¡Hola!

or should that be...

Kaixo!

How many talks have you heard about IPv6?

30?

100?

1,000?

Have you had enough?

I have!

This is not a talk about

IPv6.

This is a talk about our industry

and what is happening to the Internet we used to know

and what is happening to the ISP industry!

Where have all the ISPs Gone?

Geoff Huston

APNIC

The Internet has often been portrayed as the "poster child" for deregulation in the telecommunications sector in the 1990's.

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The rapid proliferation of new services, the creation of new markets, and the intense level of competition in every aspect of the Internet is seen as a successful outcome of this policy of deliberate disengagement by the regulator.

But is this still true today?

Do we still see intense competition in this industry? Is there still strong impetus for innovation and entrepreneurial enterprise?

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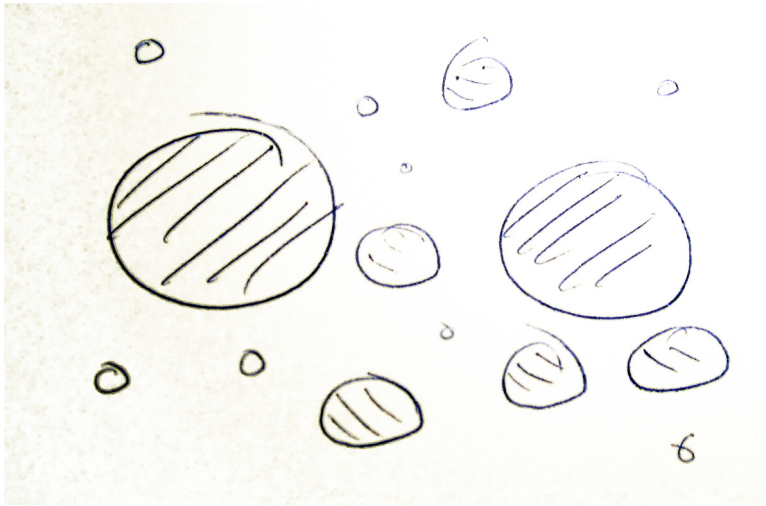
Or is this industry lapsing back into a mode of local monopolies, vertical bundling and strong resistance to further change and innovation?

How “Balanced” is this industry?



A diverse connection of large and small ISP enterprises

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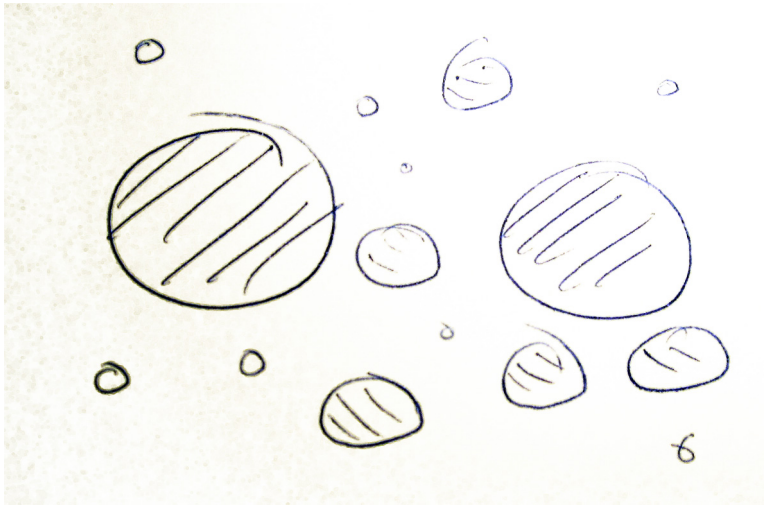

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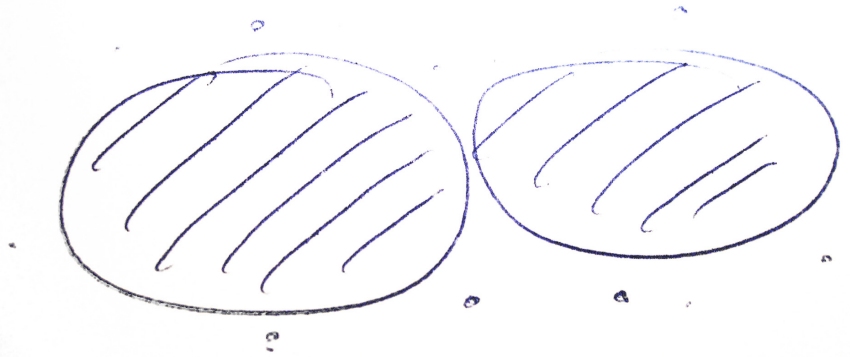
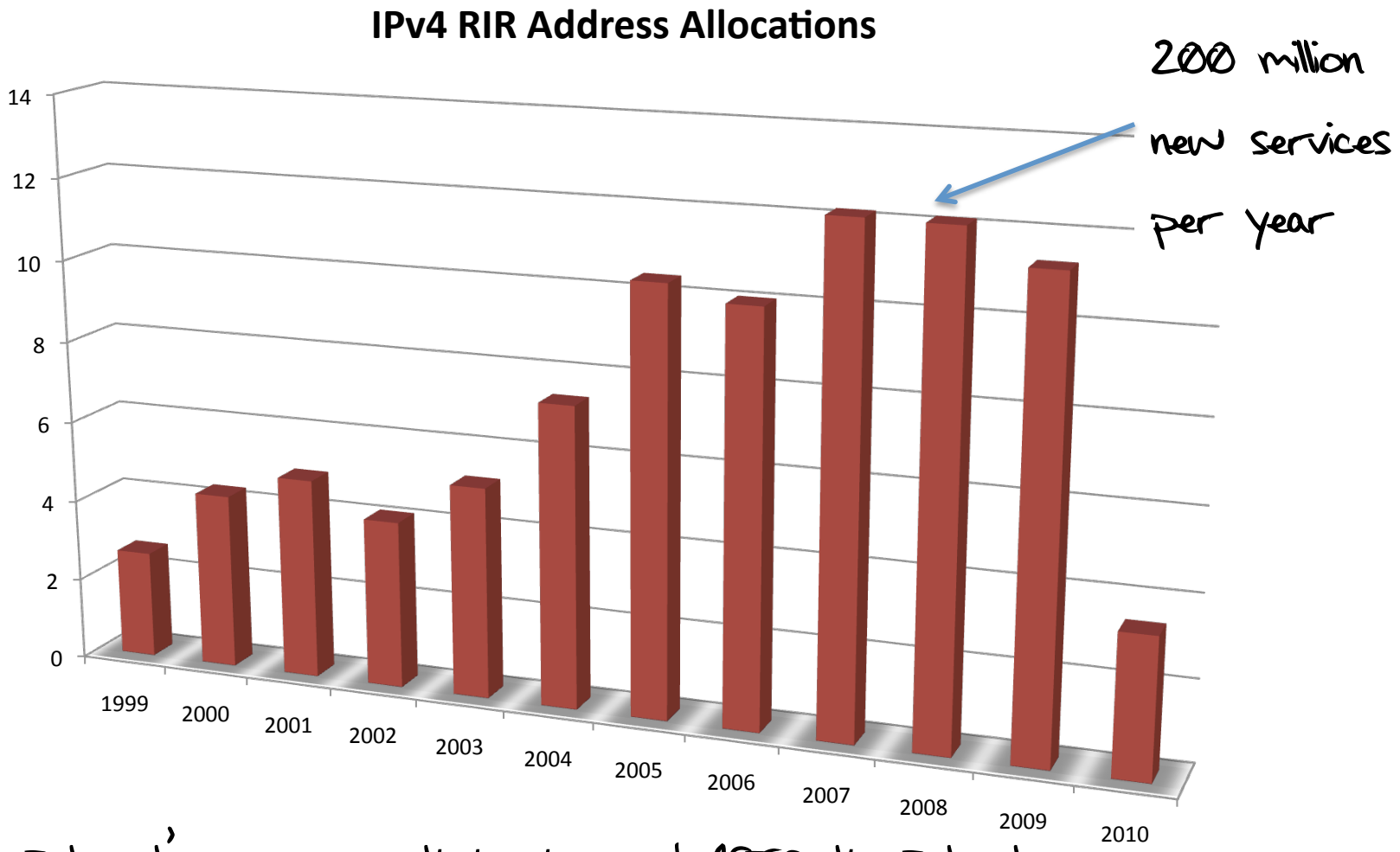


