



A Large Service Provider's View on IPv4 Address Completion and Internet Governance

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Comcast



- As the largest cable operator in the United States, Comcast manages a large pool of IPv4 resources and is an active and responsible member of the Internet community.
 - We have been working within community-defined policies, maintaining effective utilization of resources.
- Comcast fully supports the community based, bottom-up, governance model of policy development to oversee those resources.
 - The Internet's private-sector, self-regulatory governance model is a significant factor in the success of the whole Internet industry.
 - This model has proven responsive enough to meet the demands of a fast growing global industry.

IANA IPv4 completion is in front of us

- As of 5/28/2008, there remains 39 /8s blocks available at IANA.
 - Note: one /8 block is 16 million IPv4 addresses
- Global demand has increased the burn rate year after year
 - 13 /8s were allocated in 2007
- What will happen “near” and “after” the last /8s are allocated is a topic of many discussions, and of significant interest to Comcast.



When will this happen?

- Current forecasts place the IANA IPv4 completion day around 2010/2011. This date can vary greatly depending upon several factors:

Accelerate completion	Push back completion
Last minute surge in global demand	Reclamation efforts at IANA & RIRs level (e.g. net
Massive deployment of new technologies (e.g. always on wireless)	RIRs policy changes to further conserve IPv4 addresses

What are the impacts?



- IPv4 will not stop working!
- Completion of IPv4 resources will not be uniform:
 - Some RIRs may last longer than others.
 - Large contiguous allocation requests might be denied by an RIR when fractioned space is still available.
 - Small IPv4 allocation requests might be granted by an RIR long after completion of the IANA free pool.

Comcast participates in the Internet community discussions on IPv4 completion



- Comcast is involved with the policy development process within the RIRs, considering a number of ways forward:
- **Incentivized Transfers**
 - “Transfer” policies between RIR members in an effort to more efficiently redistribute allocated-but-unused addresses
 - The implications of such policies are of particular interest to Comcast.
 - Costs, availability, aggregation, and fairness are all risks being considered.
- **The End Game**
 - Global policies to distribute the last /8s from IANA
 - Regional policies to decide how to use the last /8 within an RIR
 - It is important these last resources promote continued growth of the entire Internet.
- **New Entrants**
 - Ensure entry to the Internet economy post IANA IPv4 completion
 - Eg: LACNIC /12, ARIN reserved IPv4 block for IPv6, ...

Continuity & changes



- The IPv4 IANA address pool completion will inevitably bring change to an industry where continued growth depends upon an increasing supply of IP addresses.
 - An IPv4 shortage disproportionately harms those who need many v4 addresses relative to those who need few.
- Without the benefit of bottom-up public consideration, ill-considered last-minute changes in IP governance would throw a highly evolved system into imbalance.
 - Imbalance would also occur if there were drastic differences between the allocation (or transfer) policies of the Regional Internet Registries (RIRs).

Transition to IPv6



- IPv4 resources alone will not provide a viable supply for the long term.
- Carefully planning transition to integrate IPv4 & IPv6 is the best way for the industry to sustain growth.
 - Comcast Example:
 - Realized the need to adopt IPv6 in 2005
 - Working with standards organizations, the RIR's, equipment vendors, and application developers to integrate IPv6.
- This transition should be driven by business justifications and not regulatory mandates.



Continuity

of the Internet's public governance model is the best way to handle the changes facing the Industry.