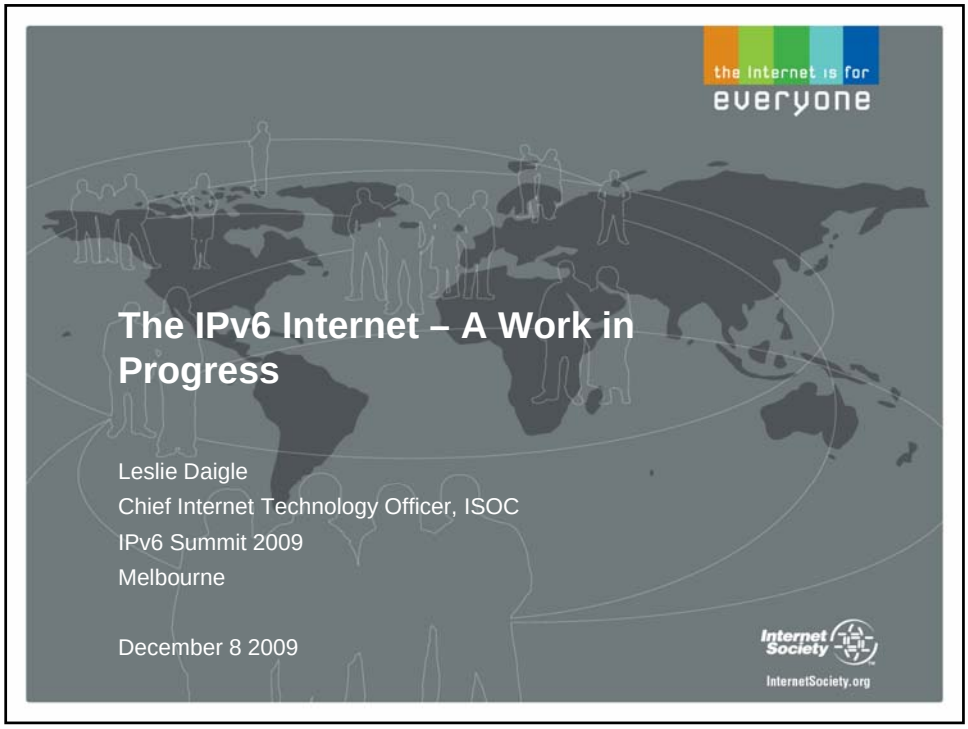
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everyone
The IPv6 Internet – A Work in Progress
Leslie Daigle
Chief Internet Technology Officer, ISOC
IPv6 Summit 2009
Melbourne
December 8 2009
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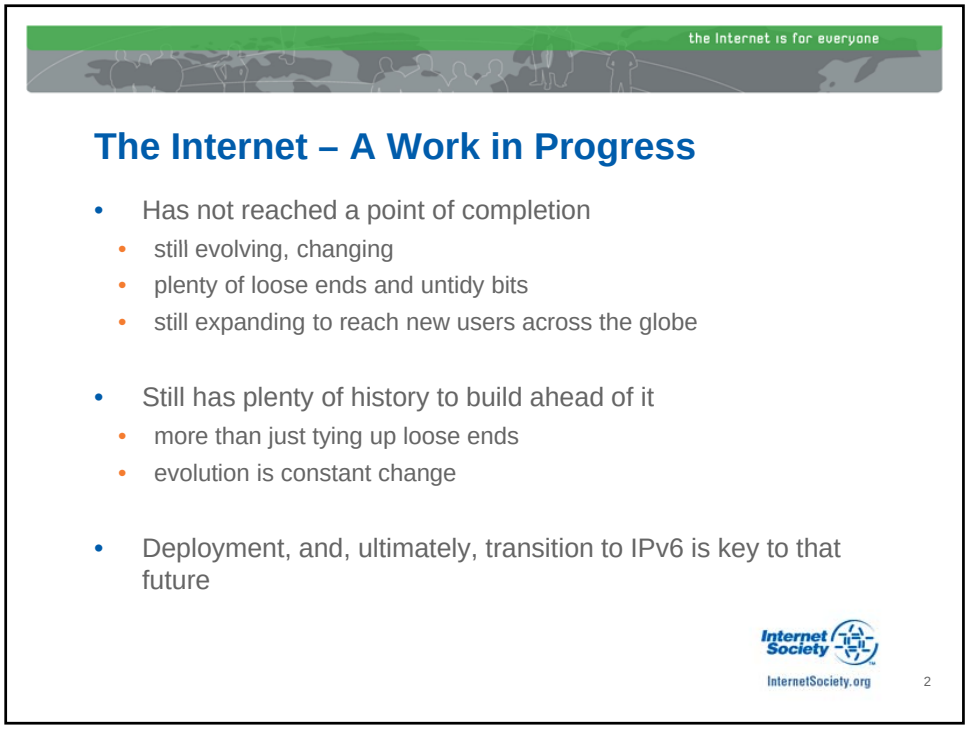
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The Internet – A Work in Progress
• Has not reached a point of completion
• still evolving, changing
• plenty of loose ends and untidy bits
• still expanding to reach new users across the globe
• Still has plenty of history to build ahead of it
• more than just tying up loose ends
• evolution is constant change
• Deployment, and, ultimately, transition to IPv6 is key to that future
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What Makes the Internet Work