A small number of very large enterprises and some very small independent players left hanging on for the ride

What can IPv4 address allocations tell us about this industry?

How "Big" is this Industry?



The Internet's major growth has happened AFTER the Intenet "boom" of 1999 to 2001

Who got all those addresses in 2009?

Rank		Company	IPv4 addresses (M)
1	CN	China Mobile Communications Corporation	8.39
2	US	AT&T Internet Services	6.82
3	CN	China TieTong Telecommunications Corporation	4.19
4	CN	Chinanet Guandong Province Network	4.19
5	KR	Korea Telecom	4.19
6	CN	North Star Information Hi.tech Ltd. Co.	4.19
7	JP	NTT Communications Corporation	4.19
8	US	Verizon Internet Services Inc.	3.78
9	US	Sprint Wireless	3.54
10	CN	China Unicom Shandong Province Network	2.10
11	CN	Chinanet Jiangsu Province Network	2.10
12	CN	Chinanet Zhejiang Province Network	2.10
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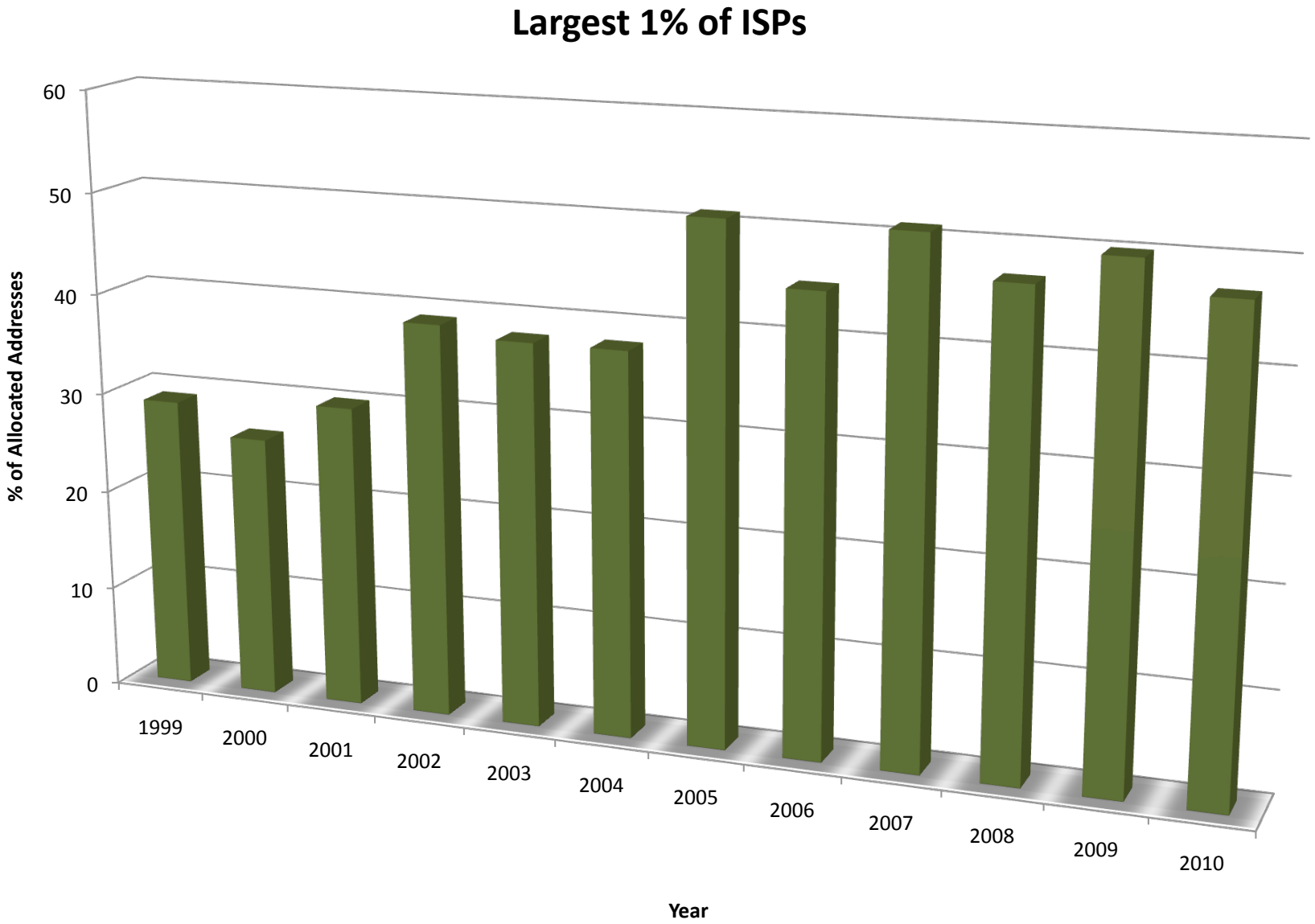
25% of all the IPv4 addresses allocated in 2009 went to just 15 ISP enterprises

How “Balanced” is this Industry?



