

# The Third Cloud

## New social contexts for safety

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# Agenda

Reed/Lippman: Social, Mobile Communications in  
Public Spaces

The Third Cloud

Architecting Social Safety



# In the Public Spaces of the Future...

People will be:

- more aware of their context
- well connected, directly with each other

People will need:

- To feel safe
- to establish trust with familiar strangers
- To share and collaborate with their neighbors



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# Communications value chain redefined by hypermediation

Communications platforms provide and  
enhance group context

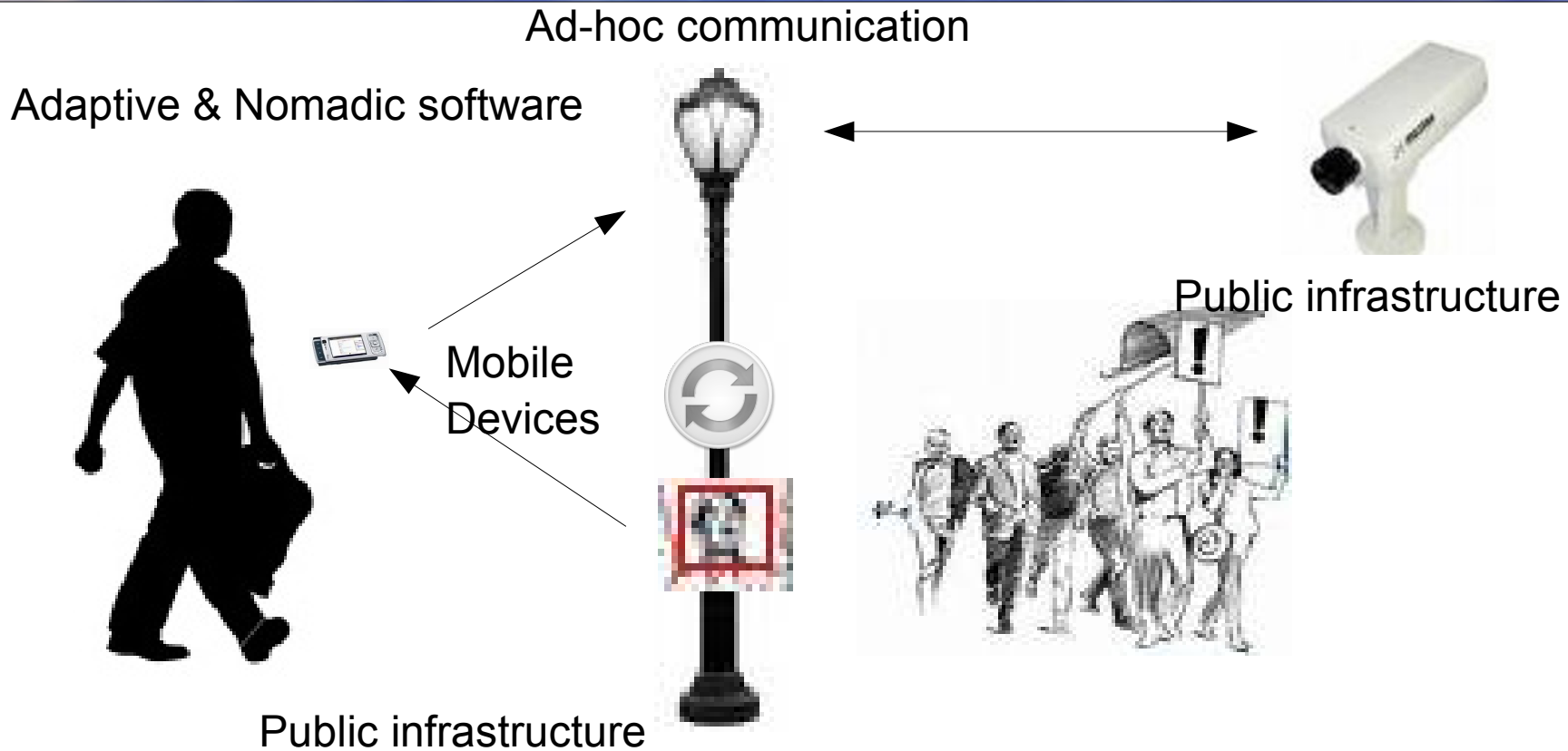
Transactions, Awareness, Search,  
Persistence, Resilience become  
essential platform elements

Value chain embodied in the cloud via  
mediated business arrangements

Resources become liquid, public, shared



# Structural Components



# Primary Communications Functions: Awareness and Coordination

We are social, cooperative spiders, building our own webs

We don't send or receive

We coordinate through awareness

There is no “I”, there are many “we's”

# New relationships emerge

Interaction is core to the public space:

Transactions, marketing, services

Public/shared resources, private goals

New relationships, new rules: safety,  
ethics, ...



