What infrastructure is needed for positively disruptive technology
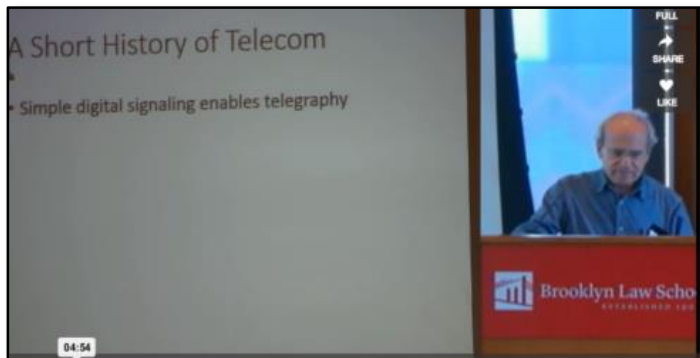
The Internet as a Discontinuity

The Internet is a discontinuity from the tradition of tele-communications. In order to understand this transition we need to think about the very words we use. Traditional telecommunications providers are in the business of communicating on our behalf.

The Internet is very different. We speak for ourselves and don't depend on third parties to carry our messages. We only ask for their "best efforts" to maintain our infrastructure.

This represents a challenge for our telecommunications policies that are operate on the assumption that we need a regulator to ensure that we can communicate.

In this talk (November 11, 2014, ISOCNY) I explain how the Internet represents a fundamental departure from that tradition and ask how our policies and legal precedents can be brought into alignment with this new reality.

Our New Infrastructure

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ISOC/NY November 11 2014

A Discontinuity from the past

- Intelligence and value are no longer inside the net
  - How did it happen and why does it work so well?
- Understanding is key
  - The Web is not the Internet
- Neutrality addresses control of the pipe
  - Need to look beyond neutrality

More Internet!

How do we get more of the secret sauce?

The Paradigm has Shifted

- How does the legal system deal with paradigms shifting?
- Current policies
  - Just like policies for 19th century railroads
  - Assume content (and value) is inside pipes
  - Based on promises and enumerated services

Jabberwocky BY LEWIS CARROLL

'Twas brillig, and the slithy toves
    Did gyre and gimble in the wabe:
All mimsy were the borogoves,
    And the mome raths outgrabe.

"Beware the Jabberwock, my son!
    The jaws that bite, the claws that catch!
Beware the Jubjub bird, and shun
    The frumious Bandersnatch!"

He took his vorpal sword in hand:
    Long time the manxome foe he sought—
So rested he by the Tumtum tree,
    And stood awhile in thought.

And, as in uffish thought he stood,
    The Jabberwock, with eyes of flame,
Came whiffling through the tulgey wood,
    And burbled as it came!

One, two! One, two! And through and through
    The vorpal blade went snicker-snack!
He left it dead, and with its head
    He went galumphing back.

"And hast thou slain the Jabberwock?
    Come to my arms, my beamish boy!
O frabjous day! Callooh! Callay!"
    He chortled in his joy.

'Twas brillig, and the slithy toves
    Did gyre and gimble in the wabe:
All mimsy were the borogoves,
    And the mome raths outgrabe.

"When I use a word," Humpty Dumpty said, in a rather scornful tone, "it means just what I choose it to mean - neither more nor less."
"The question is," said Alice, "whether you can make words mean so many different things."
"The question is," said Humpty Dumpty, "which is to be master - that's all."
Through the Looking Glass.

We communicate using words but the meaning is not inside the words.

Now let's go down the rabbit hole

The Internet is a New Paradigm

- Value comes from using available facilities
- Value is in the whole
- Must discover what we can imagine and achieve

A Short History of Telecom

- Simple digital signaling enables telegraphy
  - Telegrams as freight like railroads
  - Telegrams carry speech (in-band)
- Language elides terms
  - "Radio" is now just music and talk
  - We "communicate" using telegrams

The Talking Telegraph

- Solving Analog telephony
  - Distance became difficult (and expensive)
    - Dependent upon carriers to keep speech intelligible
  - Solutions: Digital encoding of speech
    - Still assumed meaning was inside the network
- Distance became cheap
  - And MCI ate ATT
  - Misdiagnosed as Retail/Wholesale structural separation

Software eats the world

- Computers AKA "Intelligent" Devices
  - Ran wires between them to exchange packets of bits
  - Even better using wireless packets (as in ALOHAnet)
  - Program around lost packets and other problems
    - No wired/wireless distinction!