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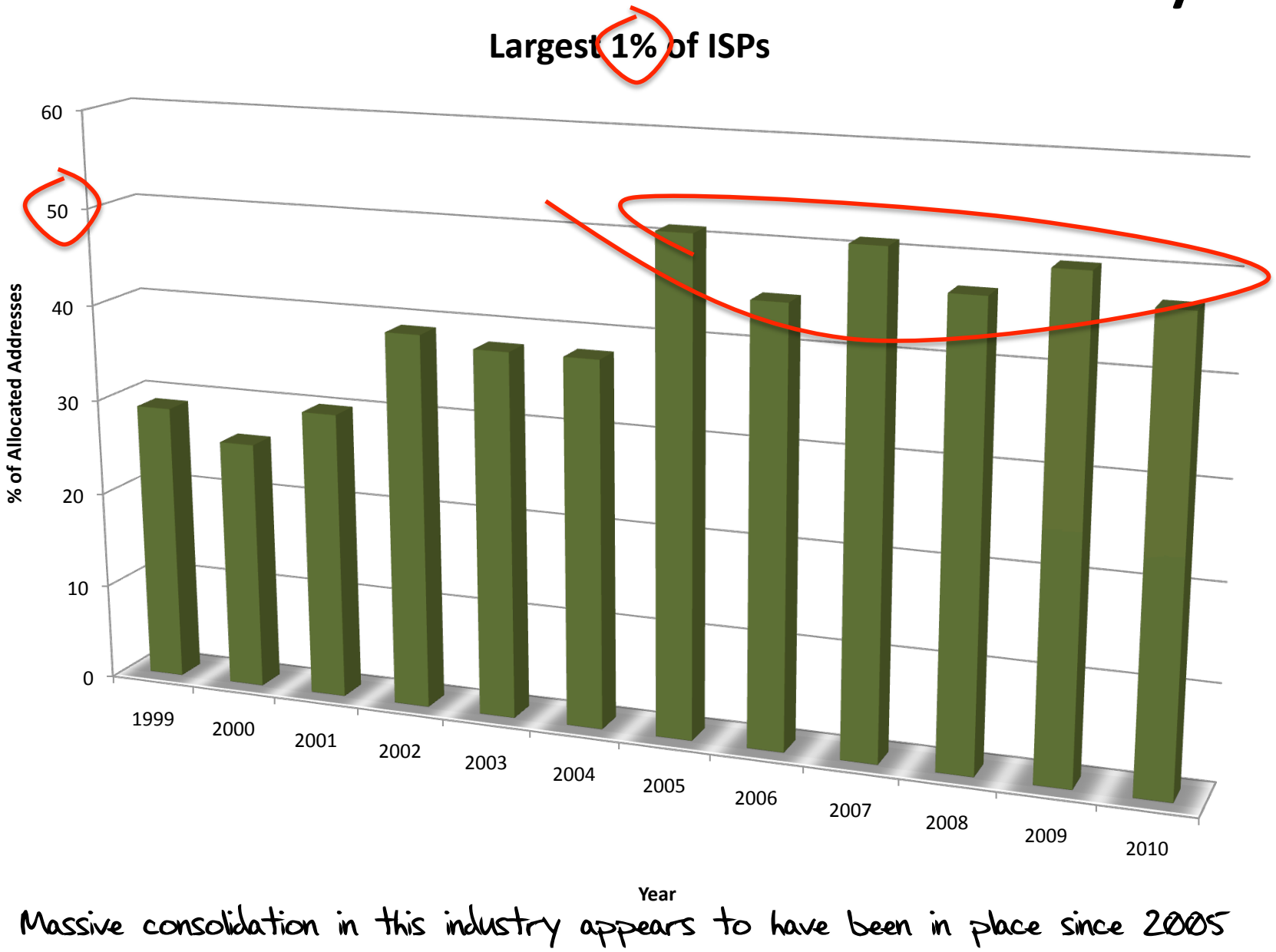
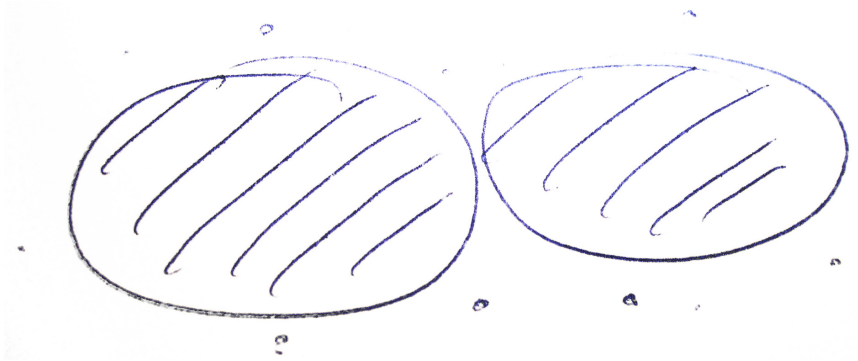


Massive consolidation in this industry appears to have been in place since 2005

How “Balanced” is this industry?