# Opportunity

Create a public infrastructure for mobile citizens and customers

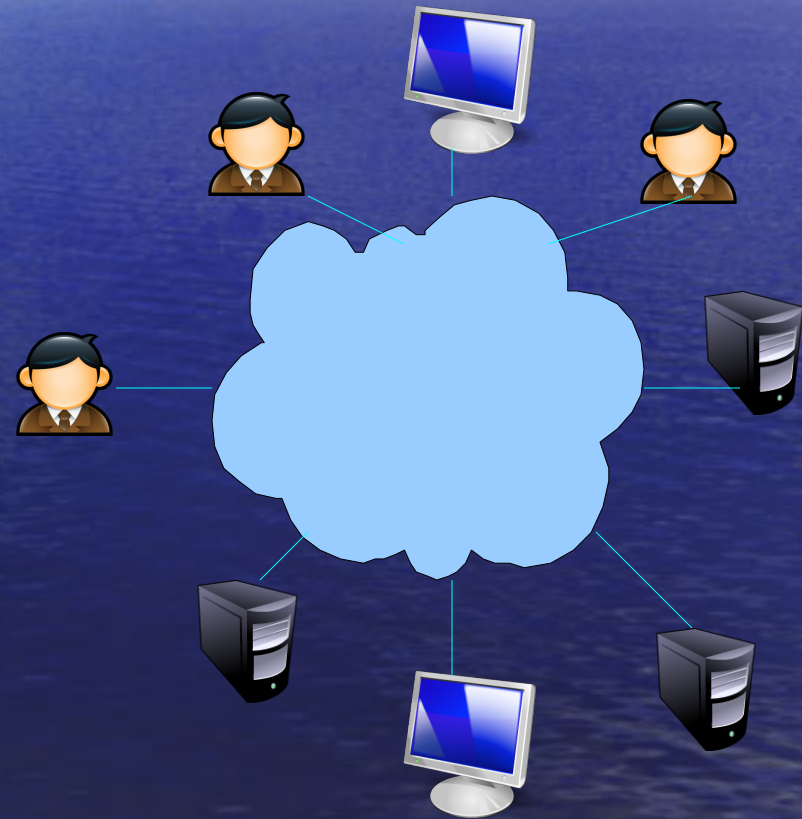
Understand the mechanisms of local cooperation, sharing, and commerce

Transform the local village in the same way that the Internet transformed the global village



# Sharing the transport: Internet

- Tele- is the problem to solve
- Resources are fixed – servers, people, content
- Transporting bits faster, farther, cheaper



# Sharing computing services: Cloud computing

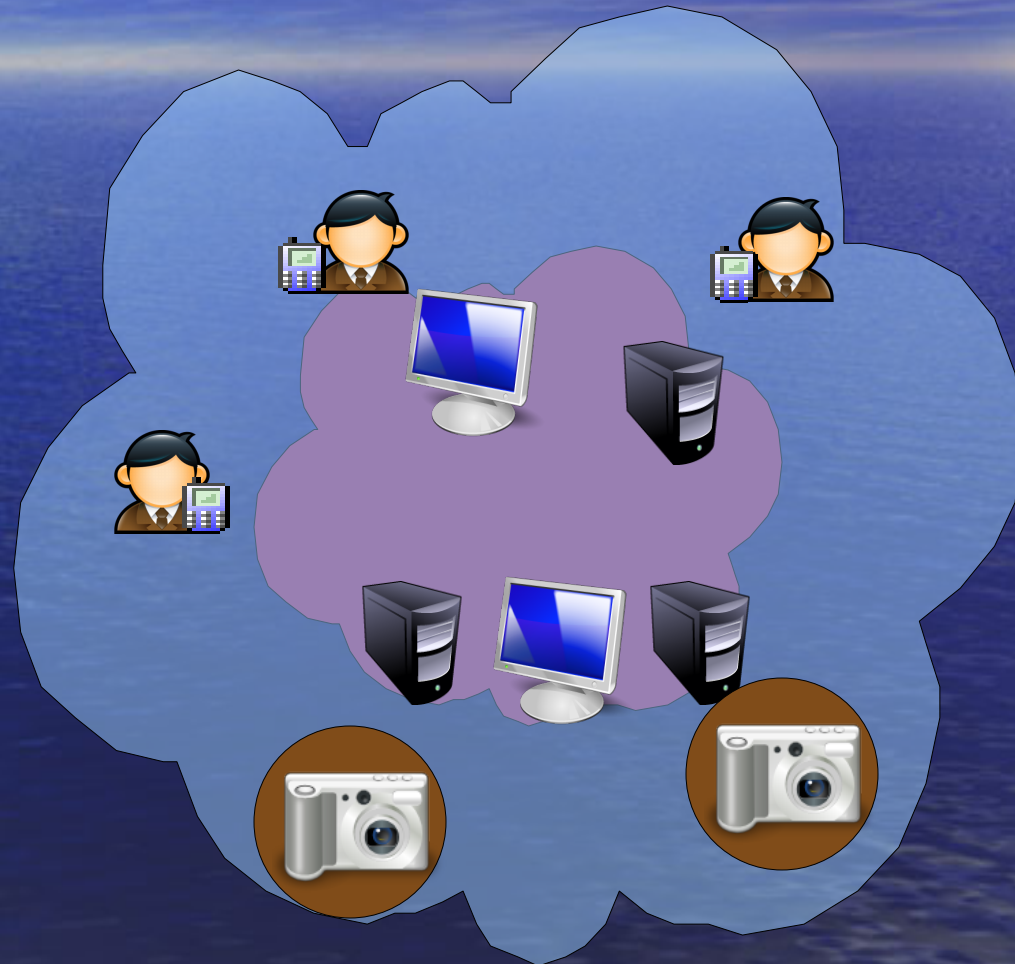
- Web 2.0
  - Mashups, YouTube
- Social networking
  - Facebook
- MMORPG
  - Blizzard Games
- Online Collaboration and Simulation
  - Second Life





