

# Beyond P2P: Liquidity and Virality

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# Platform Network Theory (Reed's Law)

*Nets host relationships:* platform networks create value by options to affiliate, forming persistent groups

Platform networks want to partner: open interconnection between nets create "excess" affiliation options that transcend boundaries

# The Net Invites *Virality*

Consider:

Answering Machines, Texting

PlanetLab, Skype, Facebook

Sudden emergence of a new global-scale phenomenon

3 defining properties of a viral system

Can scale without bound, and does

Very small incremental cost to scale

Disproportionate returns to scale

# The Viral Host

Virality exploits resources of its host

Contributory participation

Peer-to-peer (edge-based) architectures: Skype

Contribute to join: PlanetLab

Value shared with users, who then repay host

Ubiquitous availability of resources

Facebook (and Skype)

Minimal cost, high “potential” valuation payoff to creator

# Facilities as Albatross

Facilities *are already* commoditized

Amazon Web Services:

Simple Storage Services: \$0.15/GB-Month

Electric Computing Cloud: \$0.10/VM-hour

Payments Service: 2.9%+\$0.30/payment

Users *will not tolerate* lockin to facilities based provider

# The Net is now *Function Liquid*

Where to store?

Where to compute?

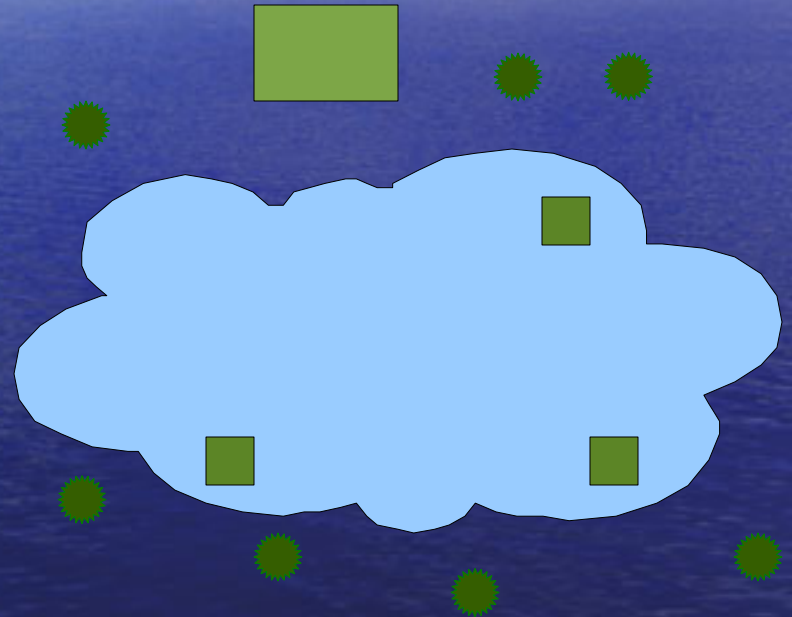
How to communicate?

How to search?

How to authenticate?

How to charge?

*Endpoint, edge, server,  
hybrids*



# Viral Growth and Evolution

The viral system overlays an enhanced network on the old host

Viral overlay's created value grows with scale, increasing incentives to join

Viral systems compete for ecological niche: Facebook vs. MySpace vs. LinkedIn

Facebook: 90+% of freshmen active in 1 year.

Facebook becomes a platform for commerce

# The Network Mirrors of “Us”

What was the Facebook host?

The social fabric

Re-engineering a global financial enterprise by discovering its hidden networks and exploiting them virally

Principle: networks grow by mirroring each other

Facebook application Causes – a new viral network spreads



# Identity is Relative: Networks of You

*The endpoint is the center of its network*

What matters is personal, not fixed

Relationships drive connectivity, not vice  
versa

Users evolve the sharing and connectivity

# Awareness and Coordination

We are social, cooperative spiders, building our own webs

We don't send or receive

We coordinate through awareness

A web of stability, of action, of change

# We are cooperative spiders

OLPC mesh network creates “last mile”

But it also is a “web” extending out from the self

Use it to create social and applications glue

Polychronis Ypodimatopolous – constant “presence awareness” in the mesh around us

# Truly “Cognitive” Networking

Make our devices sense the devices of others

As we interact, build model of the interaction occurring

Nadav Aharony: a truly “cognitive” social network

# Integrating a community of people and devices

- Make networks that support mobile community members with stable and persistent relationships
- Multiconnected users, devices
- Applications span heterogeneous technology
- Most applications are *configurations*

# Attributes of Network

- Mobility: ends move (frequently, not always rapidly)
- Awareness: ends sense, and adapt
- Accomodating: environment accomodates new ends easily
- Transport independent: minimize dependency on specialized transport network functions

# Concerns to ensure

- Heterogeneous in function
- Heterogeneous in implementation
- Evolvable/futureproof
- Composable devices/functions/...
- Safe and respectful (rather than secure)
- Sharing/multiplexing is controllable

# Ends, not boxes

- Ends exist in boxes but are not boxes
- Multiplexing ends in boxes
- Ends virtualize boxes
- Ends virtualize people, too: personas are ends



# Focus on persistent groups

- Applications are persistent groups of ends
- Maintain group independent of connection
  - virtualize
- Facilitate group evolution (add drop ends)

# Focus on coordination

- Many events are of interest to a variety of devices, based on context
- Network exists to distribute event notifications
- Internetworked publish subscribe protocols:  
event = {producer, topic, consumer, timestamp, message} [where producer, topic, consumer are unique Ids or names]

# A new hourglass

- Above the neck:
  - Define groups and semantic meaning
  - Define policies and negotiate control
  - Respond to events and adapt to context
- Below the neck:
  - Signaling events to interested ends
  - Group routing and coordination
  - Sensing ends, sensing end context
  - Limiting scope and damping effect