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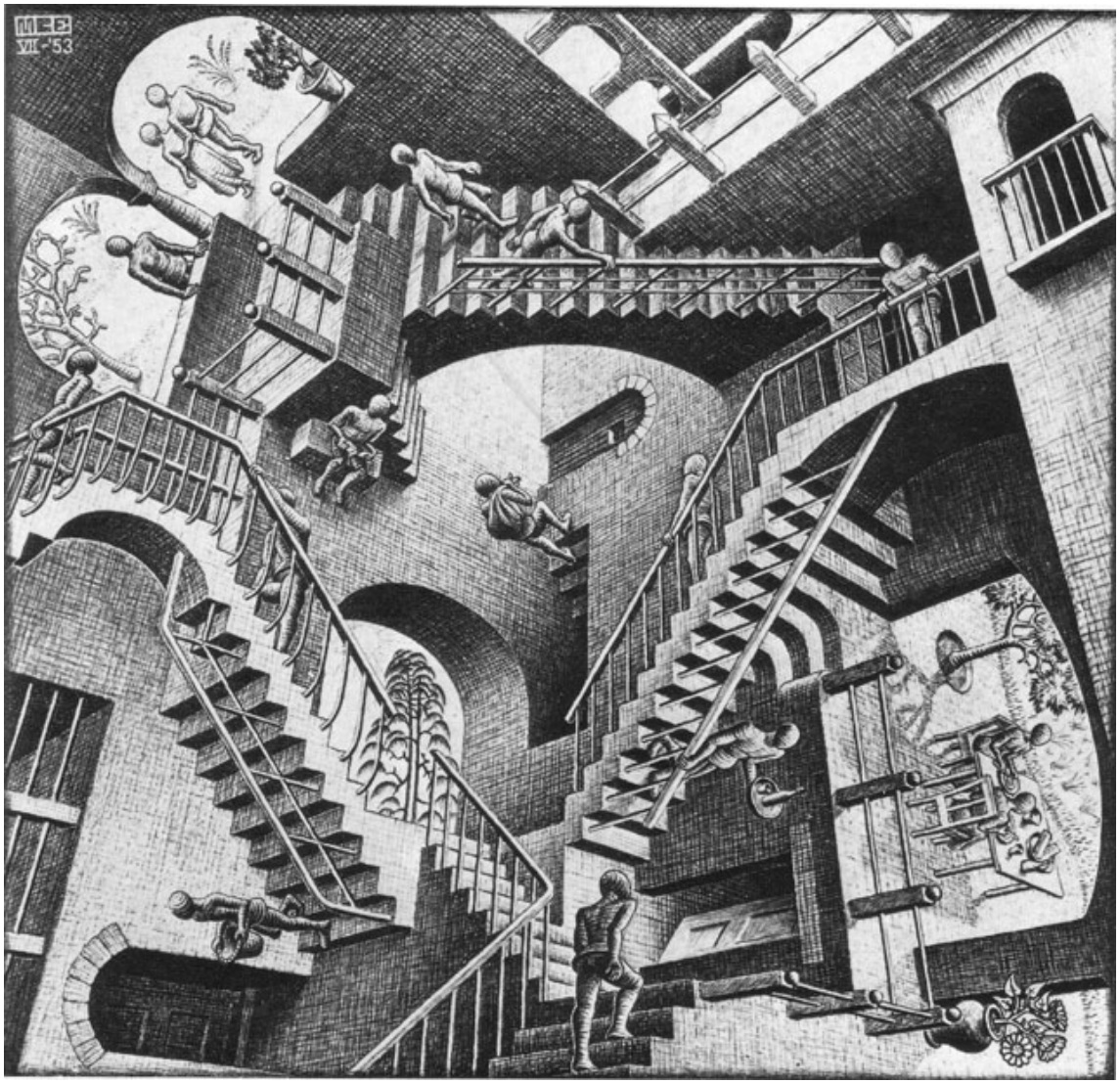
How did we get here?



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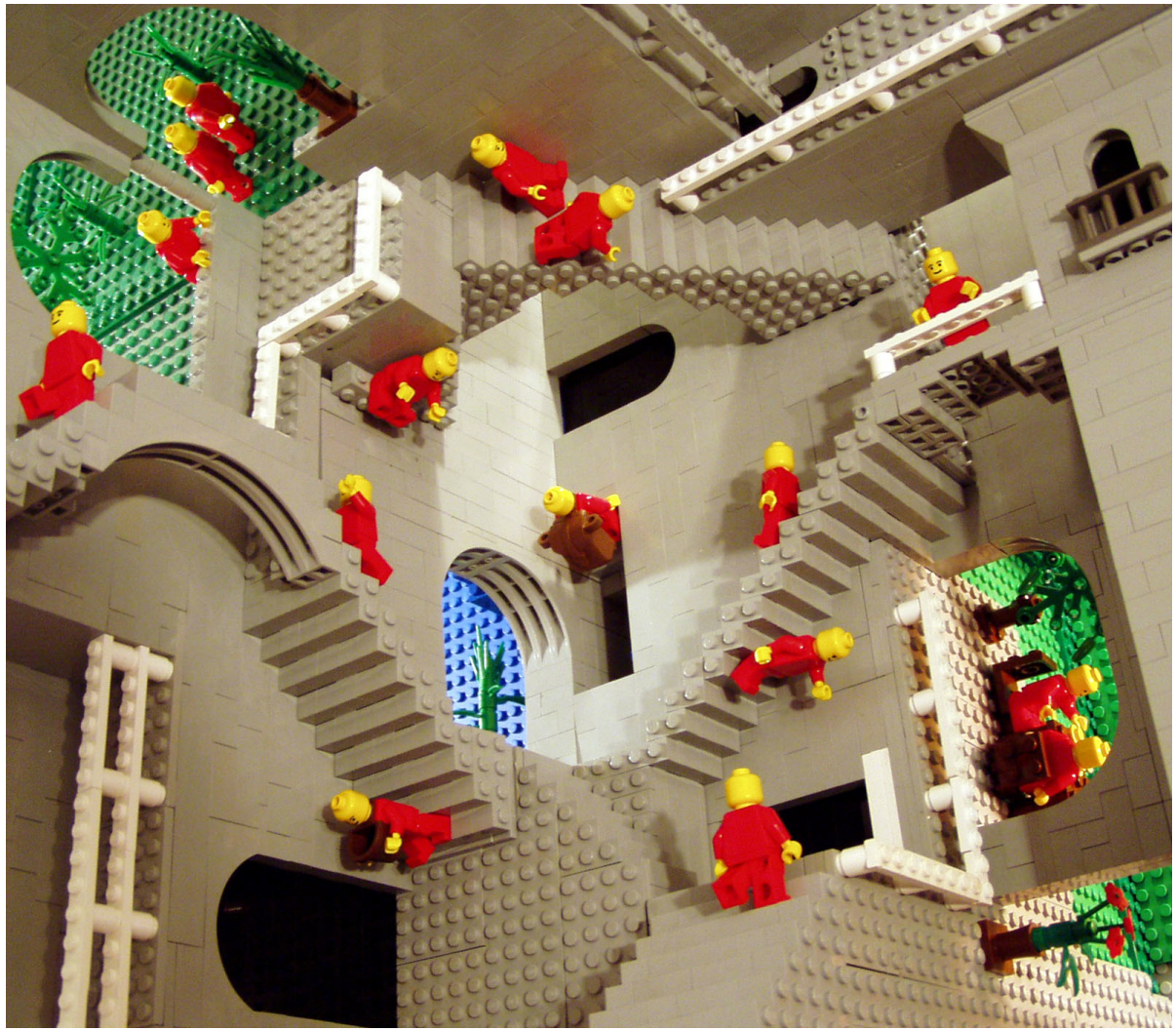

A long time ago in a galaxy not so far far away …

The Renaissance of the PTT

By the late 1970's the telco sector had reached its glorious peak

The Renaissance of the PTT

Some decades of careful planning and construction had resulted in:

