


The Internet, once not, but now,
of this world?

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Telecommunications in the 1950s



- Nation-state-based telephone companies
- One predominate service: voice (+ some “wires”)
- One quality: ‘toll-quality voice’
- Highly regulated – much revenue for country
- Interconnection via ITU rules

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ITU rules, 1st set – ITC (1865)

- ITU decisions made by country representatives
- Set pattern for future telephone rules
 - tariffs & settlements
 - technical standards
 - complaint process
 - protect state & morality
 - be able to stop messages that “*may appear dangerous to the safety of the State or which would be contrary to the laws of the country, public order or morality*”

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Meanwhile, in the 1960s

- Len Kleinrock: packet-based networks work
- JC Licklider: global data networks imaginable
- Larry Roberts: need to share scarce computers
- Paul Baran: best effort networks can be reliable



MAP 4 September 1971

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A rider not a builder

- The ARPANET, and the follow on Internet, rode on the telephone network
But were not services offered by the telephone companies
Internet service providers (ISPs) bought “wires” from telephone companies
- ISP routers interconnected these wires
ISPs not limited to a single telephone carrier or to a single country

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1980s

- Growing connectivity (hosts)
1969:4, 1984: 1,000, 1987: 10,000, 1989: 100,000
- Ethernet (1980) & TCP/IP (1983)
- Companies connect – driven by student experience at universities (post 1983)
- Dial-up connections common

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Inconceivable relevance

- Existing telecommunications world did not believe
 - E.g., IBM no-bid ARPANET router
 - no future in packet-based networks
- Conventional wisdom: best effort useless
 - Guaranteed QoS required
- Most connections low speed (dial-up)
 - No threat seen to telephone companies
- Thus, totally ignored by regulators including the ITU



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1990s

- 1991: WWW
 - Permissionless innovation
- Growing connectivity
 - Hosts: 1991: 376 K, 1999: 56 M
 - Countries: 1990: 31, 1997: 171
 - Users: 2000: 260 M
- "Always on" growing
- Still mostly ignored by regulators as "useless"
- The US did try to regulate Internet speech
 - The Computer Decency Act of 1996

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The importance of occasional chaos

- "What achieved success was the very chaos that the Internet is. The strength of the Internet is that chaos. It's the ability to have the forum to innovate"* S. Bradner, witness, CDA trial, 3/'96
- "Just as the strength of the Internet is chaos, so the strength of our liberty depends upon the chaos and cacophony of the unfettered speech the First Amendment protects."* Judge Dalzel, 6/'97

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Relative importance?

“The invention of the [...] is the greatest event in history. It is the mother of revolution.”

“In its [...] form, thought is more imperishable than ever; it is volatile, irresistible, indestructible. It is mingled with the air. ... Now it converts itself into a flock of birds, scatters itself to the four winds, and occupies all points of air and space at once.”

“A [...] is so soon made, costs so little, and can go so far! How can it surprise us that all human thought flows in this channel?”

Who said this about what?

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Victor Hugo: Hunchback

*“The invention of the **printing press** is the greatest event in history. **It is the mother of revolution.**”*

*“In its **printed** form, thought is more imperishable than ever; it is volatile, irresistible, indestructible. It is mingled with the air. ... Now it converts itself into a flock of birds, scatters itself to the four winds, and occupies all points of air and space at once.”*

*“A **book** is so soon made, costs so little, and can go so far! How can it surprise us that all human thought flows in this channel?”*

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The Internet in the 1990s

- Doubling annually
- Exploding in mindshare
- But still no meaningful regulation
 - FCC explicitly declined to regulate
- From inside the net you could not see national borders
 - i.e., it was **cyberspace**, and looked like it was not of this world




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Managing cyberspace in the 1990s

- Internet technology did not require centralized management
- Bilateral agreements between ISPs defined connectivity & architecture
- Services rode on top of Internet
Like Internet rode on top of telephone networks
- Two exceptions: IP addresses & domain names

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IP Addresses

- Blocks of addresses assigned to independent regional Internet registries (RIRs) by IANA
Internet assigned numbers authority
i.e. Jon Postel 
- RIRs independently developed assignment policies
Community-based policy development process
IETF approved global policies 
No government involvement 



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Domain Names

- IANA, under US government contract, delegated operation of top level domains (TLDs)
E.g., .com, .net, .us, .jp
- Commercial TLD delegations directed by US
- Country code delegations done by IANA alone
Generally first come, first got
- IANA also managed "root zone"
List of TLD delegations in a US government-run root zone server ("the A root")
12 other Root name servers retrieve zone from the A root

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“Shine perishing republic”

- The brief reign of the republic of cyberspace
- *A Declaration of the Independence of Cyberspace* – John Perry Barlow – 1996
“Your legal concepts of property, expression, identity, movement, and context do not apply to us. They are all based on matter, and there is no matter here..”
- ‘the Internet will get rid of countries’ – participant, *International Forum on the White Paper (IFWP)* – 1998

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Cautionary Vignette

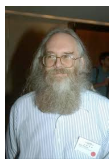
- NET '97 - Kuala Lumpur
- ISOC Developing Country Workshop



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The beginning of the end

- Jan 1998 – Jon Postel “redirected the root”
Asked the root server operators to retrieve zone from his server (instead of the government run one) - and 10 did



“The Internet”

VS.



VS. “The Government”

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Aftermath

- Ira Magaziner threatened to send in the Marines (literally)
- Jon relented after a short while & ICANN was formed soon after
With strong "guidance" from the US Government
- ITU redoubled efforts to gain control



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Illusionary interregnum

- Cyberspacers were filling a regulatory vacuum with imaginary structures
- There are still cyberspacers out there
- But so are the ITU, national regulators & the copyright industry
- And users, money, the Arab Spring, "confused citizens" and the NSA

2.4 B users – 1/3 of world population 3.4% of GDP of 13 developed countries



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The Internet is now far too important to leave it to the people that know how it actually works

The party is over (for most it never started)
Update: maybe and maybe not . . .

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I* meeting

- ISOC, ICANN, RIRs, IAB, IETF & W3C CEOs & chairs
- Met in Montevideo the week of Sept 30, 2013
“expressed strong concern over the undermining of the trust and confidence of Internet users globally due to recent revelations of pervasive monitoring and surveillance”

...

“called for accelerating the globalization of ICANN and IANA functions, towards an environment in which all stakeholders, including all governments, participate on an equal footing”

Brazil

- Brazil announced it would hold an Internet governance meeting in 2014
 After the President met with the ICANN CEO
- Specifically, a multistakeholder meeting



Brazil President Dilma Rousseff



ICANN CEO Fadi Chehade
