



IPv6 Way Forward for Canada

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On behalf of the isacc IPv6 Task Group

Why so much emphasis on IPv6?

Just to continue providing new services and grow revenues

The growth in Broadband subscriptions has helped fuel the expansion of the internet and also been one source of its growing pains. This growth in the number of networks – and devices attached to those networks – has led to a shortage of unique addresses used to identify individual devices connected to the internet. As a result here is a need for all network operators to upgrade to a new internet addressing scheme, internet protocol version 6 (IPv6). Based on allocation trends, experts estimate that the addresses in the current scheme (IPv4) will run out late 2011 or early 2012

quoted from OECD 2009 Telecommunications Outlook p 147

Don't strangle the telecommunications goose

Telecommunications is a \$ 1.3 trillion market in the OECD

Telecommunications represent 3% of the OECD GDP

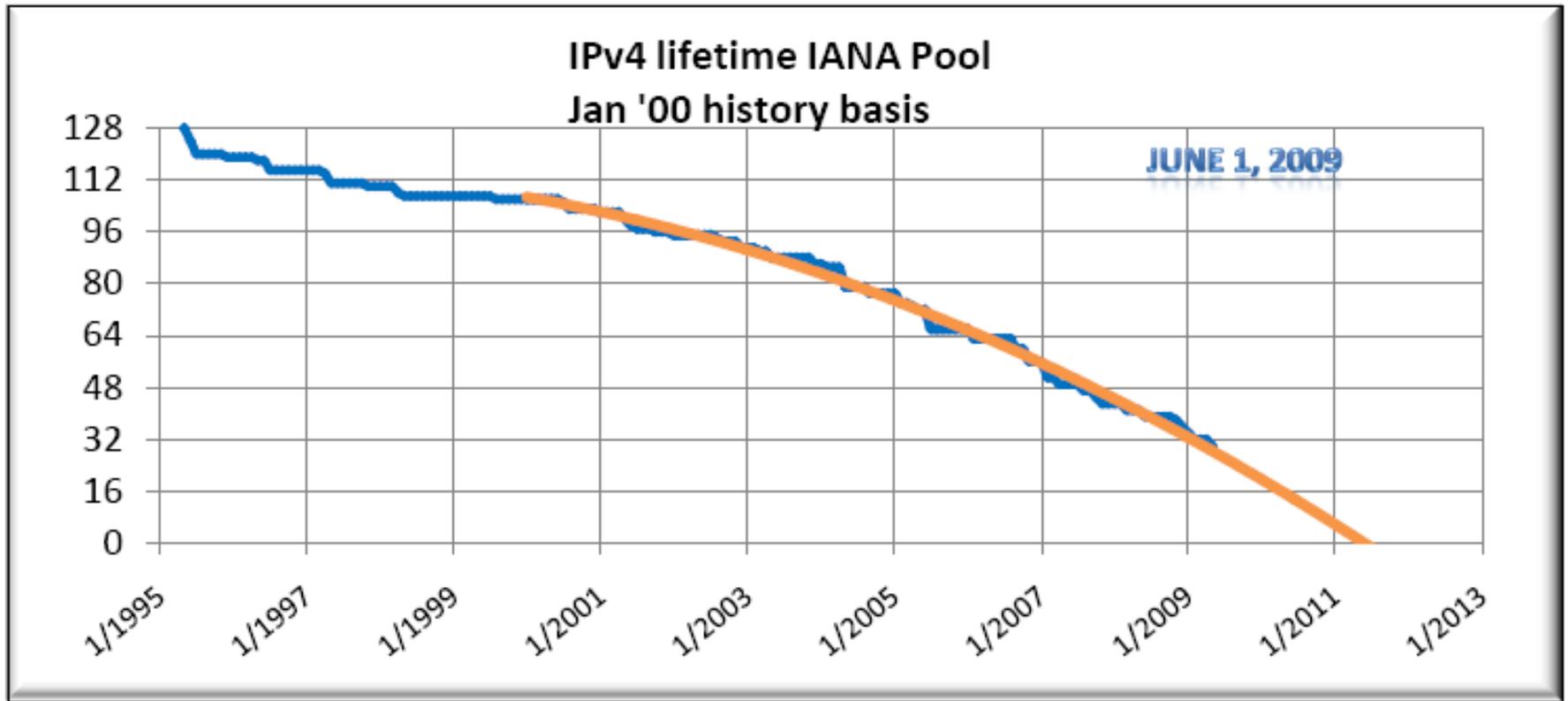
Globally, share of data revenues continues to increase

NTT: 25.7% mobile voice, 26.5% fixed voice, 24% data



source: OECD 2009 Telecom Outlook

That bad ? Are we really running out of IP addresses?