- a fully funded and comprehensive infrastructure

The Renaissance of the PTT

Some decades of careful planning and construction had resulted in:

- a fully funded and comprehensive infrastructure
- massive margins
- an interlocking structure of monopolies
- control over offered services
- control over technology
- control over the regulatory sector
- control over the user

1980's - Sowing the Seeds of Decline

At the same time there were pressures being placed on these lucrative telco monopolies:

- the shift to digital switching technologies inside the telco network had reduced cost, but prices remained high
- prevailing high operating margins created strong investment pressure to open this activity to private sector investment
- public sector reluctance to continue to commit more public funds to capital investment in communications infrastructure

1990's - Deregulation of the Telco

- Progressive wave of deregulation and privatization of the telco sector in the late 80's
  - unbundling monopoly control
  - private sector investment
  - competitive carriers
  - competitive services
  - competitive suppliers

The Reaction to Deregulation

- Initial wave of competitive full service telcos
- But competition in full service telephony proved expensive and inefficient

The 2nd Reaction to Deregulation

- A second wave of specialized competition was directed at areas of high return or high vulnerability
- Unbundling the telco monopoly by competition in:
  - mobile telephony
  - long distance telephone
  - specialized data services

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The Rise of the Internet

- Entrance of the ISP as a Value-Added Data Service Provider
  - leased line capacity from the telco
  - use local phone network as the last mile access
  - add modems and IP routers
  - and connect up all those shiny new PCs that were entering the consumer electronics market
  - outsource service provision from the network to the customer's PC

The Internet "Opportunity"

The Internet exposed new market opportunity in a market that was actively shedding many regulatory constraints

- exposed new market opportunities via arbitrage of circuit offerings from the entrenched PTT operator
- presence of agile high-risk entrepreneur capital willing to exploit short term market opportunities exposed through this form of arbitrage
- volume-based PTT operators unable to redeploy capital and process to meet new demand
  - unable to cannibalize existing markets
  - unwilling to make high risk investments

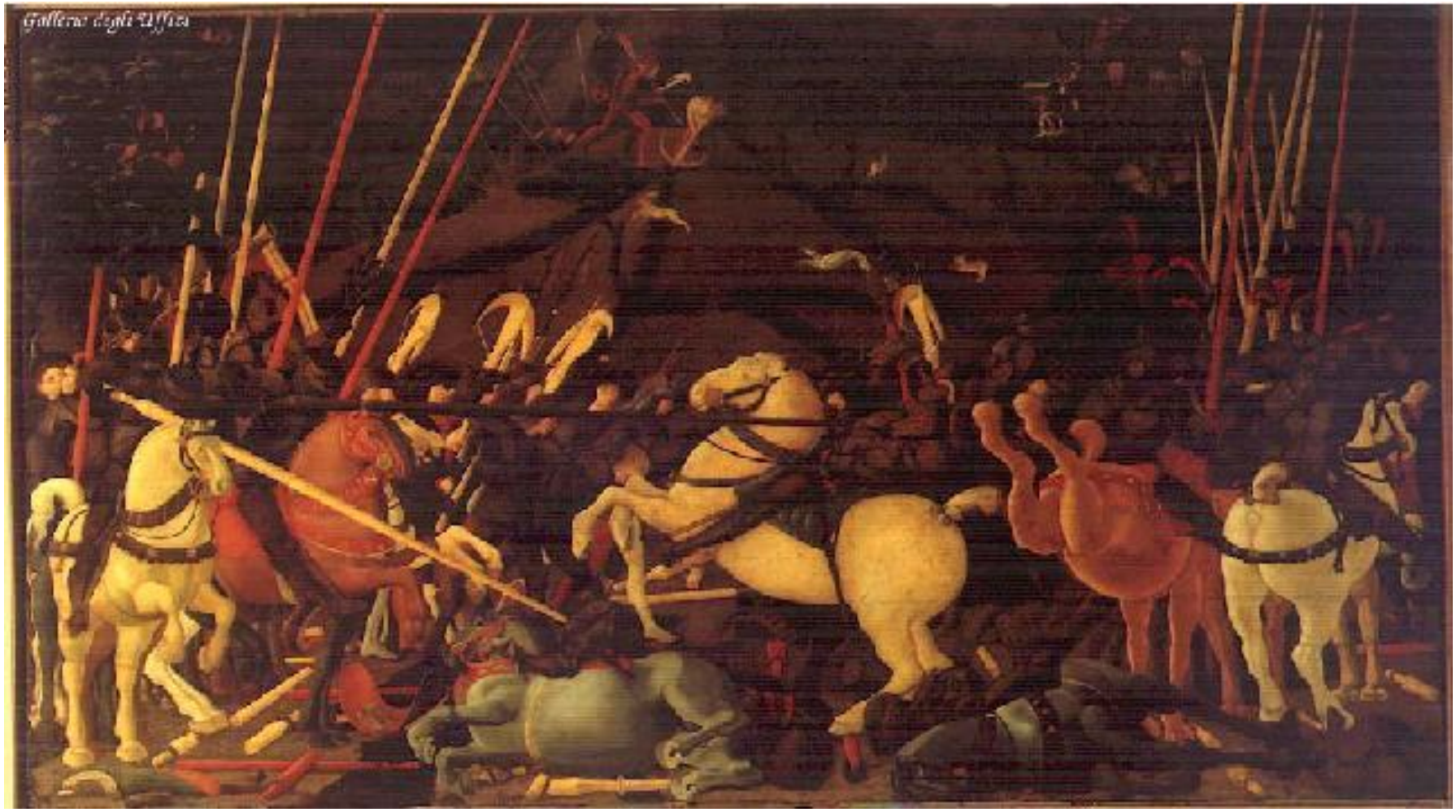
ISP Industry Drivers

- Unbundling, Competition and Optimism
  - specialized competitive opportunities created in every aspect of service delivery
    - access, platform, content, service,…
  - cost efficiencies of Internet service delivery expose other markets to competition
    - e.g. music, movies and television

The Rise and Rise of the Internet

- New markets to complement these basic access IP providers:
  - content providers
  - web portals and content aggregators
  - indexing and search engines
  - advertising
  - social networks
- Unbundling of the the original “vertically integrated full service model” to create an entirely new sets of industry players

