Is the transition to IPv6 a market failure?

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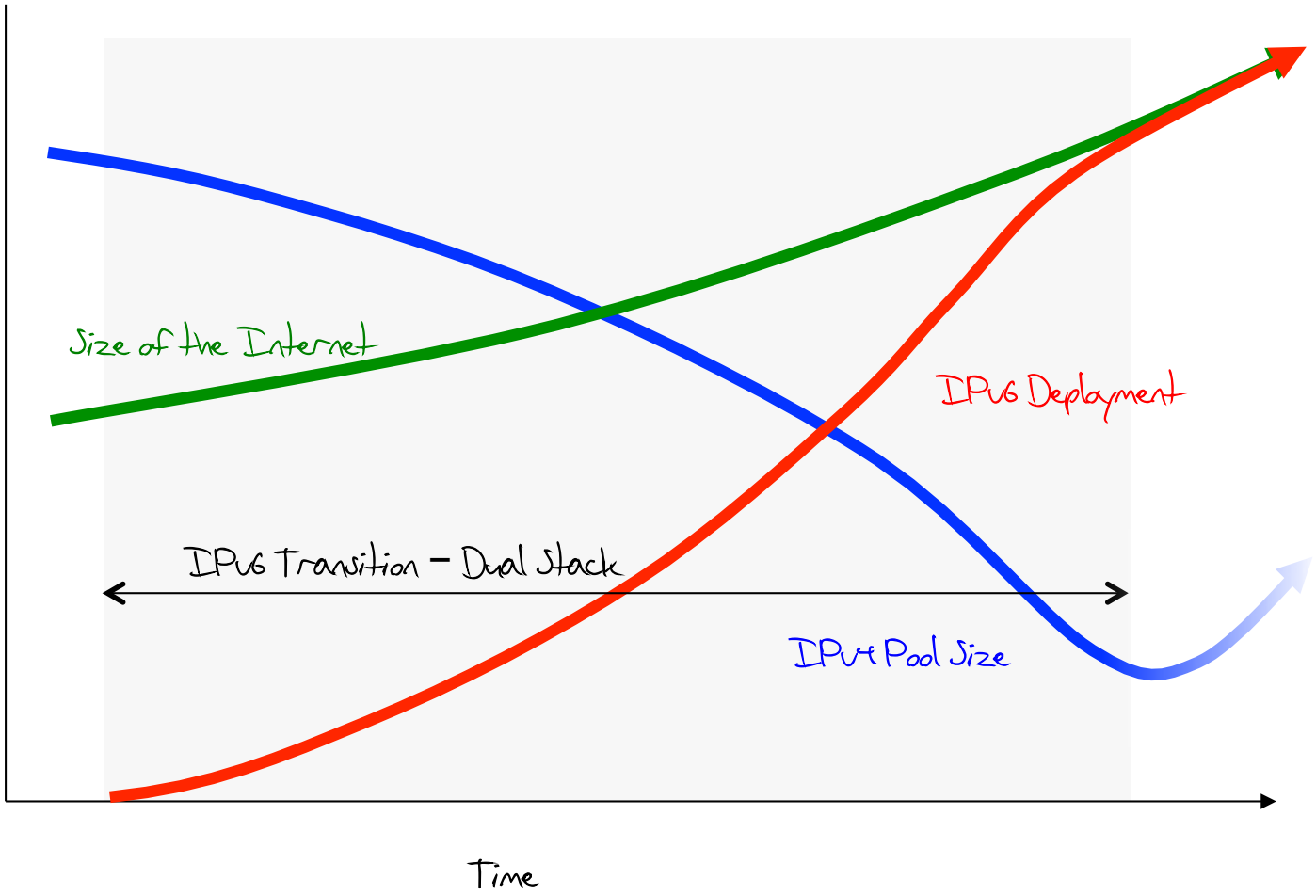
The Fine Print: I am not a economist in terms of my professional qualifications or by virtue of my work experience. Worse still, I think I fit in to the category of amateur economic dilettante! So most of what I offer here I do so tentatively, as it probably needs a little more rigor and precision in basic economic terms than I am able to provide! Geoff