- Rather than prescribing a future, pioneering technologists created the platform which opened the door to the future
- This created a participatory network – not just information delivery
- And that enabled uses and expansion simply not conceivable
  - the World Wide Web
  - Social networking
  - E-commerce, E-gov, E-tcetera
- We now call this the *Internet Model of development*, a term that embodies a common set of operating values shared among many of the key communities and organizations that have been central to the development and ongoing evolution of the Internet.

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Targeting the Future

- Continued growth of reach of Internet
  - users & uses
- Openness and ease of access
  - for (new) users, (new) networks
  - for new types of devices and networking
- Open standards
  - including access to the parameter resources, such as domain names, IP addresses
- Unfettered innovation
  - applications on the network
  - applications of the network
- Global in all dimensions
  - not balkanization or walled gardens
- Resilience, robustness, reliability

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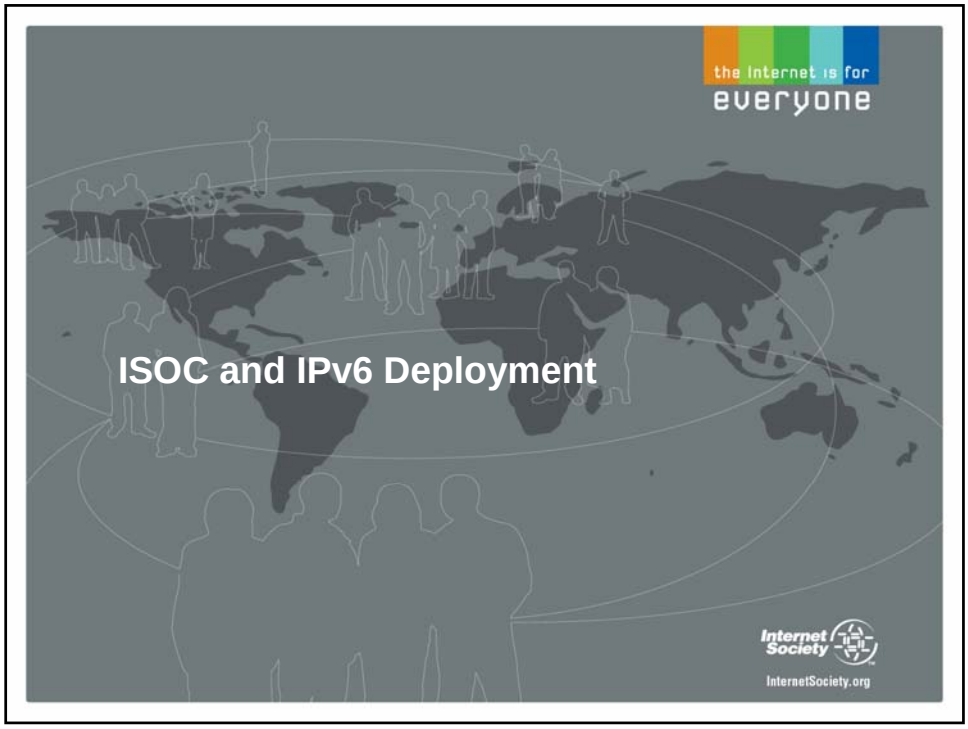
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ISOC and IPv6 Deployment
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What makes ISOC unique in tackling IPv6 deployment?
• Focus is the Internet as a global ecosystem
◦ Education, Standards, Public Policy
• Organisational home of the Internet Engineering Task Force (IETF), Internet Architecture Board (IAB), and related bodies
• Enable capacity and technical community building throughout the world
• Key player in public policy discussions pertaining to the Internet
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Our programmatic work