Couldn't we just do with the IPv4 addresses we currently have?

In order to reach 20% of the world population of 6.6 billion with one address per person, 808 IPv4 /8's would be needed. IPv4 only has 256 « slash 8's » and as of early November 2009 only 26 slash 8's are left for distribution.

Emerging economies are on a roll. End of June 2008 China passed the USA as number one with 253 million internet subscribers comprising 214 million broadband accesses! 56.2% growth from 162 million subs a year before!

The mobile phone market by itself has already outgrown the IP address space

The IPv4 address space clearly cannot sustain this growth

What is likely to happen if we just do nothing?

The internet will continue but its growth will be stunted and it will fragment and could ultimately wither. Organizations who wish to follow this scenario should:

- Forget the revenues associated with new services and hyperconnectivity
- Forget IP converged networks and a truly mobile internet
- Forget IP address based billing
- Forget global competitiveness
- Forget survival in the telecom ecosystem

Probability of this scenario?

The push for revenue generation and growth will just be too strong. The Darwinian process in which stragglers fade away could impact the telecom ecosystem and even the GDP growth of some countries.

Governments are aware of it, hence the calls for action

Economies that wish to stay relevant evolve to IPv6

IPv6 solves much more than the address shortage

Solves address shortage

Restores p2p communication

Mobility

- Much easier roaming
- Better spectrum utilization
- Better battery life!

Security

- IPsec mandatory
- Cryptographically generated addresses

Multicast

Better QoS (flow labels)

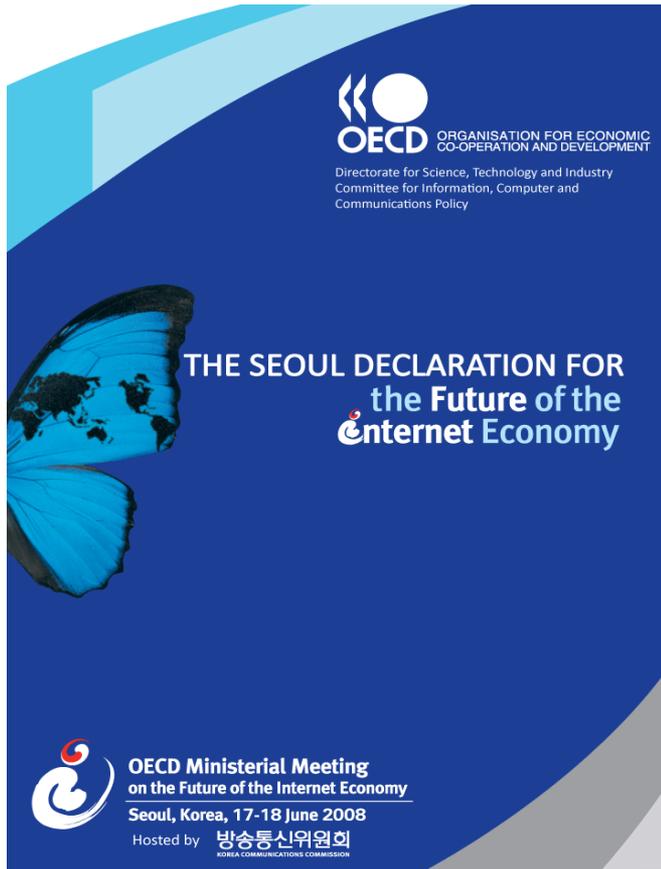
Auto configuration

- Mobile Ad-Hoc networking
- Mobile networks
- Sensor networks
- Plug and Play networks

Permanent addresses

- Identity (CLID)
- Traceability (RFID)
- Addressability!
- IP address based billing

International Organizations and Governments endorse the IPv6 push



WE DECLARE that, to contribute to the development of the Internet Economy, we will:

a) Facilitate the convergence of digital networks, devices, applications and services, through policies that:

.....

Encourage the adoption of the new version of the Internet protocol (IPv6), in particular through its timely adoption by governments as well as large private sector users of IPv4 addresses, in view of the ongoing IPv4 depletion.