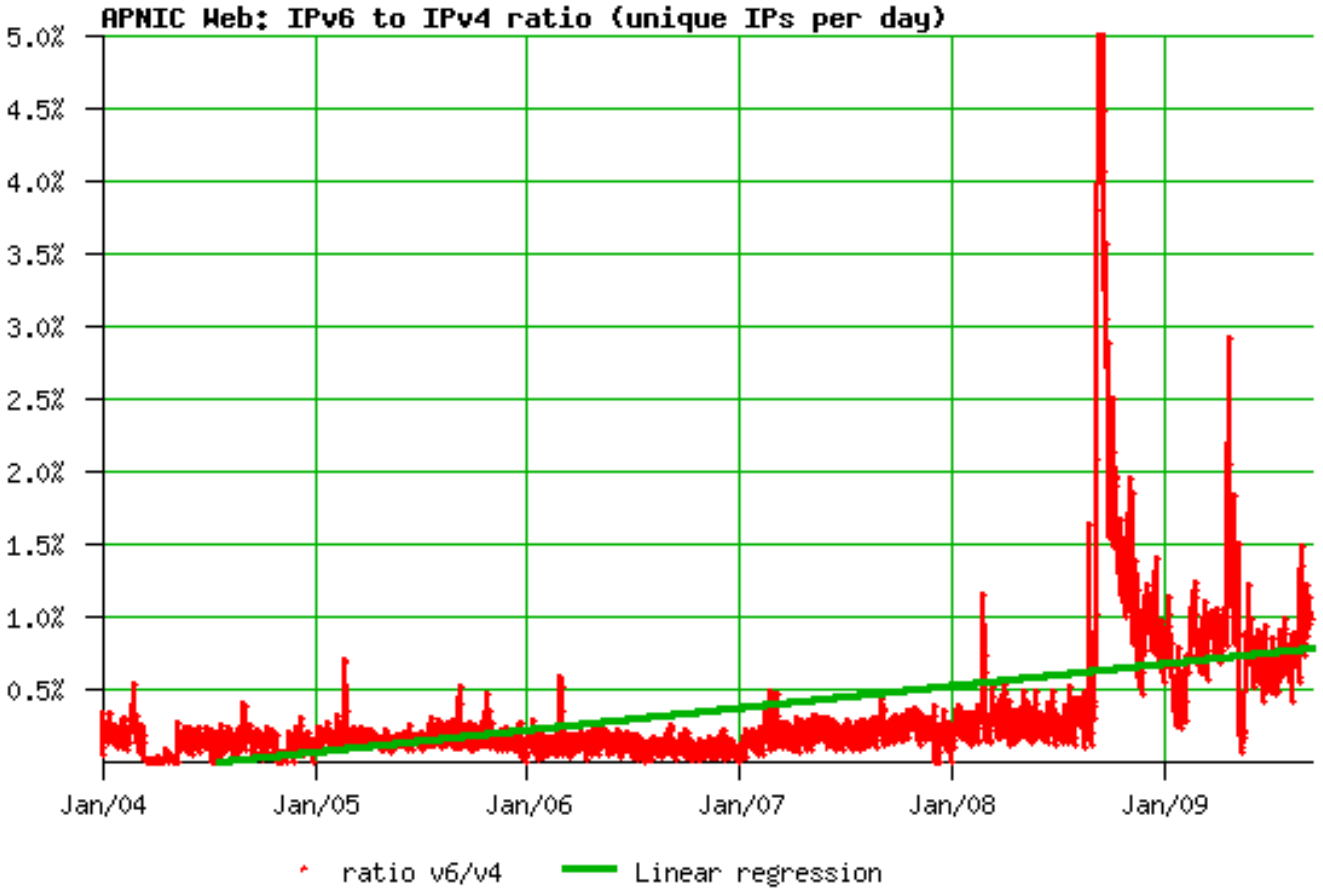
“The minister for communications and information technology does not believe that regulatory intervention is appropriate. Adoption of IPv6 needs to be lead by the private sector. The private sector must recognise that adopting IPv6 is in their own best interests to protect their investment in online capabilities into the future. Issues of advantages and disadvantages, costs, risks, timing, methodology etc, have to be for each enterprise to assess for itself.”