# Sharing interaction services

- Location
- Identity/Relation
- Privacy/safety
- Resiliency
- Sensing/capture
- Interaction/expression
- Computing
- Glue (comms)



# The Third Cloud

- Cloud 1: The Internet – a universal communications “utility”
- Cloud 2: A universal computing service “utility”: “Cloud Computing”, Web 2.0, Software as a Service, Everything as a Service
- Cloud 3: A universal local human interaction and sharing “utility”



# Creating a common platform

- Communications embedded in context
- Enabled by identity
- Centered around awareness and discovery
- Cooperative use of common resources
- Negotiation
- Standard programming interfaces (APIs)
- Standard protocols for negotiation

# Technical challenges: radio

- “universal radio” - interoperability with everything at the physical layer.
- Radio-based awareness – use every observable signal to build context and connectivity
- Radio secrecy – limit what can be discovered without permission
- Approach: multi-radio, asymmetric SDR



# Technical challenges: safety and privacy

- Intimate information spanning multiple devices and owners – provide virtualization and multiplexing solutions
- Information accountability – ensure that devices we use are accountable for what they do to the users and groups affected
- Approach: auditable, secure virtual elements, mathematically secure protocols

# Technical challenges: easy to use, understand, control

- Applications span devices and architectures
- Users depend on elements and systems that they did not build or buy
- Developers create applications that must work on combinations of platforms
- Approach: common high level expressive “language”, UI that represents that language directly



# Approach

- The Amulet
- The Crowd
- The Neighborhood
- Social Dashboards
- Open collaborative community outside MIT that builds on this (Open Source?)

# The Amulet

- In-pocket computing and wireless communications device
- Secure mediation of identity
- Organizes and establishes personal context
- Composes ambient computing systems
- Multiple radio -> software adaptive radio
- Parasitic on environment for interaction, computing power, storage, resiliency



# The Crowd

- Each person at the center of his/her own networks of *relationships*
- Relationships are “real-time” and “persistent”
- Cooperation based in, **requires** instantiation of relationship

# The Neighborhood

- Devices that support “amulet-based” interaction (screens, controls, cameras, ...)
- Multiplexed, virtual, context-creating



# Architecting social safety

## Key problems:

Action is not information

Assistance creates dependency

Freedom implies responsibility

Service implies accountability

Beyond *information* accountability:  
action accountability

# Social Safety, Neighborhood Safety

What makes a city feel "safe"? Be "safe"?

Trust is a verb

Trust is collective

Norms are important



# Some candidate principles?

Publicity beats privacy

If an act can be public, do it in public

Privacy is respected

Avert your eyes, don't record, don't rat on friends

Support others, and reward support

Reveal your intentions and signal honestly

Punish dishonesty

# Evolving “common carriage”?

Providing service to others (especially essential ones) -> tort rules against exploitation

Safety = not being exploited by one's neighborhood

Joint interest in “safety” (not national, not local, but collective).



# Low level assistance easier to regulate/structure

Carry my bits vs. carry out my intentions

Run this program vs. answer my question

Why? Difficulty of interpreting intention

# The "Social Dashboard"

Show user what's  
happening

Allow user to  
manipulate  
meaningfully

Multiple Dashboards





# Elements of “virtualization” and “multiplexing” interactions

Helping vs. being helped - duality

Does “deep packet inspection” lead to “deep VM inspection”?

When does a neighbor “impose” too much in asking for help?

What is the business model of a flowerbox?

Can monetary exchange capture local cooperation?

# New “common carriage” units

Virtual Machine – Run on behalf

Virtual Content – Store in cloud

Virtual Network – Establish configuration

Virtual Display – instantiate

Virtual Sensor – observe through

These are the “units of behavior” - creating  
an aura for individuals and groups



# Conclusions: safety in clouds

Structure the interactions

Establish norms and principles

Ensure observability