Going Global & Doing it Ourselves

- Interconnecting disparate facilities
  - Only point of commonality was packets
  - Make (wires) or buy (leasing) as an engineering tradeoff
    - Packets represented an existential threat
    - Common Carrier forced them to carry the packets anyway
  - Learned how to deal with lost packets and constrictions
- Result
  - Common technique for sharing unreliable medium (TCP)
  - Raw packets for better never than late

A Short History of Broadband

- Community Access TV (CATV)
  - Shared Antennas to relay broadband video
- Originally just relayed over the air
  - Owners found new ways to use *their* coaxial cables
  - Phone companies repurposed their copper w/ADSL
- Broadband (new meaning) was a FAT pipe
  - Owned by providers for *their* services.
    - Services like telephony and meter reading
    - Interactive TV, HBO, CNN, ... and "Internet"

One Infrastructure Two Interpretations

- Different ways of using the same facilities

  - Telecommunication
    - Owner has exclusive control over pipes
    - Enumerated services
  - Internet
    - A way we use any available facilities
    - Discover what is possible

- Only seem the same through very fuzzy glasses

Current Policies are for Telecom

- Assumptions – The owner
  - Has exclusive control
  - Value is in owning the facilities
  - Uses facilities to create (profitable) services
  - Offers promises.
- High capital costs and Little Differentiation
  - A facility for each kind of service
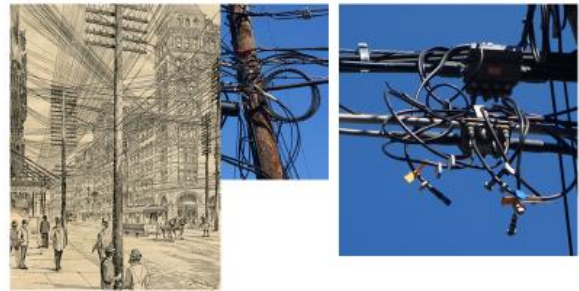- Regulate enumerated services (ICC, FCC)

Traditional Telephony

- Every element in the network exists solely for voice
  - Voice works if and only if everything is just right
  - *That control means a provider can charge for voice.*

- The service is defined by the network
  - A call is "complete" even if no one answers!
  - Network defines quality – all or nothing

Today's Broadband

Finding our Voice (over IP)

- Couldn't assure sufficient resources in early 90's
  - But web provided reason for increasing capacity
- Discovered voice worked often
  - And so did video … often is better than never!
- Users defined quality
  - Call was only complete when user was happy!
- Network provided wasn't involved
  - So couldn't charge for added value
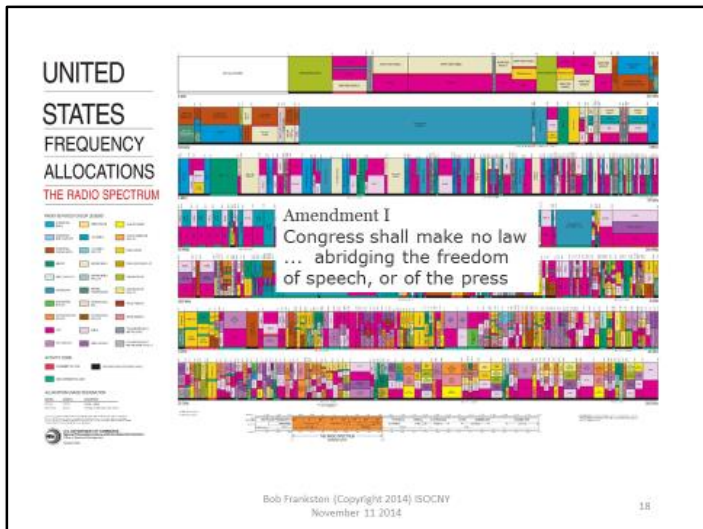- Implementation is M2M! (It's always been IoT)

The problem with Broadband

- Natural monopoly like electricity
  - Content is no longer inside the pipes
  - So no freight or intrinsic value like electricity
  - And we don't need pipes to contain bits
- This is not a sustainable business model
- Alternative
  - Funding as common infrastructure
  - Not "Utility" in that there is nothing to meter

UNITED
STATES
FREQUENCY
ALLOCATIONS
THE RADIO SPECTRUM

Amendment I
Congress shall make no law
... abridging the freedom
of speech, or of the press

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For More ...

- Bob Frankston
- http://Frankston.com
- http://rmf.vc/BeyondNeutrality

New Policies for a New Paradigm

- Value is created using facilities
  - Services are created outside by users
  - No promises but lots of opportunity
- Facilities are (relatively) passive
  - "Infrastructure" rather than "Utility"
- FCC ➔ Department of Connectivity
  - ICC ➔ Department of Transportation
  - Indifference rather than Neutrality

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Future of "Cable"

- Content business separate from facilities
  - Netflix, YouTube, Hulu, Skype etc.
  - Time-Warner spun out TWC
  - Comcast shifts to becoming NBC Universal
- Standalone "cable" (AKA Broadband)
  - Problematic business => Infrastructure
  - Avoids inherent conflict of interest
  - Comcast wouldn't need TWC if level playing field
- Cable becomes content brokering

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