- InterNetWorks Global Addressing programme
  - focus on continued ability for global addressing of the Internet
  - IPv4 free pool runout – policy development
  - collecting and disseminating credible, neutral information about IPv6, IPv6 deployment, transition technologies
  - fostering communications between impacted players
  - reaching beyond technical realm, to governments at global and local scale
  - education and development
- promoting the importance of the globally addressable Internet

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Working for education – where IPv6 is key

- Regional NOGs
  - ISOC contributes to fellowship programmes and other meeting costs
- Next Generation Internet Leaders Program
  - Cultivating a new generation of Internet leaders who will address the critical technology, policy, business, and education challenges that lie ahead
  - http://www.isoc.org/leaders/
- IETF Fellowships
  - Bringing technologists from the developing world to IETF
- Regional INETs
  - Working with regional Internet communities to increase expertise and capacity
  - http://www.isoc.org/isoc/conferences/inet/

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Working with Partners

- Community Grants Programme
  - Supported Irish IPv6 Summit 2009
    - http://www.ipv6.ie/summit2009/
  - Supported Taiwanese Chapter in a project to deploy dual-stack infrastructure to education campuses
  - Up to $10k available for eligible projects
- ISOC Australia chapter is very active
  - http://www.ipv6now.com.au/
  - http://www.ipv6.org.au/
- ISOC HK chapter is very active
  - Recognized: http://www.ogcio.gov.hk/eng/infra/eipv6_dev.htm
- Many other chapters also promoting IPv6 deployment in their own regions and countries

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Working on the global stage

- OECD
  - OECD Ministerial on Future of the Internet Economy, Seoul, June 2008
  - Coordinated Internet technical community for “Internet Technical Forum” day; establishing Internet Advisory Committee for OECD (2009)
- ITU
  - World Telecommunications Standardisation Assembly (WTSA) 2008
  - WTPF 2009
- European Commission
  - ICT for a Global Sustainable Future, January 2009
- WSIS and IGF

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ISOC's IPv6 Resources Page

- Link here:
  - http://www.isoc.org/ipv6
- Reports of activities we have conducted
- Pointers to ISOC IPv6 Resources
- Pointers to important IPv6 Resources from the various regional registries, ICANN and policy materials on related IPv6 matters

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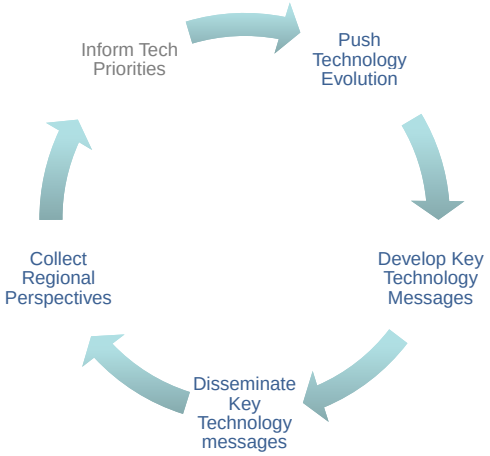
ISOC and Technologies