Statement by the New Zealand Minister for Communications
24 August 2009

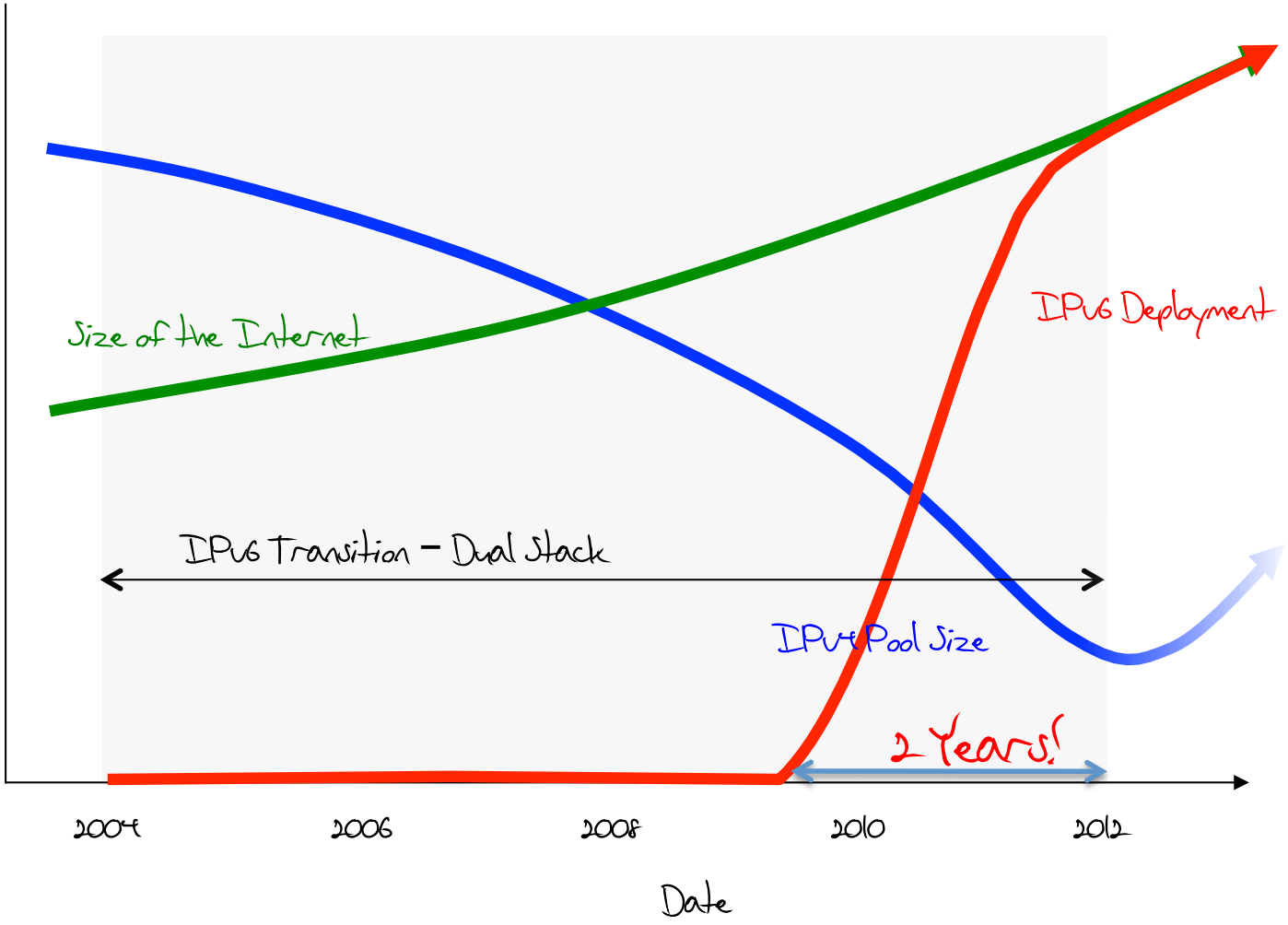
Theoretical IPv6 Deployment



Measured IPv6 Deployment



Theoretical IPv6 Deployment V2.0



Is this feasible?

- Deploy IPv6 across 1.7 billion users, with around a billion end hosts, hundreds of millions of routers, firewalls and middleware units, billions of lines of configuration codes and filters, and across hundreds of millions of ancillary support systems within the next 700 days

Is this feasible?

- What about if we remove the time constraint?
- Does coping with a depleted IPv4 address pool make this transition harder or more “natural” for industry players?
- Is regulatory intervention going to be required in any case?

How did deployment occur with IPv4?