The European Union urges member Countries to act and deploy IPv6



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 27/05/2008
COM(2008) 313 final

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**ADVANCING THE INTERNET
Action Plan for the deployment of Internet Protocol version 6 (IPv6) in Europe**

National Policies: ICT and GDP growth

National and regional policies:

- China's CNGI
- Korea's u-IT839
- Malaysia's MyICMS
- Japan's U-Japan
- Singapore's Next Gen NII and IN2015
- India's 10 point Agenda
- USA's DoC (Department of Commerce) and DoD guidelines
- European Union i2010

Common objectives:

- Ubiquitous, affordable high speed communication over converging networks
- Facilitate substantial growth of IT share of GDP and job creation
- Position the country for competitiveness in a Global Economy.

Canada and IPv6 : ISACC IPv6 Task Group Terms of reference

At ISACC's 40th Plenary, Ms. Helen McDonald (ISACC Vice-Chair and Assistant Deputy Minister, Spectrum, Information Technologies and Telecommunications at Industry Canada) invited the ISACC membership to create a Task Group on IPv6 Deployment in Canada. As discussed at the Plenary, Canada has not taken a leadership role globally in the adoption of IPv6 so far and there is no agreed Canadian view on when and how to migrate from IPv4 to IPv6. There is concern whether this approach will put Canada at a disadvantage in light of initiatives already undertaken in the United States.

The Plenary created the IPv6 Task Force during this meeting

Canada and IPv6 : ISACC IPv6 Task Group Tasks

Tasks

To explore the options available in Canada regarding IPv6 deployment.

For each of the options identified:

- benefits and challenges shall be analyzed**
- actions to be taken by the public and private sector shall be explored**
- policy directions to Industry Canada shall be made**

The seven recommendations of the ISACC IPv6 Task Group

- 1. Government : specify IPv6 support in your IT procurements immediately**
- 2. CRTC : ensure that the relevant Telecommunications decisions and policies support IPv6 deployment.**
- 3. ISP's : accelerate deployment and commercial availability of IPv6**
- 4. Industry : intensify IPv6 support on all products, at least on par with IPv4**
- 5. Content providers : make your content and application IPv6 accessible**
- 6. Set up Center of Excellence to increase awareness, train, educate, advise, share best practises**
- 7. Use Government programs to promote and support IPv6 transition.**

Government as stakeholder

- Major project and Request for Proposals planned in the near future to upgrade and consolidate the multiple Government departmental networks into a smaller more manageable number.
- Future purchases should be IPv6 capable or have a committed roadmap to support IPv6 by a software only upgrade – reducing risk of major upgrades to support future IPv6 requirements
- Plan for a phased IPv6 deployment
- Good policy to show responsible management of tax payers dollars.
- Government IT procurement policies constitute a major catalyst for the national telecom industry.
- Government IT should be able to satisfy state of the art communications needs internally and with its citizens and partners in a Global Economy.

CRTC as stakeholder

The CRTC should consider the role IPv6 can play in realizing the objectives of the Telecom Act, which are:

- (a) to facilitate the orderly development throughout Canada of a telecommunications system that serves to safeguard, enrich and strengthen the social and economic fabric of Canada and its regions;
- (b) to render reliable and affordable telecommunications services of high quality accessible to Canadians in both urban and rural areas in all regions of Canada;
- (c) to enhance the efficiency and competitiveness, at the national and international levels, of Canadian telecommunications;
- (d) to promote the ownership and control of Canadian carriers by Canadians;
- (e) to promote the use of Canadian transmission facilities for telecommunications within Canada and between Canada and points outside Canada;
- (f) to foster increased reliance on market forces for the provision of telecommunications services and to ensure that regulation, where required, is efficient and effective;
- (g) to stimulate research and development in Canada in the field of telecommunications and to encourage innovation in the provision of telecommunications services;
- (h) to respond to the economic and social requirements of users of telecommunications services; and
- (i) to contribute to the protection of the privacy of persons.

ISP's as stakeholder

- **Canadian Internet Service Providers (ISPs) acknowledge that adoption of IPv6 is imminent**
- **They recognize the need to prepare their communication infrastructures and systems for supporting commercial IPv6 access and network services.**
- **The associated IPv6 support timelines should align with anticipated customer demands, foreseen IPv4 public and private address exhaustion and industry standard specifications.**
- **ISPs should drive the support of IPv6 peering in existing and future Canadian Internet Exchange Points to ensure interoperability.**

Industry as stakeholder

- Major router equipment suppliers have been readying for IPv6 for a number of years, ditto for suppliers of major software operating systems and applications.
- The delaying factor so far has been the lack of customer demand from the Corporate and Government as well as residential sectors.
- The chicken and egg conundrum is being broken by Government led initiatives in a number countries.
- The growing number of Government tenders mandating IPV6 support is putting pressure on the industry to enhance their IPv6 support.
- Industry anticipates a rise in demand as the address depletion becomes more acute and an urgency to upgrade fast increases.