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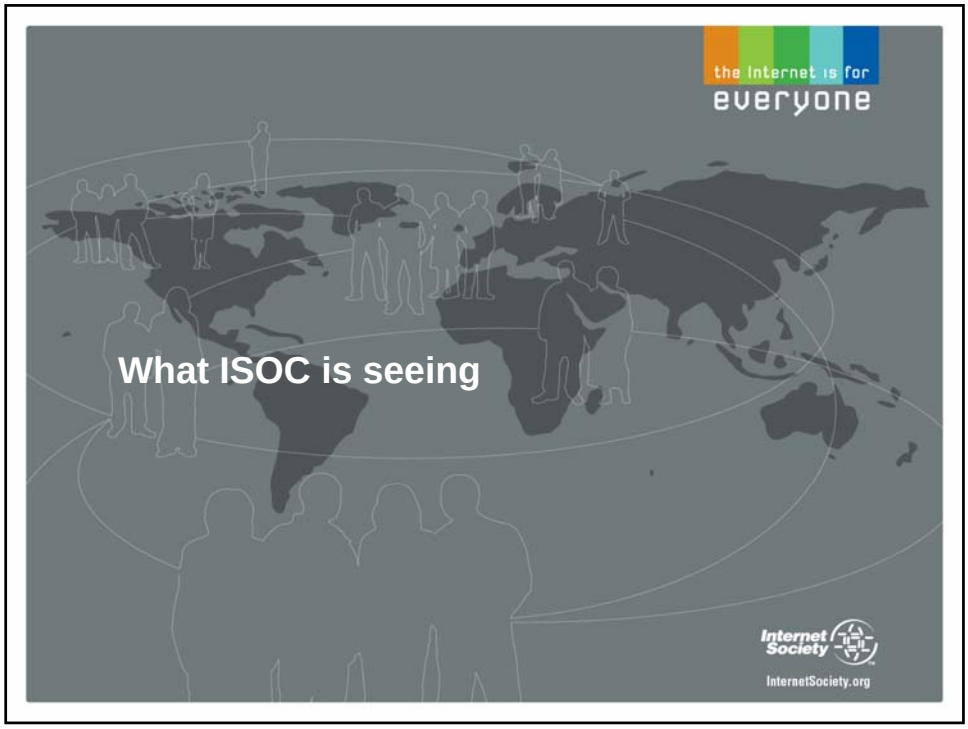

Headlines

- Netflix streaming content (announced at NANOG) 13 June 2009:
  - Netflix is a US-based DVD rental business that also offers movies streaming online
  - http://www.nanog.org/meetings/nanog46/presentations/Monday/DTemkin_lightning_N46.pdf
- Limelight (Netflix CDN):
  - http://finance.yahoo.com/news/Limelight-NetworksR-prnews-15523248.html?.v=1
- Verizon is mandating IPv6 support for next generation (LTE) cell phones
  - https://www22.verizon.com/opendev/Forum/LTE_Document_Archives.aspx

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Some perceived challenges

- Some platforms are still missing IPv6 features
  - Speak to vendors
  - Don't accept 'nobody else is asking for this' as an answer!
  - New equipment specifications increasingly, and appropriately, require IPv6
- Licensing terms may impose additional costs for IPv6 features
  - Although this is starting to diminish as a transition cost
- Education is critically important
  - IPv6 is not just IPv4 with larger addresses

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Success stories

- Google
  - http://www.networkworld.com/news/2009/032509-google-ipv6-easy.html
    - Building a pilot IPv6 network "was not expensive," said Colitti, who recommended rolling out IPv6 in stages. "There's nothing inherently unreliable about IPv6."
    - Google is already reaping the benefits of IPv6. "It's refreshingly simple" to look at a network with globally addressable devices, Colitti said.