The Cyberspace Tussle: “old” Telco vs the “new” Internet



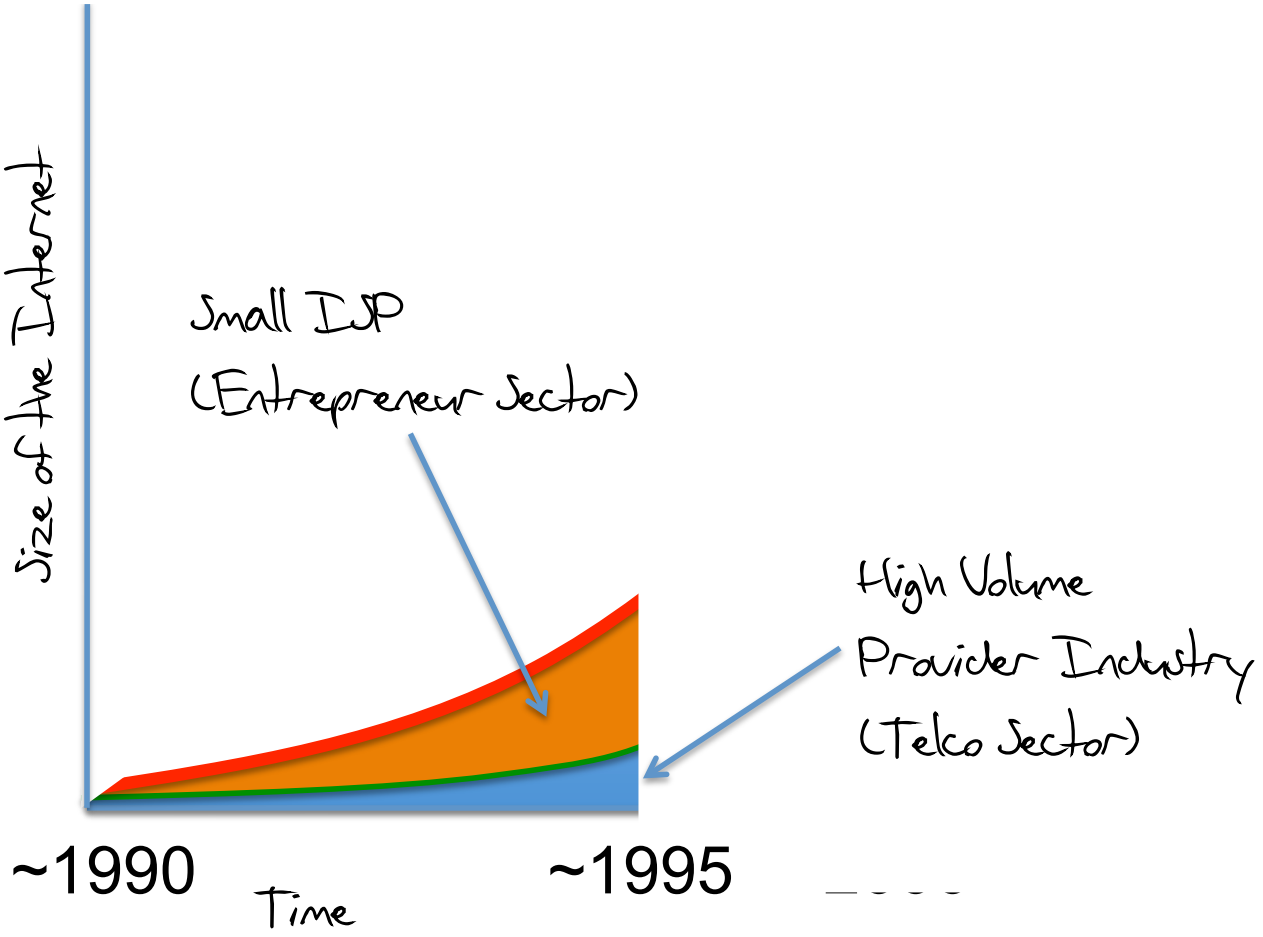
The Golden Age of the ISP

- The market for Internet services was moving faster than the telco's could react

  "The pace of new problems appearing is much faster than our ability to solve any of them"

  Telco Exec, Bell Canada, 1996

Internet Deployment



The Golden ISP Age

- The late 90's produced thousands of ISPs that were leveraged off cheap dialup access:
  - Cost of calls: $0
  - Cost of ISP infrastructure per customer: $200 or so
  - Value of the customer: $2000
  - Net Return: 1000% What a business! What a boom!

But …

But … we want more!

- Customers wanted even higher speeds and even lower prices
  - This was possible only through economics of scale in deployment of access infrastructure
- Small to medium scale ISPs were not positioned to undertake massive capital investment in infrastructure
- The emerging economies of scale said “Get big or get bought”

The DSL Evolution

- Telco shift to DSL access for IP
  - eliminate modem loads on the PSTN
  - eliminate dial-based overlay access from competitors
  - shift to an access technologies that required relatively small capital investment on the part of the telco with its existing installed infrastructure, but cut out the under-capitalized ISP competitors from the access market

A New Access Monopoly?

Reworking the access network requires relatively high level of capital investment

- investment risks are reduced if competitive access is eliminated
- returns are improved if vertical service bundling can be put in place to allow structural cross-subsidization
- “Triple Play” bundling with IP, Phone and IPTV appears in the access market

And then there's Mobility Mania!