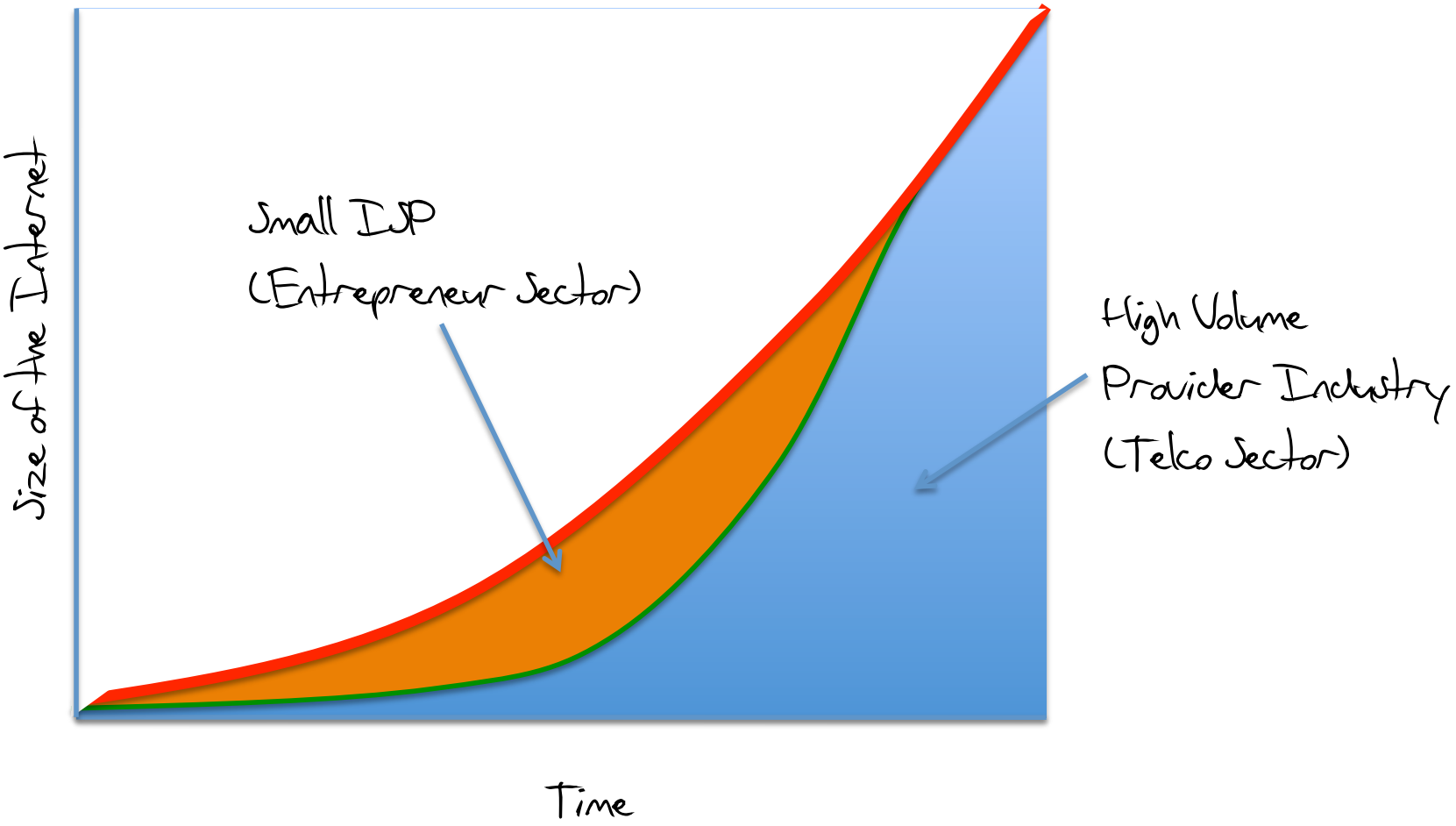
Technology: packet switching vs circuit switching

- lower network costs though pushing of functionality and cost to end systems exposed a new demand schedule for communications services

Business: exposed new market opportunity in a market that was actively shedding many regulatory constraints

- exposed new market opportunities
  - buy a circuit, resell it as packets
- presence of agile high-risk entrepreneur capital willing to exploit short term market opportunities
- volume-based suppliers initially unable to redeploy capital and process to meet new demand
  - unable to cannibalize existing markets
  - unwilling to make high risk investments

IPv4 deployment



What about IPv6 Transition?

- Will the same technology and regulatory factors that drove the deployment of the Ipv4 Internet also drive this industry through the transition from IPv4 to Ipv6?

IPv6 vs IPv4

Are there *competitive differentiators*?

✗ cost = cost

✗ functionality = functionality

✓ size (4) << size (6)

no inherent consumer-visible difference

no visible consumer demand

no visible competitive differentiators other than *future risk*

The Transition to IPv6

Nothing has happened for 10 years when this could've been achieved without undue pain and on a far smaller network base

So given that we've left it so late in terms of the scale of the transition and the degree of difficultly with IPv4 exhaustion, will it happen at all?

The Transition to IPv6

Is this transition an instance of a *market failure*?

Individual self-interest leads to inefficient supply outcomes, as self-interest does not lead the installed based of consumers and suppliers to underwrite the cost of dual stack operation

IPv6 Transition as a Public Good?

Is the transition to IPv6 is *non-excludable* and *non-rivalrous?*

In which case this transition issue parallels that of a *public good*

with an implication that conventional market dynamics in a deregulated environment will not lead to this transition being undertaken

and a corollary that if this transition is considered to be necessary or essential then some form of public good solution needs to be considered

Public Good “solutions”

- Assurance contracts
- Coasian solutions
- Government enterprise provisioning
- Tariffs
- Subsidies
- Taxation remedies
- Regulatory impost