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Realities for content providers and application developers

- ISPs are going to start connecting end-users via IPv6 and/or severely limit IPv4 connectivity through deployment of shared addressing solutions
- Application innovation will become more challenging and expensive for IPv4
- We will start to see applications that perform better and offer additional features in the presence of IPv6

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What's provoking progress?

- Continuity is an imperative for businesses
- Commercial business today is absolutely dependent on the working Internet
- The continuity of those businesses is challenged by some of the developmental hurdles for the Internet
  - Exhaustion of the availability of more IPv4 addresses
  - Transition to IPv6
- To maintain the continuity of business on the Internet, businesses that use it must embrace transition

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Recognition of an Important Crossroad

- The choice is not between today's Internet or an IPv6 one
  - There is no option to "stand still"
- The open, innovative, accessible Internet we've been nurturing for 20 years is changing
  - the longer it stays with IPv4, the more "coping mechanisms" will be introduced, breaking uniform global accessibility
  - the sooner we get more IPv6 deployed, the more open and innovative the Internet will remain: Global Addressing
- There is no turning back the clock.

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IPv6 Organisation Member Study

- ISOC has about 100 Organisation Members
- Great diversity in size, type of organisation, geographical location, and operational network types
- During Q3-08 we canvassed our members for information about actual deployment of IPv6 in their operational network
- The results are available here:
  - http://www.isoc.org/ipv6/2009-IPv6-OrgMember-Report.pdf

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Key Highlights from the Survey

- When asked whether an organization would be willing to return any of its IPv4 allocation, almost everyone said “no”
- Response to questions about specific business drivers were pretty vague, but two high runners were 1) needed for IPv6 product development and 2) customer demand
- Specific advice for others interested in deploying IPv6 highlighted the need to start now and the lack of skills and experience in working with IPv6

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IPv6 Operator Roundtables

- Invitation-based events for operators
- Discuss operational and technical issues facing operators who are in the process of deploying IPv6 for commercial service offerings
- Identify common issues that require attention from vendors, operators, or Internet Standards or regional operator communities
- Build confidence in IPv6 deployment
- Events so far:
  - Operator Roundtable, Fall 2008
    - http://www.ietf.org/id/draft-ford-shared-addressing-issues-01.txt
  - Operator/Content Provider Summit, Spring 2009
    - IP Address Affinity: http://www.isoc.org/educpillar/resources/docs/ipv6_200905.pdf
  - Operator/Content Provider Summit, Fall 2009

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IPv6 Panel at IETF 74

- ISOC brought together a distinguished panel of experts to discuss IPv6 as the central technology for the ongoing growth of the Internet
- History and description of the event is here:
  - http://www.isoc.org/isoc/conferences/ipv6panel/
  - Includes an audio transcript and copies of the presenters' slides
- Outcomes
  - Panelists described their current realities and activities in IPv6 deployment
  - Consistent message is that the question is no longer one of "if" but "how"
  - Emphasis on lessons learned and suggestions

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Documents, feedback

- IP Address Affinity
  - http://www.isoc.org/educpillar/resources/docs/ipv6_200905.pdfAddress sharing
- Issues with Address Sharing
  - http://www.ietf.org/id/draft-ford-shared-addressing-issues-01.txt
- Issues
  - Will impact subscribers
    - NAT and ALGs in the core => subscribers apply to their network provider to get incoming ports opened as necessary
    - Operators won't necessarily support this
  - Potential impact for law enforcement
  - Users get crippled Internet functionality (near term) and/or architecture fundamentally imperiled

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Conclusions

- The future of the global Internet is IPv6
- The future is here!
  - There is no option to “stand still”
- Business continuity is the driver
- The Internet Society is very active in helping to move the transition along.

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Thanks for your attention!
Any questions?
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