Content Providers as stakeholders

- In an acute address depletion scenario, the content providers are the first affected as accessibility to their services implies routable IP addresses.
- The very existence and growth of business entities such as Google are predicated on a non fragmented internet, hence their interest.
- Revenue opportunities associated with new offerings such as location based services and mobile social networking

Recommended short term actions

Federal Government IT Procurement Policies:

We assume Treasury will have the foresight to include their requirements for support of IPv6 in the specifications and RFQ for GENS and other future Government IT infrastructure projects.

Industry and Government to set up a Canadian IPv6 Centre of Excellence

Extend the ISACC IPv6 Task Group for a further 6 months



Survival in the Global Rat Race:

To be a good follower is often a viable strategy but to be outdistanced never will be

The Task Group members were honoured to participate in this effort, would like to see implementation of their recommended immediate action plan and are ready to serve for another six months.

supporting slide 1: Government programs to support IPv6

- **The migration to IPv6 technologies broadly impacts a variety of key Canadian policy imperatives including infrastructure, environmental sustainability, improving the knowledge economy and public safety.**
- **Communications materials should be developed to encourage businesses to leverage the wide array of existing government benefit programs (SRED, EnergyStar discounts, etc.) to support their migration efforts.**
- **Clear policy statements as to eligibility of IPv6 in these programs should be made to reduce up-front-risk to project managers and CFOs planning IPv6 related work.**

Supporting slide 2: IPv6 Centre of Excellence

- Industry lead ‘virtual’ Canadian CoE for IPv6
 - to increase awareness and provide training
 - create a community of subject matter experts (SME),
 - share best practices about adoption of IPv6,
 - facilitate discussion and collaborate with other agencies in US and elsewhere for education and training purposes,
 - create working group recommend mechanisms to encourage the deployment of IPv6 by Government and Industry
 - facilitate the set up of an IPv6 conformity and interoperability lab for HW and SW open to Government and Industry.
 - Concentrate on system/solution instead of just « RFC » conformance

Supporting slide 3: isacc IPv6 Task Group participants

IITG Meeting Attendance	
Attendee	Affiliation
Anurag Jain	Polynate
Bill Munson	ITAC
Brian Hanson	Cisco Systems
Brian Smith	Bell Canada
Chris MacFarlane	Cogeco Cable
Colman Ho	Industry Canada
Cory Wishak	CRTC
David Gibson	Industry Canada
Douglas Kwong	Bell Canada
Ed Juskevicius	Industry Canada
Eric Beauchesne	Microsoft Canada
Eric Bernier	CANARIE
Eric Tsang	Communications Research Centre Canada
Erone Quek	Bell Canada
Faud A. Khan	Alcatel-Lucent ALU Ventures – Bell Labs
Francois Menard	Xittel Communications
George Hart	Rogers
George Babut	Rogers
Gerry Thompson	Rogers
Jacqueline Jones	Industry Canada
J.C.P. (Phil) Jourdeuil	Defence Research & Development Canada
Jean-François Tremblay	Vidéotron

Jean-Yves Bernard	Rogers
Jim MacFie	Microsoft Canada
Joe Zearth	
John Hopkinson	ISSEA
John Visser	
John Weigelt	Microsoft Canada
Jonathan Sau	RIM
Ken Nguyen	Treasury Board of Canada Secretariat
Lewis Robart	Communications Research Centre Canada
Ling Liang	RIM
Marc Blanchet	Viagenie
Marc Lemoine	Defence Research & Development Canada
Marcelo Ferme	Industry Canada
Mario Boisvert	Public Works and Government Services Canada
Michael Richardson	Sandelman Software Works
Mikael Lind	gogo6
Mukesh Gupta	Tata Consultancy Services
Percy Lee	TELUS
Richard Thomas	
Stephen Orr	Cisco Systems
Tara Hennessy	Industry Canada
Thomas Tam	CANARIE
Vino Vinodrai	RIM
Yves Poppe	Tata Communications