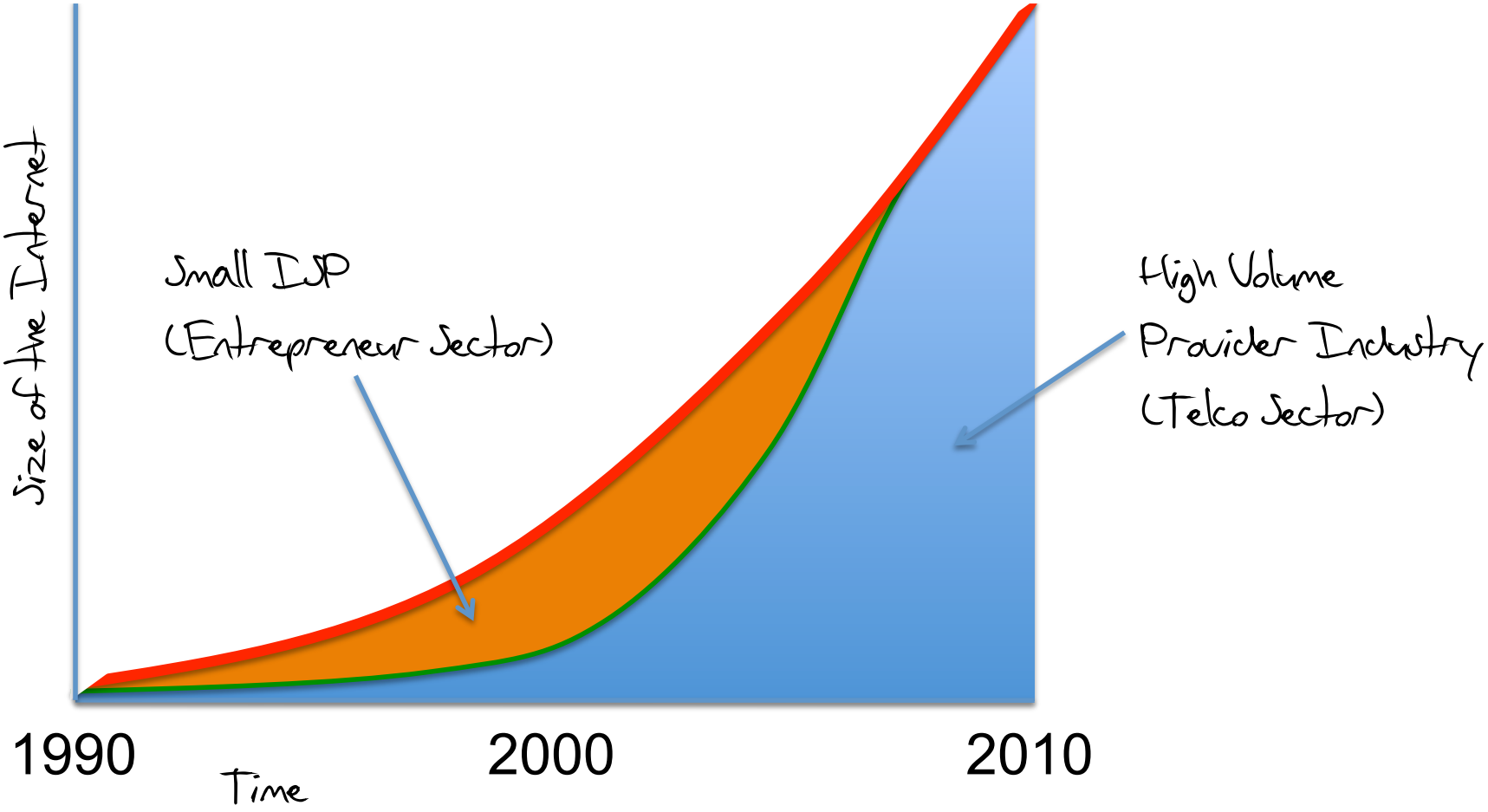
"Use of wireless broadband services mushroomed during the past year [2009] to reach more than 2 million subscribers, driven by the popularity of wireless modems and mobile devices such as the iPhone. The Australian Communications and Media Authority's communications report [for 2009] revealed the use of wireless broadband services jumped by 162 per cent in 2008-2009. … *Wireless broadband subscribers accounted for 25 percent of the number of Internet subscribers, up from 11 per cent in 2008*."

The Australian, Wednesday 13 January 2010

Today

- Economies of scale dominate this industry
- Large-scale providers are reasserting their dominance over the IP market

Internet Deployment



What should we think about this?

Are we comfortable with the re-bulking of this industry?

Are we happy with the reemergence of monopolies in a deregulated market?

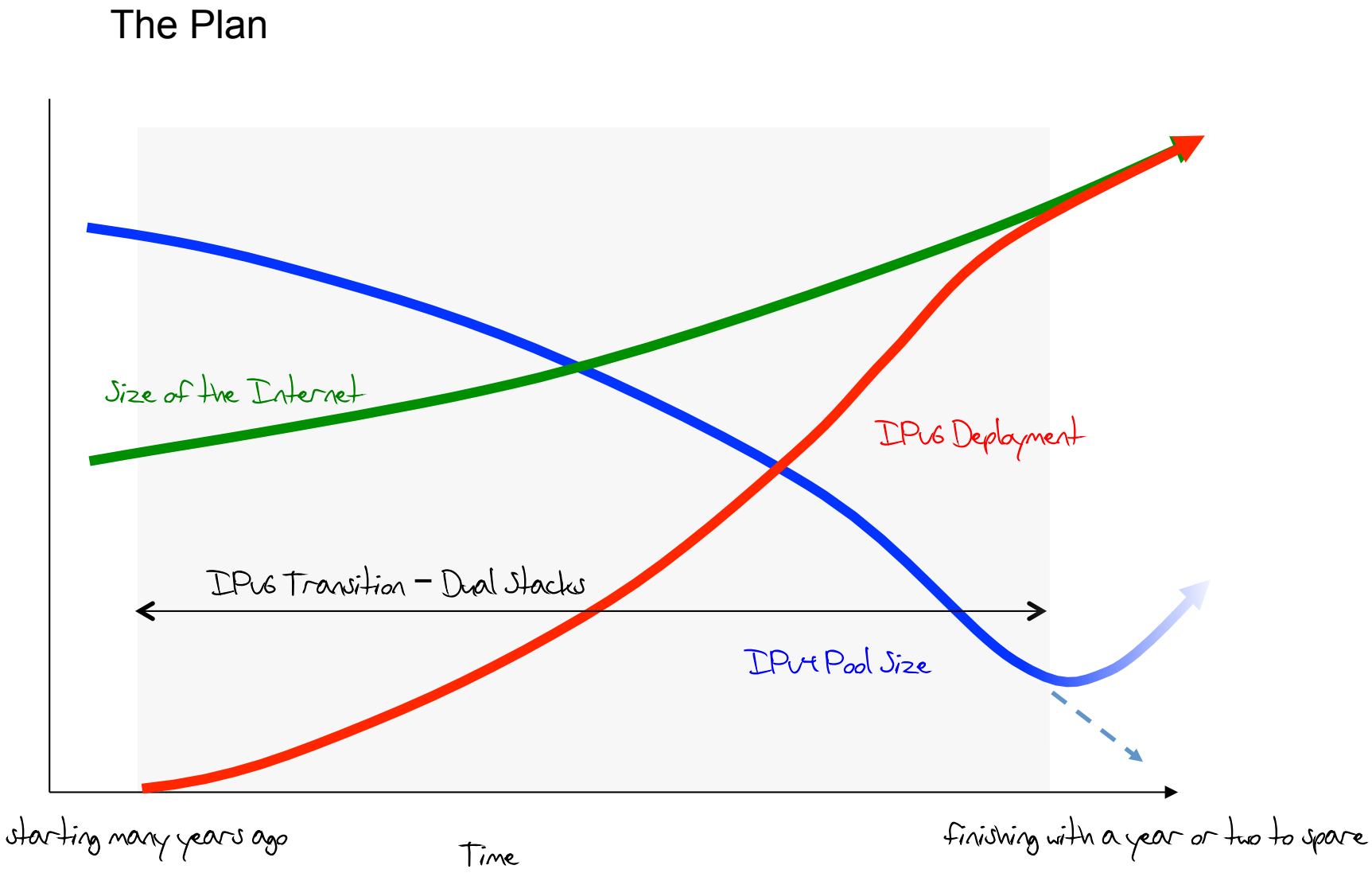
Public Risks of Monopolies

- Escalation of consumer prices
- Barriers to competitive access
- Barriers to technology and service innovation
- Rebuilding monopoly control over technology and services

What about the “Open Architecture” of IP?

