion

- We can use IPv6 with only-IPv4 networks
  - Not a show stopper
- Take advantage already of old applications, even if they didn't succeed previously
- The key is simple: Extensive usage of address space
- Transition is a slow process
  - Not a show stopper
- In less than ONE YEAR will see the explosion of new consumer electronic devices with IPv6
- New applications will come soon
- The "2nd key" will be the usage of the new IPv6 features, till to be fully explored

ISOC Paper

Internet Society

Addressing the Digital Divide with IPv6-enabled Broadband Power Line Communications

ISOC MEMBER BRIEFING #13

Definition

Power Line Communications (PLC) allows transmission of data over power lines. PLC is potentially the network with the deepest capillarity in the world, since power lines are almost ubiquitous.

IPv6 provides a package of highly scaleable enhancements to the Internet compared to the capabilities of the existing IPv4 protocol, which is today only sustained by Network Address Translation (NAT). NAT has unfortunately created unexpected barriers during the massive growth of the Internet, consequently breaking the initial end-to-end communications concept.

However, this massive IPv4 deployment happened mainly in rich countries, creating a digitally divided society. IPv6, associated with other scaleable technologies like PLC, is key to redressing the balance and alleviating the digital divide, enabling more people and entire countries to access information and knowledge, which in turn will allow them to benefit from the global economy, and create new knowledge and services.

Background

New access technologies, like PLC, that have been evaluated for some years, have failed to support the legacy Internet paradigm. These technologies now have a new opportunity with IPv6, because IPv6 will give value to their deployment.

Power Line Communications has been around since the 1930's but was never seriously thought of as a medium for communication due to its low speed, low functionality and high deployment cost. However, new modulation techniques supported by recent technological advances have finally enabled this medium to become a realistic and practical means of communication.

Recently, new technology has led to integrated circuits and modems entering the market, providing high speeds over power line infrastructure at reasonable and falling cost.

Although several broadband PLC technologies have been successfully developed, there is no standard yet. Some vendors provide "low-speed" (up to 2 Mbps) data rates using single-carrier modulations (GMSK, CDMA). Some technologies are based on multicarrier modulations (OFDM) and offer higher data rates, notably a 45 Mbps OFDM PLC chipset, which is the highest data rate available at this time.

In December 2002, at least one PLC technology vendor announced that during the second half of 2003, a new generation of broadband PLC technology providing 200 Mbps of physical layer data rate would be available as a commercial product.

Technical Issues of PLC

The main advantage of PLC over other technologies is that no new cabling is required, as all the cables are already there. Every building, be it offices, apartments or houses, has the network already installed. This permits a computer,

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Relevant IETF RFCs
Over 50 RFCs have been published by different IETF Working Groups, including those directly implicated in the standardization of IPv6, but also some others. A new WG is being formed, Zerouter, that will facilitate the large scale deployment of networks, facilitating the autoconfiguration of the devices at both, the customer end, and the ISP network itself.

From OnTheInternet
http://www.isoc.org/oti/articles/1201/g8.html
http://www.isoc.org/oti/articles/1201/wilkinson.html
http://www.isoc.org/oti/articles/0601/rao3.html
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Thanks !

Contact:

- **Jordi Palet (IPv6 TF-SC): jordi.palet@consulintel.es**

- **Madrid 2005 IPv6 Summit, more info at:**
    http://www.ipv6-es.com

- **The IPv6 Portal**
    http://www.ipv6tf.org