- Scarcity of addresses in IPv4 is helping the push to vertical service integration
  - If you are an access provider, and what you want is to regain control of the entire IP service environment then:
    - NATs can be good
    - Application Level gateways are even better!
    - IPv6 is not good!
- IPv6 reopens the network to competitive overlays and overlay services, and potentially pushes back the access provider to a commodity packet pushing role

What about this transition to IPv6?



Where are we?

- We seem to be back to a familiar situation
  - a small number of players with a large footprint over the market
  - rising barriers to competitive access by new market entrants
  - increasing aspects of control over delivered services – “vertical integration” from telco operators is back in vogue in many markets
  - increasing resistance by the entrenched incumbents to any change that could open up the market to innovation and competition

Where are we?

The enterprises that dominate today's access and carriage activities in the Internet have no direct interest in making investments in a new protocol such as IPv6 that simply leaves the gate open for the continued provision of edge-to-edge overlay services that might recapture the Internet's major revenue streams

Market Theory

Is this IPv6 transition an instance of a *Market Failure*?

Individual self-interest on the part of the small number of large providers is not being directed to IPv6 adoption

The barriers to market entry prevent others from entering the market to provide IPv6 services

Nothing happens!

What questions should we be asking ourselves?

- How important is it to operate a capable and open infrastructure for the public communications sector?
- What is the appropriate balance between public sector direction and private sector activity?
- Where is the true value in communication: the carriage of the packet or its content?
- What do we want from the Internet?

A New Zealand Approach

“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

An Australian Approach

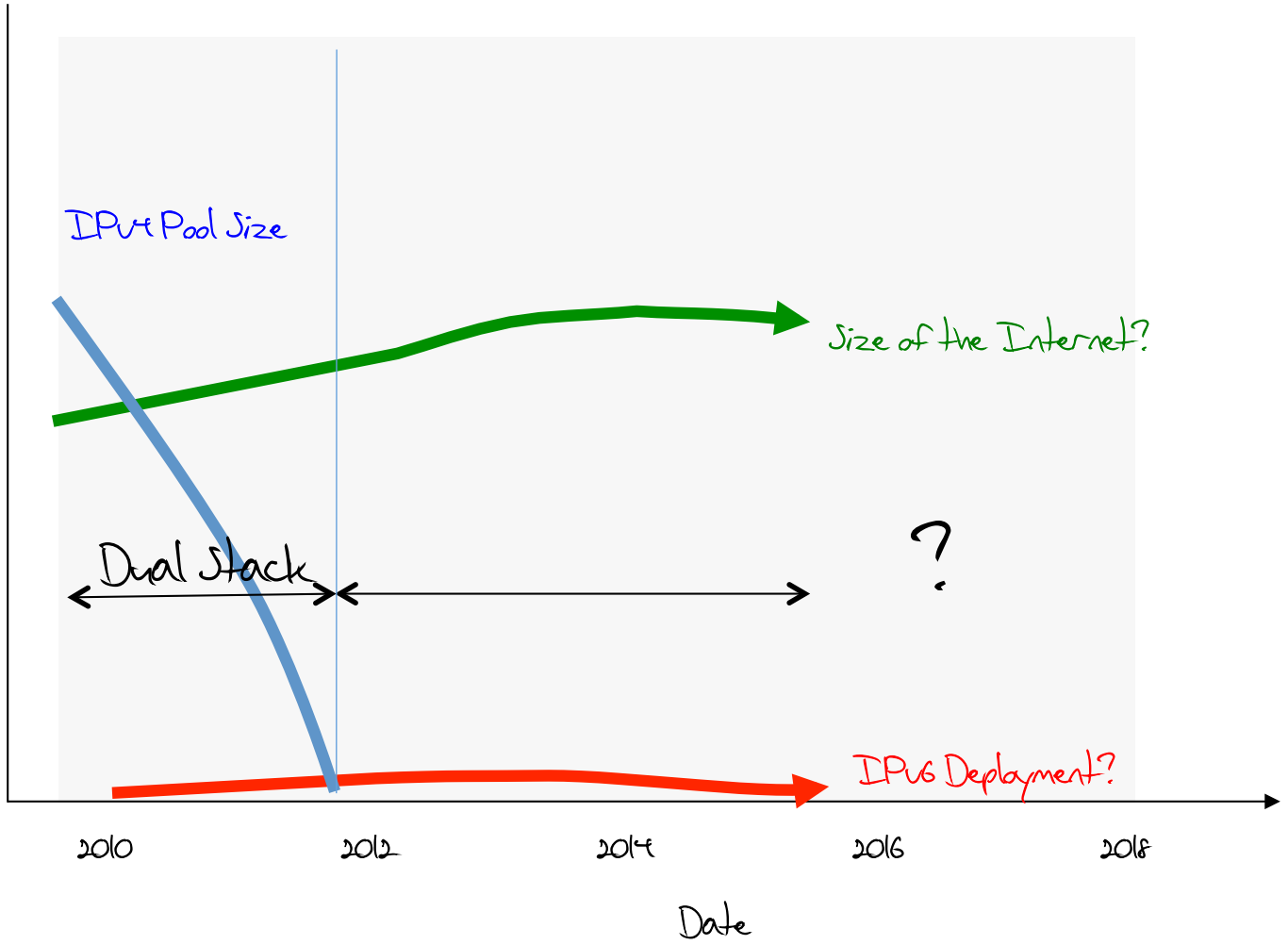
- The “National Broadband Network”
  - $ 43 billion of public funds ($2000 per capita)
  - FTTH for 90% of the continent
  - “neutral” national access network for data and voice
  - no more copper loop
- De-Fanging the telco
  - structural separation by legislation into retail and wholesale components
  - limits on 3G spectrum and content ownership

Striking a Balance

- There are very few industries where the private sector is entirely capable of looking after the public interest

- We now need robust active public regulatory frameworks that can support vibrant industry competition, fundamental innovation and maintain the enduring public value of our Internet

And if we get it wrong…



Actually, I lied ...

I mentioned IPv6, didn't I!

¡mis disculpas!

Thank You!